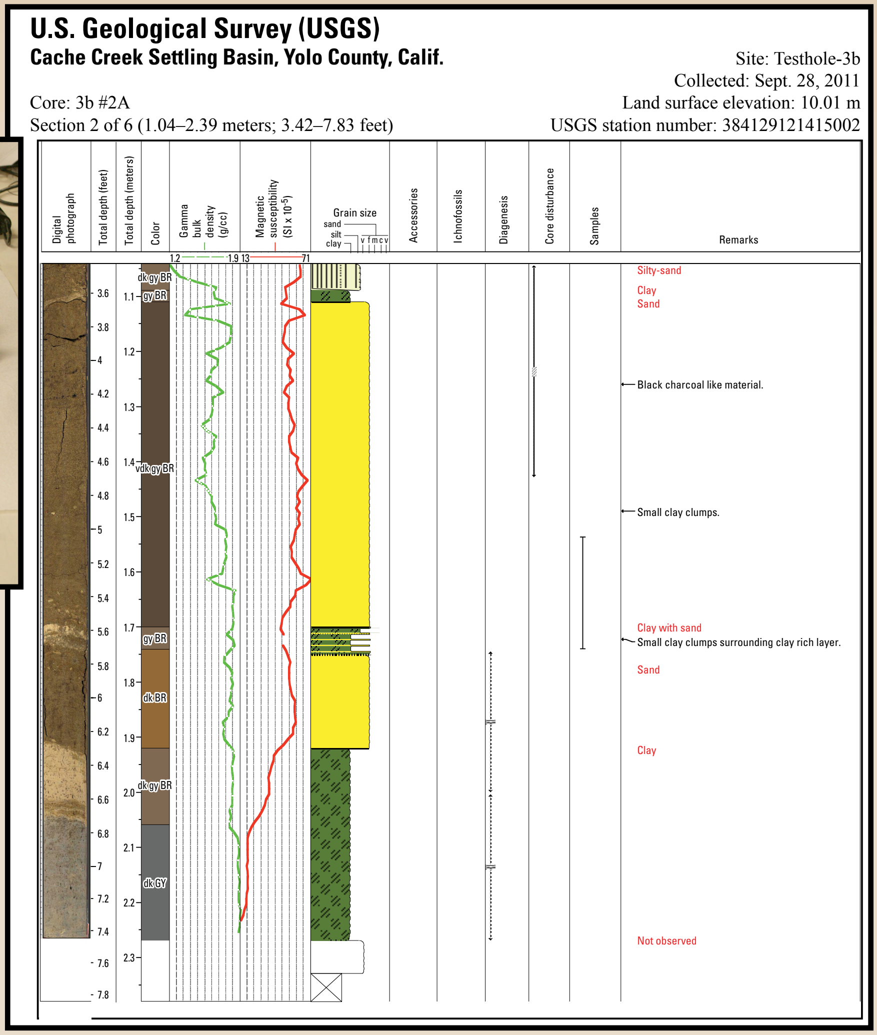
Prepared in cooperation with the California Department of Water Resources

Geochemistry of Mercury and Other Constituents in Subsurface Sediment—Analyses from 2011 and 2012 Coring Campaigns, Cache Creek Settling Basin, Yolo County, California



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Left. Drilling operation, Cache Creek Settling Basin, Yolo County, California, August 2012.

Center. Laboratory sub-sampling of core section 15b #2A from Cache Creek Settling Basin, Yolo County, California, December 14, 2012.

Right. Reprint of graphical core log for core section 3b #2A from Cache Creek Settling Basin, Yolo County, California.

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U.S. Department of the Interior
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Conversion Factors

International System of Units to U.S. customary units

Multiply	By	To obtain
	Length	
centimeter (cm)	0.3937	inch (in.)
millimeter (mm)	0.03937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
	Area	
square kilometer (km^2)	0.3861	square mile (mi^2)
	Volume	
cubic centimeter (cm^3)	0.06102	cubic inch (in^3)
	Mass	
gram (g)	0.03527	ounce, avoirdupois (oz)
	Density	
gram per cubic centimeter (g/cm^3)	62.42	pound per cubic foot (lb/ft^3)
	Radioactivity	
becquerel per liter (Bq/L)	27.027	picocurie per liter (pCi/L)

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

$$°F = (1.8 \times °C) + 32.$$

Datum

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

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

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

Supplemental Information

Activities for radioactive constituents in water are given in picocuries per liter (pCi/L).

Acronyms, Abbreviations, and Chemical Notation

Bi-214	bismuth isotope with atomic weight of 214
BrCl	bromine monochloride
CCSB	Cache Creek Settling Basin
CFR	Code of Federal Regulations
CGPS	Continuous Global Positioning System
CMGP	Coastal and Marine Geology Program
CRM	certified reference material
Cs-137	cesium isotope with atomic weight of 137
Fe	iron
Fe(II)	acid extractable ferrous iron
$Fe(III)_a$	amorphous (poorly crystalline) ferric iron
$Fe(III)_c$	crystalline ferric iron
GPS	Global Positioning System
Hg	mercury
Hg(II)	mercury (II) (mercuric, divalent oxidation state)
keV	kiloelectron volt
LDPSA	laser diffraction particle-size analyzer
LOI	loss on ignition
MDL	method detection limit
MeHg	methylmercury (monomethylmercury)
MS	matrix spike
MSCL	multi-sensor core logger
NGS	National Geodetic Survey
Pb-210	lead isotope with atomic weight of 210
Pb-214	lead isotope with atomic weight of 214
PRL	practical reporting limit
QA	quality assurance
Ra-226	radium isotope with atomic weight of 226
RL	reporting limit
Rn-222	radon isotope with atomic weight of 222
RPD	relative percentage difference
RPDEV	relative percentage deviation
RTK	real-time kinematic
THg	total mercury
TRS	total reduced sulfur
USGS	United States Geological Survey

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Abstract

Cache Creek Settling Basin was constructed in 1937 to trap sediment from Cache Creek before delivery to the Yolo Bypass, a flood conveyance for the Sacramento River system that is tributary to the Sacramento–San Joaquin Delta. Sediment management options being considered by stakeholders in the Cache Creek Settling Basin include sediment excavation; however, that could expose sediments containing elevated mercury concentrations from historical mercury mining in the watershed. In cooperation with the California Department of Water Resources, the U.S. Geological Survey undertook sediment coring campaigns in 2011–12 (1) to describe lateral and vertical distributions of mercury concentrations in deposits of sediment in the Cache Creek Settling Basin and (2) to improve constraint of estimates of the rate of sediment deposition in the basin.

Sediment cores were collected in the Cache Creek Settling Basin, Yolo County, California, during October 2011 at 10 locations and during August 2012 at 5 other locations. Total core depths ranged from approximately 4.6 to 13.7 meters (15 to 45 feet), with penetration to about 9.1 meters (30 feet) at most locations. Unsplit cores were logged for two geophysical parameters (gamma bulk density and magnetic susceptibility); then, selected cores were split lengthwise. One half of each core was then photographed and archived, and the other half was subsampled. Initial subsamples from the cores (20-centimeter composite samples from five predetermined depths in each profile) were analyzed for total mercury, methylmercury, total reduced sulfur, iron speciation, organic content (as the percentage of weight loss on ignition), and grain-size distribution. Detailed follow-up subsampling (3-centimeter intervals) was done at six locations along an east-west transect in the southern part of the Cache Creek Settling Basin and at one location in the northern part of the basin for analyses of total mercury; organic content; and cesium-137, which was used for dating. This report documents site characteristics; field and laboratory methods; and results of the analyses of each core section and subsample of these sediment cores, including associated quality-assurance and quality-control data.

Introduction

Cache Creek drains parts of the Coast Ranges in Lake, Colusa, and Yolo Counties, California, including Clear Lake and Indian Valley Reservoir (fig. 1). The total area of the Cache Creek drainage basin is 2,950 square kilometers (1,140 square miles) upstream from the gaging station at Yolo (U.S. Geological Survey station 11452500; http://waterdata.usgs.gov), which is approximately 8 kilometers upstream from the Cache Creek Settling Basin (CCSB). In 1937, the CCSB was constructed (U.S. Army Corps of Engineers, 1987) to trap sediment from Cache Creek before transport to the Yolo Bypass, a flood conveyance in the Sacramento River system that is tributary to the Sacramento–San Joaquin Delta (fig. 1).

The California State Water Resources Control Board (SWRCB) and the Central Valley Regional Water Quality Control Board are interested in improving the efficiency of trapping mercury (Hg) in the CCSB (Cooke and Morris, 2005; Wood and others, 2010a, b). In 2009, the California Department of Water Resources, which operates and maintains the CCSB, formally requested cooperation from the U.S. Geological Survey (USGS) to monitor the quantity and quality of streamflow into and out of the CCSB. The data gathered by the USGS are being used to assess annual loads into and out of the settling basin and the associated sediment and Hg trap efficiencies. Other ongoing research by the USGS in the CCSB is aimed at understanding spatial and temporal variations in methylmercury (MeHg) in surface sediment and biota. The results of those investigations are to be reported in other publications.

Figure 1. Location of the Cache Creek Settling Basin in California.

Another goal of the USGS project is to determine the spatial variability of Hg and other constituents in sediment trapped in the CCSB. One management option to maintain and possibly improve the trap efficiency of the basin is to excavate and remove sediment from part of the basin (U.S. Army Corps of Engineers, 1987). One concern regarding sediment excavation in the CCSB is the possible exposure of sediment layers that have elevated Hg concentrations from historical Hg mining in the watershed (Domagalski and others, 2004a, b). In addition, there is interest in ascertaining the deposition rate of sediment in the CCSB to evaluate sedimentation-rate projections made by the U.S. Army Corps of Engineers (1987) and to help calibrate and verify ongoing modeling efforts by the University of California, Davis (Carr and others 2010, 2015). To address the concerns regarding Hg levels in the subsurface and questions regarding sediment deposition rates, deep-core drilling campaigns were completed by the USGS during 2011 and 2012. Results from those campaigns are presented in this report.

This report contains information about the 15 drill sites, the drilling methods used, and the recovery achieved for each core section. Geophysical properties are reported in graphical form, based on multi-sensor core logging of unsplit cores. Digital photographs of split cores are included, along with descriptions of color and macroscopic features. Methods and results of geochemical analyses and detailed grain-size distribution are reported for 20-centimeter (cm) composite intervals collected from 5 targeted depths, where available at each of the 15 drill sites; data are also included for selected analytes for 3-cm subsamples collected at 7 of the drill sites.

The 2011 Deep Core Drilling Campaign

Sites 1 through 10 (fig. 2) were drilled during September 27 to October 5, 2011. For most sites, two boreholes were drilled (designated “a” or “b”) approximately 2 meters (m) apart horizontally to fully represent the sediment at each depth and account for core section seams. At site 2, the first borehole (2a) was abandoned because of poor recovery, and a third borehole, 2c, was drilled. All borehole locations are listed in table 1 by geographic coordinates along with identification numbers, drilling information, and recovery information.

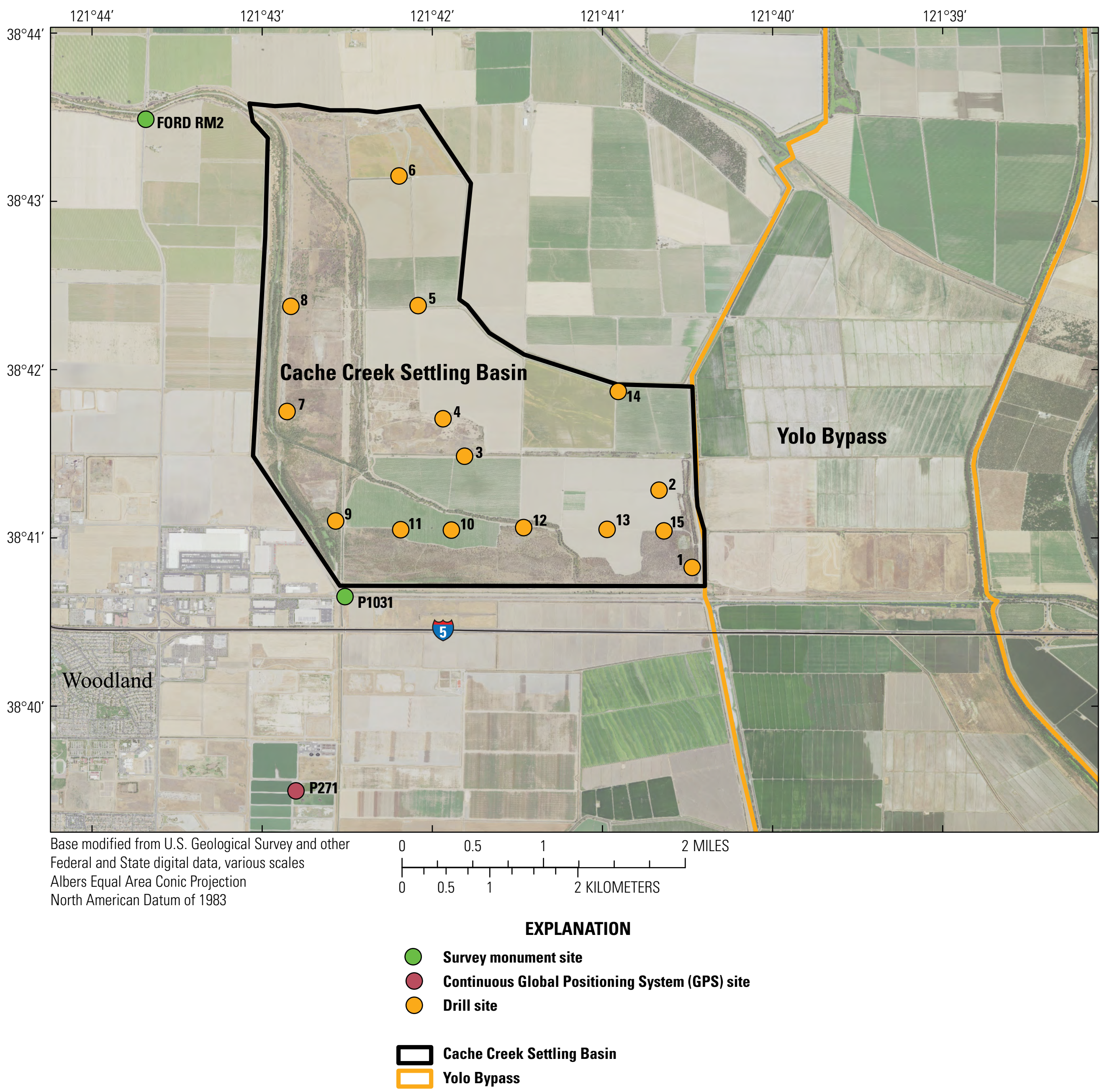


Figure 2. Drill sites in the Cache Creek Settling Basin, California, and nearby survey control stations.

Table 1. Borehole location and recovery of sediment cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two boreholes was poor. In most cases, the borehole was drilled in six sections. Each section represented roughly 5 feet. **Abbreviations**: dd° mm' ss.s", degrees minutes seconds; ddd° mm' ss.s", degrees minutes seconds; decimal ft, decimal foot; ID, identification; LSD, land-surface datum; m, meter; NAD 83, North American Datum of 1983; NAVD 88, North American Vertical Datum of 1988; no., number; USGS, U.S. Geological Survey]

Borehole site no.	USGS station ID	Latitude (NAD 83) (dd° mm' ss.s")	Longitude (NAD 83) (ddd° mm' ss.s")	LSD elevation (NAVD 88) (m)	No. of sections	Borehole interval (decimal ft)	Borehole interval (m)	Borehole recovery (m)	Borehole recovery (percent)
1a	384048121402602	38° 40' 48.2" N	121° 40' 26.2" W	9.98	6	0.0–29.8	0–9.09	7.46	82.1
1b	384048121402603	38° 40' 48.2" N	121° 40' 26.2" W	9.98	6	0.0–28.1	0–8.56	8.11	94.7
2b	384117121403902	38° 41' 16.9" N	121° 40' 38.7" W	9.12	6	0.0–27.6	0–8.41	7.94	94.4
2c	384117121403903	38° 41' 16.9" N	121° 40' 38.7" W	9.12	6	0.0–27.1	0–8.26	7.60	92.0
3a	384129121415001	38° 41' 29.2" N	121° 41' 50.0" W	10.04	6	0.0–29.6	0–9.03	7.57	83.8
3b	384129121415002	38° 41' 29.2" N	121° 41' 50.0" W	10.04	6	0.0–28.3	0–8.64	8.27	95.7
4a	384143121415801	38° 41' 42.9" N	121° 41' 57.7" W	9.84	6	0.0–28.7	0–8.74	8.29	94.9
4b	384143121415802	38° 41' 42.9" N	121° 41' 57.7" W	9.84	6	0.0–27.9	0–8.51	8.45	99.3
5a	384225121420701	38° 42' 24.6" N	121° 42' 7.1" W	10.17	6	0.0–27.8	0–8.46	7.71	91.1
5b	384225121420702	38° 42' 24.6" N	121° 42' 7.1" W	10.17	6	0.0–25.0	0–7.62	6.52	85.6
6a	384312121421401	38° 43' 12.3" N	121° 42' 14.2" W	10.43	6	0.0–29.3	0–8.94	7.85	87.8
6b	384312121421402	38° 43' 12.3" N	121° 42' 14.2" W	10.43	6	0.0–28.3	0–8.61	4.75	55.2
7a	384145121425601	38° 41' 45.5" N	121° 42' 55.6" W	10.93	6	0.0–28.8	0–8.79	8.54	97.2
7b	384145121425602	38° 41' 45.5" N	121° 42' 55.6" W	10.93	5	0.0–23.9	0–7.28	7.01	96.3
8a	384225121425401	38° 42' 24.6" N	121° 42' 54.2" W	10.45	3	0.0–14.9	0–4.55	4.51	99.1
8b	384225121425402	38° 42' 24.6" N	121° 42' 54.2" W	10.45	4	0.0–17.0	0–5.18	5.01	96.7
9a	384105121423701	38° 41' 5.3" N	121° 42' 37.1" W	10.02	6	0.0–30.5	0–9.31	8.48	91.1
9b	384105121423702	38° 41' 5.3" N	121° 42' 37.1" W	10.02	7	0.0–25.9	0–7.90	8.84	111.9
10a	384102121415501	38° 41' 2.4" N	121° 41' 54.6" W	10.11	6	0.0–29.3	0–8.92	8.84	99.1
10b	384102121415502	38° 41' 2.4" N	121° 41' 54.6" W	10.11	6	0.0–28.3	0–8.64	8.41	97.3
11a	384102121421401	38° 41' 2.4" N	121° 42' 13.6" W	10.37	6	0.0–29.4	0–8.97	8.43	94.0
11b	384102121421402	38° 41' 2.4" N	121° 42' 13.6" W	10.37	10	0.0–46.8	0–14.27	13.74	96.3
11c	384102121421403	38° 41' 2.4" N	121° 42' 13.6" W	10.37	2	0.0–9.5	0–2.91	2.41	82.8
12a	384103121412901	38° 41' 3.3" N	121° 41' 28.8" W	10.23	6	0.0–29.6	0–9.02	8.99	99.7
12b	384103121412902	38° 41' 3.3" N	121° 41' 28.8" W	10.23	6	0.0–27.8	0–8.46	8.23	97.3

Table 1. Borehole location and recovery of sediment cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two boreholes was poor. In most cases, the borehole was drilled in six sections. Each section represented roughly 5 feet. **Abbreviations**: dd° mm' ss.s", degrees minutes seconds; ddd° mm' ss.s", degrees minutes seconds; decimal ft, decimal foot; ID, identification; LSD, land-surface datum; m, meter; NAD 83, North American Datum of 1983; NAVD 88, North American Vertical Datum of 1988; no., number; USGS, U.S. Geological Survey]

Borehole site no.	USGS station ID	Latitude (NAD 83) (dd° mm' ss.s")	Longitude (NAD 83) (ddd° mm' ss.s")	LSD elevation (NAVD 88) (m)	No. of sections	Borehole interval (decimal ft)	Borehole interval (m)	Borehole recovery (m)	Borehole recovery (percent)
13a	384102121405701	38° 41' 2.3" N	121° 40' 57.1" W	9.75	6	0.0–29.4	0–8.97	8.88	99.0
13b	384102121405702	38° 41' 2.3" N	121° 40' 57.1" W	9.75	6	0.0–28.4	0–8.66	8.48	97.9
14a	384153121405401	38° 41' 53.1" N	121° 40' 53.8" W	9.20	6	0.0–28.6	0–8.73	7.21	82.6
14b	384153121405402	38° 41' 53.1" N	121° 40' 53.8" W	9.20	6	0.0–27.9	0–8.51	8.41	98.8
15a	384102121403701	38° 41' 1.9" N	121° 40' 36.9" W	9.65	6	0.0–29.0	0–8.84	8.09	91.5
15b	384102121403702	38° 41' 1.9" N	121° 40' 36.9" W	9.65	6	0.0–27.9	0–8.50	8.53	100.4

The 2012 Deep Core Drilling Campaign

Sites 11 through 15 were drilled during August 20–24, 2012. As in 2011, two boreholes (a and b) were drilled at each site, with the exception of site 11, where three boreholes were drilled (including 11c). All borehole locations are listed in table 1 by geographic coordinates, along with identification numbers, drilling information, and recovery information.

Coring Methods and Equipment

Three methods (auger, hammer, and push) were used to drill boreholes. Hollow-stem auger drilling is regarded as one of the best methods in contaminated environments because the borehole can be simultaneously drilled and cased, thus preventing collapse and contamination of the core sample (Shuter and Teasdale, 1989). A center rod and pilot bit were used to collect cores in approximately 1.5-meter (5-foot) intervals. Once drilled, each 1.5-meter interval was returned to the surface. A clean perimeter was established around the borehole prior to drilling to return collected sediment cores. The auger drilling method can only be used to drill in unconsolidated soils or softer rock.

In sites where hollow-stem auger drilling was not suitable, sediment core samples were drilled with either the "push" or "hammer" method, using a split-barrel driver sampler with a liner 1.5 m in length. In softer material, the barrel drive was pushed into the sediment to drill the hole using 2,000 to 2,700 kg of downward thrust. If the material at the site consisted of hard-packed clay or gravel, a 60 kg or 135 kg slip-type drive hammer was attached to the drill rig, and a "hammering" action was employed on the drive rod to drill the borehole. Further details of the push and hammer method can be found in Shuter and Teasdale (1989).

For some sites, multiple methods were used to drill cores. The method used to collect particular core sections is included in the core section identification in table 2. Boreholes were drilled in approximately 152-cm (5-foot) sections that were 25.4–30.4 cm (10–12 inches) in diameter. The boreholes were not lined or completed with casing string (cemented pipe). Most boreholes were drilled to a total depth of about 9.1 m (30 feet), resulting in six core sections for each borehole. Each core section was numbered sequentially, beginning at the surface. For example, core section 9a #3P represents drill site 9, borehole 9a, third section from the top, collected by the "push" method. At site 11, borehole 11b was drilled to a depth of 14.27 m (46.83 ft), resulting in 10 core sections. Site 11 was drilled deeper to ensure that flood-plain sediment deposited prior to Hg mining in the Cache Creek drainage basin and prior to gold mining in the Sierra Nevada, (pre-Gold Rush of 1848) was collected. After all core sections were collected, each borehole was backfilled and topped with cement.

Table 2. Depth intervals and core recovery of sediment-core sections that were split and described, Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The core intervals for the two boreholes were offset to capture any changes in sediment texture at the core interval boundary. The borehole with recovery closest to 100 percent was selected to be split and described, in most cases. Recovery greater than 100 percent is most likely from slough from the preceding (overlying) core section, because the bore holes were not lined. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; ECS, empty core space, because sediment was physically missing from a core section or it was not a representative sample (that is, slough from drilling the preceding core section); in., inch; m, meter]

Core section	Drill date (mm/dd/yyyy)	Core outer diameter (cm)	Core outer diameter (in.)	Core inner diameter (cm)	Core inner diameter (in.)	Depth interval (decimal ft)	Depth interval (m)	Core length recovered (cm)	Length recovered corrected for ECS (cm)	Percent recovery corrected for ECS
1b #1P	10/02/2011	7.62	3.0	7.30	2.9	0.0–3.8	0–1.17	111.8	111.8	95.6
1b #2H	10/02/2011	7.62	3.0	7.30	2.9	3.8–9.3	1.17–2.82	137.2	133.2	80.7
1b #3P	10/02/2011	7.62	3.0	7.30	2.9	9.3–14.0	2.82–4.27	132.1	128.1	88.3
1b #4P	10/03/2011	7.62	3.0	7.30	2.9	14.0–18.1	4.27–5.51	111.0	110.0	88.7
1b #5P	10/03/2011	7.62	3.0	7.30	2.9	18.1–23.3	5.51–7.09	154.9	147.9	93.6
1b #6P	10/03/2011	7.62	3.0	7.30	2.9	23.3–28.1	7.09–8.56	161.3	151.3	102.9
2c #1P	10/02/2011	7.62	3.0	7.30	2.9	0.0–4.1	0–1.24	113.7	113.7	91.7
2c #2P	10/02/2011	7.62	3.0	7.30	2.9	4.1–8.9	1.24–2.72	137.2	134.2	90.7
2c #3P	10/02/2011	7.62	3.0	7.30	2.9	8.9–13.9	2.72–4.24	116.2	116.2	76.4
2c #4P	10/02/2011	7.62	3.0	7.30	2.9	13.9–18.8	4.24–5.74	144.8	144.8	96.5
2c #5P	10/02/2011	7.62	3.0	7.30	2.9	18.8–23.7	5.74–7.21	147.3	147.3	100.2
2c #6PH	10/02/2011	7.62	3.0	7.30	2.9	23.7–27.1	7.21–8.26	104.1	104.1	99.1
3b #1A	09/28/2011	8.89	3.5	8.57	3.4	0.0–3.4	0–1.04	105.4	105.4	101.3
3b #2A	09/28/2011	8.89	3.5	8.57	3.4	3.4–7.8	1.04–2.39	137.2	129.2	95.7
3b #3A	09/28/2011	8.89	3.5	8.57	3.4	7.8–13.1	2.39–3.99	158.8	158.8	99.3
3b #4A	09/28/2011	8.89	3.5	8.57	3.4	13.1–18.2	3.99–5.54	143.5	143.5	92.6
3b #5A	09/28/2011	8.89	3.5	8.57	3.4	18.2–23.2	5.54–7.06	149.9	141.9	93.4
3b #6A	09/28/2011	8.89	3.5	8.57	3.4	23.2–28.3	7.06–8.63	151.1	148.1	94.3
4b #1A	09/29/2011	8.89	3.5	8.57	3.4	0.0–3.0	0–0.91	91.4	91.4	100.4
4b #2A	09/29/2011	8.89	3.5	8.57	3.4	3.0–8.1	0.91–2.46	127.0	127.0	81.9
4b #3A	09/29/2011	8.89	3.5	8.57	3.4	8.1–13.0	2.46–3.96	158.8	158.8	105.9
4b #4A	09/29/2011	8.89	3.5	8.57	3.4	13.0–18.1	3.96–5.51	158.8	158.8	102.5
4b #5A	09/29/2011	8.89	3.5	8.57	3.4	18.1–23.0	5.51–7.01	158.8	158.8	105.9
4b #6A	09/29/2011	8.89	3.5	8.57	3.4	23.0–27.9	7.01–8.51	158.8	150.8	100.5
5a #1A	09/30/2011	8.89	3.5	8.57	3.4	0.0–4.3	0–1.32	134.6	130.6	98.9
5a #2A	09/30/2011	8.89	3.5	8.57	3.4	4.3–9.4	1.32–2.87	128.3	120.3	77.6
5a #3A	09/30/2011	8.89	3.5	8.57	3.4	9.4–14.5	2.87–4.42	108.0	105.0	67.7
5a #4A	09/30/2011	8.89	3.5	8.57	3.4	14.5–17.2	4.42–5.23	116.8	116.8	144.2
5a #5A	09/30/2011	8.89	3.5	8.57	3.4	17.2–24.2	5.23–7.37	158.8	158.8	74.2
5a #6A	09/30/2011	8.89	3.5	8.57	3.4	24.2–27.8	7.37–8.46	158.8	139.8	128.3

Table 2. Depth intervals and core recovery of sediment-core sections that were split and described, Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The core intervals for the two boreholes were offset to capture any changes in sediment texture at the core interval boundary. The borehole with recovery closest to 100 percent was selected to be split and described, in most cases. Recovery greater than 100 percent is most likely from slough from the preceding (overlying) core section, because the bore holes were not lined. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; ECS, empty core space, because sediment was physically missing from a core section or it was not a representative sample (that is, slough from drilling the preceding core section); in., inch; m, meter]

Core section	Drill date (mm/dd/yyyy)	Core outer diameter (cm)	Core outer diameter (in.)	Core inner diameter (cm)	Core inner diameter (in.)	Depth interval (decimal ft)	Depth interval (m)	Core length recovered (cm)	Length recovered corrected for ECS (cm)	Percent recovery corrected for ECS
6a #1A	09/30/2011	8.89	3.5	8.57	3.4	0.0–4.6	0–1.40	99.1	99.1	70.8
6a #2A	09/30/2011	8.89	3.5	8.57	3.4	4.6–9.2	1.40–2.79	74.9	71.9	51.7
6a #3A	09/30/2011	8.89	3.5	8.57	3.4	9.2–14.4	2.79–4.39	158.8	142.8	89.3
6a #4A	09/30/2011	8.89	3.5	8.57	3.4	14.4–19.5	4.39–5.94	158.8	157.8	101.8
6a #5A	09/30/2011	8.89	3.5	8.57	3.4	19.5–24.3	5.94–7.42	158.8	156.8	105.9
6a #6A	09/30/2011	8.89	3.5	8.57	3.4	24.3–29.3	7.42–8.94	158.8	156.8	103.2
7a #1A	10/04/2011	8.89	3.5	8.26	3.3	0.0–4.1	0–1.24	102.9	102.9	83.0
7a #2A	10/04/2011	8.89	3.5	8.26	3.3	4.1–8.8	1.24–2.69	135.9	129.9	89.6
7a #3A	10/04/2011	8.89	3.5	8.26	3.3	8.8–13.8	2.69–4.19	160.0	160.0	106.7
7a #4A	10/04/2011	8.89	3.5	8.26	3.3	13.8–18.8	4.19–5.74	158.8	158.8	102.5
7a #5A	10/04/2011	8.89	3.5	8.26	3.3	18.8–23.8	5.74–7.24	158.8	158.8	105.9
7a #6A	10/04/2011	8.89	3.5	8.26	3.3	23.8–28.8	7.24–8.79	158.8	143.8	92.8
8b #1P	10/05/2011	7.62	3.0	7.30	2.9	0.0–3.3	0–1.02	95.3	95.3	93.4
8b #2P	10/05/2011	7.62	3.0	7.30	2.9	3.3–7.9	1.02–2.40	132.1	123.1	89.2
8b #3P	10/05/2011	7.62	3.0	7.30	2.9	7.9–12.0	2.40–3.66	161.3	127.3	101.0
8b #4P	10/05/2011	7.62	3.0	7.30	2.9	12.0–17.0	3.66–5.18	161.3	155.3	102.2
9a #1PHP	10/03/2011	7.62	3.0	7.30	2.9	0.0–4.8	0–1.47	143.5	143.5	97.6
9a #2P	10/03/2011	7.62	3.0	7.30	2.9	4.8–9.5	1.47–2.90	132.1	118.1	82.6
9a #3P	10/03/2011	7.62	3.0	7.30	2.9	9.5–15.3	2.90–4.65	151.1	119.1	68.1
9a #4P	10/03/2011	7.62	3.0	7.30	2.9	15.3–20.3	4.65–6.17	161.3	153.3	100.9
9a #5P	10/03/2011	7.62	3.0	7.30	2.9	20.3–25.3	6.17–7.70	161.3	156.3	102.2
9a #6P	10/03/2011	7.62	3.0	7.30	2.9	25.3–30.5	7.70–9.31	161.3	157.3	97.7
10b #1A	10/04/2011	8.89	3.5	8.26	3.3	0.0–3.5	0–1.08	105.4	105.4	97.6
10b #2A	10/04/2011	8.89	3.5	8.26	3.3	3.5–8.3	1.08–2.54	135.9	135.9	93.1
10b #3A	10/04/2011	8.89	3.5	8.26	3.3	8.3–13.3	2.54–4.06	157.5	157.5	103.6
10b #4A	10/04/2011	8.89	3.5	8.26	3.3	13.3–18.3	4.06–5.59	146.1	146.1	95.5
10b #5A	10/04/2011	8.89	3.5	8.26	3.3	18.3–23.3	5.59–7.11	158.8	158.8	104.5
10b #6A	10/04/2011	8.89	3.5	8.26	3.3	23.3–28.3	7.11–8.64	147.3	137.6	89.9

Table 2. Depth intervals and core recovery of sediment-core sections that were split and described, Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The core intervals for the two boreholes were offset to capture any changes in sediment texture at the core interval boundary. The borehole with recovery closest to 100 percent was selected to be split and described, in most cases. Recovery greater than 100 percent is most likely from slough from the preceding (overlying) core section, because the bore holes were not lined. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; ECS, empty core space, because sediment was physically missing from a core section or it was not a representative sample (that is, slough from drilling the preceding core section); in., inch; m, meter]

Core section	Drill date (mm/dd/yyyy)	Core outer diameter (cm)	Core outer diameter (in.)	Core inner diameter (cm)	Core inner diameter (in.)	Depth interval (decimal ft)	Depth interval (m)	Core length recovered (cm)	Length recovered corrected for ECS (cm)	Percent recovery corrected for ECS
11c #1A	08/23/2012	8.89	3.5	8.57	3.4	0.0–4.4	0–1.35	123.2	123.2	91.3
11c #2A	08/23/2012	8.89	3.5	8.57	3.4	4.4–9.5	1.35–2.91	118.1	118.1	75.7
11b #3A	08/22/2012	8.89	3.5	8.57	3.4	7.7–12.9	2.35–3.94	160.0	154.0	96.9
11b #4A	08/22/2012	8.89	3.5	8.57	3.4	12.9–17.9	3.94–5.46	157.5	155.5	102.3
11b #5A	08/22/2012	8.89	3.5	8.57	3.4	17.9–22.8	5.46–6.93	154.9	152.9	104.0
11b #6A	08/22/2012	8.89	3.5	8.57	3.4	22.8–27.8	6.93–8.47	160.0	160.0	103.9
11b #7A	08/22/2012	8.89	3.5	8.57	3.4	27.8–32.7	8.47–9.96	158.8	158.8	106.6
11b #8A	08/22/2012	8.89	3.5	8.57	3.4	32.7–37.4	9.96–11.39	156.2	154.2	107.8
11b #9A	08/22/2012	8.89	3.5	8.57	3.4	37.4–42.8	11.39–13.03	146.1	146.1	89.1
11b #10A	08/22/2012	8.89	3.5	8.57	3.4	42.8–46.8	13.03–14.27	114.3	112.3	90.6
12a #1A	08/21/2012	8.89	3.5	8.57	3.4	0.0–4.4	0–1.35	124.5	124.5	92.2
12a #2A	08/21/2012	8.89	3.5	8.57	3.4	4.4–9.4	1.35–2.87	146.1	143.1	94.1
12a #3A	08/21/2012	8.89	3.5	8.57	3.4	9.4–14.6	2.87–4.44	157.5	154.5	98.4
12a #4A	08/21/2012	8.89	3.5	8.57	3.4	14.6–19.6	4.44–5.97	152.4	152.4	99.6
12a #5A	08/21/2012	8.89	3.5	8.57	3.4	19.6–24.5	5.97–7.48	158.8	158.8	105.2
12a #6A	08/21/2012	8.89	3.5	8.57	3.4	24.5–29.6	7.48–9.02	160.0	160.0	103.9
13b #1A	08/23/2012	8.89	3.5	8.57	3.4	0.0–3.3	0–0.99	99.1	99.1	100.1
13b #2A	08/23/2012	8.89	3.5	8.57	3.4	3.3–8.4	0.99–2.57	134.6	134.6	85.2
13b #3A	08/23/2012	8.89	3.5	8.57	3.4	8.4–13.3	2.57–4.05	129.5	128.5	86.8
13b #4A	08/23/2012	8.89	3.5	8.57	3.4	13.3–18.4	4.05–5.61	165.1	164.1	105.2
13b #5A	08/23/2012	8.89	3.5	8.57	3.4	18.4–23.4	5.61–7.14	160.0	152.4	99.6
13b #6A	08/23/2012	8.89	3.5	8.57	3.4	23.4–28.4	7.14–8.66	160.0	152.4	100.3
14a #1A	08/24/2012	8.89	3.5	8.57	3.4	0.0–4.3	0–1.30	123.2	121.2	93.2
14b #2A	08/24/2012	8.89	3.5	8.57	3.4	2.8–8.0	0.86–2.43	146.1	146.1	93.1
14b #3A	08/24/2012	8.89	3.5	8.57	3.4	8.0–13.0	2.43–3.95	147.3	147.3	96.9
14b #4A	08/24/2012	8.89	3.5	8.57	3.4	13.0–17.8	3.95–5.41	147.3	147.3	100.9
14b #5A	08/24/2012	8.89	3.5	8.57	3.4	17.8–22.7	5.41–6.92	158.8	158.8	105.2
14b #6A	08/24/2012	8.89	3.5	8.57	3.4	22.7–27.9	6.92–8.51	158.8	156.8	98.6

Table 2. Depth intervals and core recovery of sediment-core sections that were split and described, Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The core intervals for the two boreholes were offset to capture any changes in sediment texture at the core interval boundary. The borehole with recovery closest to 100 percent was selected to be split and described, in most cases. Recovery greater than 100 percent is most likely from slough from the preceding (overlying) core section, because the bore holes were not lined. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; ECS, empty core space, because sediment was physically missing from a core section or it was not a representative sample (that is, slough from drilling the preceding core section); in., inch; m, meter]

Core section	Drill date (mm/dd/yyyy)	Core outer diameter (cm)	Core outer diameter (in.)	Core inner diameter (cm)	Core inner diameter (in.)	Depth interval (decimal ft)	Depth interval (m)	Core length recovered (cm)	Length recovered corrected for ECS (cm)	Percent recovery corrected for ECS
15b #1A	08/21/2012	8.89	3.5	8.57	3.4	0.0–2.8	0–0.84	87.6	87.6	104.3
15a #1A	08/20/2012	8.89	3.5	8.57	3.4	0.0–4.4	0–1.35	135.9	135.9	100.7
15b #2A	08/21/2012	8.89	3.5	8.57	3.4	2.8–7.8	0.84–2.37	144.8	144.8	94.6
15b #3A	08/21/2012	8.89	3.5	8.57	3.4	7.8–12.9	2.37–3.93	154.9	154.9	99.3
15a #4A	08/20/2012	8.89	3.5	8.57	3.4	14.4–19.5	4.40–5.94	158.8	158.8	103.1
15a #5A	08/20/2012	8.89	3.5	8.57	3.4	19.5–24.3	5.94–7.42	158.8	158.8	107.3
15a #6A	08/20/2012	8.89	3.5	8.57	3.4	24.3–29.0	7.42–8.84	137.2	137.2	96.6

Calculation of Core Depths

The drill operator determined the depth interval below land surface of each core section using a steel tape measure. In addition to each 152-cm (5-ft) core section, material was recovered from the shoe at the bottom of the core barrel. When full of sediment, the shoe accounted for up to 10 cm (4 inches) of additional material. Because of possible contamination, the material from the drill shoe was not included in any of the subsamples submitted for constituent analysis.

In some instances, material was observed to slough off of the walls of the borehole during the removal of the core from the borehole or during the extension of the drill pipe for the next core section. Such material was identified in the field notes and, after the cores were split, was observed to consist of poorly consolidated material that was not subsampled because it was not in place. In cases where recovery was less than 100 percent (table 2), the material that was recovered was considered to have been from the top of the drilled interval. Lost material was interpreted to have come from the bottom of each core section.

Determination of Land-Surface Elevations at Coring Locations

The Global Positioning System (GPS) was developed by the U.S. Department of Defense to be an accurate, all-weather, worldwide, continuous navigation system. With the use of high-level, survey-grade GPS equipment, it is possible to attain accurate positional data. For this study in the CCSB, a Trimble® RTK 4400 system was used for the first survey, and a Trimble® R7 Global Navigation Satellite System (GNSS) base receiver and R8 GNSS Rover were used for the second survey.

Global Positioning System (GPS) Network

Collection of the GPS data began in the fall of 2011, when 10 drill sites for extracting cores were marked and surveyed. In 2012, a second round of coring added another 5 sites distributed throughout the basin, for a total of 15 sites. Each site was marked with steel rebar driven into the ground to serve as a repeatable GPS station. In addition, two nearby survey monuments installed by the National Geodetic Survey (NGS), designated FORD RM2 and P1031 (fig. 2), were used as controls. Geodetic monuments are flat metal disks that are anchored in the ground or to a structure and can be used for repeated surveying measurements of horizontal and vertical positions. Historical data for monuments near the CCSB were compiled from the NGS and reviewed to determine the location, age, and quality of the vertical-control data and suitability for GPS observations.

Determination of Ellipsoid Heights and Elevations

The first round of surveying took place during December 5–10, 2011, and was completed with the use of a Trimble® RTK 4400 system for the base station and the rover. Dual-frequency receivers were used along with Trimble® TSC-1 data collectors and Trimble L1/L2 dual-frequency antennas with ground plane (TRM 33429-00 +GP). The only difference between the base and rover was the oversized ground plane on the GPS antenna at the base. Trimble® Business Center (ver. 2.70) software was used to process the data.

The second round of surveying took place during November 27–29, 2012, using a Trimble® R7 GNSS base receiver with a Zephyr Geodetic 2 antenna. The rover unit was the Trimble® R8 GNSS with a Trimble® TSC-3 data collector. Trimble® Business Center (ver. 2.81) software was used to process the second round of data.

Considering both rounds of surveying together, 15 GPS stations representing the coring locations were occupied with the rover along with 2 NGS benchmark monuments to determine horizontal coordinates as well as ellipsoid heights. Horizontal coordinates were referenced to the North American Datum of 1983 (NAD 83), which is based on the Geodetic Reference System of 1980 and is more compatible with modern surveying techniques than the 1927 datum it replaced (Schwarz and Wade, 1990). The ellipsoid height can be described as the vertical offset relative to the geodetically defined reference ellipsoid. Ellipsoid heights were then converted to elevation above the North American Vertical Datum of 1988 (NAVD 88) using the geoid 03 model (GEOID03), which best represents the actual shape of the Earth in this area.

Both rounds of GPS surveying combined “static” and “real-time kinematic” (RTK) methods of data collection. The RTK method is a differential measurement of one location (rover station) relative to another location, where static, or longer term, data are concurrently collected (base station). The accuracy of the rover-station coordinates derived by differential measurements is partially dependent on knowing accurate coordinates for the base stations. During the 2011 survey, static GPS data were collected for two monument locations (FORD RM2 and P1031) to obtain accurate coordinates for the base stations. The GPS data were collected at FORD RM2 for nearly 21.5 hours on two different days and at P1031 for about 13.5 hours on two different days. As static GPS data were being collected at FORD RM 2 or P1031, RTK GPS data were collected concurrently at the 10 GPS stations representing the 2011 drill sites. Collecting rover data relative to two base stations increased redundancy and quality control and, therefore, confidence in the measurements. Additionally, observations at the 10 GPS stations were made multiple times each day, further increasing the redundancy and confidence of measurements. In all, 8–10 observation periods, ranging about 5–10 minutes each, were used at each of the 10 GPS stations during a 5-day period in the 2011 survey. For the 10 GPS stations in the 2011 GPS network, the RTK differential measurements from FORD RM2 and P1031 were both used to derive the final coordinates, because the data collected at each base station were of good quality, and the measurements relative to each were in agreement.

During the 2012 survey, the same methods as described previously were used, except only one monumented base location (FORD RM2) was used. (Station P1031 was not available because of permitting reasons.) During the 3-day surveying period, approximately 25 hours of static data were collected at the FORD RM2 base location. The 2012 survey included four new GPS stations along an approximately west to east line along the southern portion of the settling basin (sites 11, 12, 13, and 15), and a fifth new station (site 14) near the northeast corner (fig. 2). Along with these five new stations, the 2012 reoccupation of three stations from the 2011 survey allowed results from the two surveys to be compared for consistency. Results from the 2011 and 2012 surveys showed a vertical offset of 7.3 cm at site 6 and site 9. A larger difference, 12.8 cm, was found at site 1. In all three cases, the 2012 elevations were lower than those in 2011.

Possible sources of data variability that directly affected these measurements are related to the equipment used, stability of the benchmarks and rebar, and occupation durations. Two different types of surveying equipment were used in the 2011 and 2012 surveys. The 2011 survey used older RTK equipment (RTK 4400), whereas in 2012, the more advanced RTK equipment (Trimble® R7 and R8) was available and was used. Additionally, nearby continuous GPS site P271 (fig. 2) and extensometer 9N/3E-8C4 indicated up to 2.0 cm of subsidence in the area between 2011 and 2012 (http://www.unavco.org/instrumentation/networks/status/pbo/overview/P271 and http://www.water.ca.gov/waterdatalibrary/docs/Hydstra/index.cfm?site=09N03E08C004M, accessed August 14, 2015). Therefore, regional subsidence could have been responsible for a portion of the observed differences between the 2011 and 2012 surveys at these three locations.

Stability of the benchmarks and rebar can also affect measurements. Benchmarks (NGS monuments) are subject to ground movement (for example, regional tectonics or subsidence), and rebar also can move with flooding and drying of soils in the settling basin.

Station occupation durations between the 2011 and 2012 surveys also varied slightly. In 2011, station occupation times were 5 to 10 minutes, whereas in 2012, all stations were occupied for at least 10 minutes.

Global Positioning System (GPS) Data Processing

To determine accurate coordinates for the base stations, the GPS data for the base stations were post-processed (baseline and least-squares adjustment computations) with data from three nearby continuous GPS (CGPS) stations—P271 (fig. 2), P272, and LNC1 (not shown)—along with precise satellite orbital data and accurate coordinates of the CGPS stations produced by the International GPS Service and by Scripps Orbit and Permanent Array Center (SOPAC), respectively. The GPS observation frequency of the CGPS stations was set at 30 seconds, and the observations were archived by SOPAC.

To determine the horizontal coordinates and ellipsoid heights of the rover stations, the coordinates of the two base stations were held fixed at the positions determined during the first phase, and the horizontal coordinates and ellipsoid heights for the rover stations were determined relative to each of the two base stations. GEOID03 was applied to the ellipsoid heights to generate NAVD 88 elevations (table 1). Outliers were removed, such that the 2011 elevations of the GPS stations represented elevations derived from 7 to 10 observations relative to each of the 2 base stations. The relative accuracy of the 2011 elevations was plus or minus (±) 3.9 cm at the 95-percent confidence level.

The GPS data from the 2012 survey were processed using identical procedures as for the data from the 2011 survey; the only difference was the use of only a single base (FORD RM2). Outliers were also removed, leaving four to six observations for each station in the shorter, 3-day surveying period. The relative accuracy of the elevations in the 2012 survey was ±3.0 cm at the 95-percent confidence level.

Sediment-Core Processing

Sediment cores were processed to measure and capture three types of information: (1) geophysical properties, (2) physical appearance, and (3) geochemical properties. The geophysical properties were measured on intact (unsplit) cores, and the results were used to determine which cores to process further by splitting to determine physical appearance and geochemical properties.

Multi-Sensor Core Logger

A multi-sensor core logger (MSCL), manufactured by Geotek, Ltd. (Daventry, United Kingdom), and owned and maintained by the USGS Coastal and Marine Geology Program (CMGP; Menlo Park, Calif.), was used to measure the geophysical properties of intact core sections in a non-destructive manner. The MSCL consists of a 4-m-long track with three primary sensors placed along the track that measure (1) gamma bulk density, (2) magnetic susceptibility, and (3) p-wave velocity. Each intact core section was placed on the track and moved past each sensor in 1-cm increments by a step motor operated by a computer.

Bulk density is the mass of a material divided by its total volume, which include the volume of intergranular voids as well as the particle volume, in the case of sediment or soil (Geotek, 2014). Because the degree of compaction, and thereby bulk density, can change as a result of handling, ideal measurement methods use an undisturbed or least-disturbed, intact bulk sample. The method of material density measurement used in this study, gamma bulk density, was modified from Evans (1965) and consists of a radioactive source, cesium-137 (Cs-137), placed on one side of the track, with a scintillator opposite it. The scintillator counts the number of emitted gamma rays that pass through the core liner and sediment. Using Lambert's Law, gamma bulk density can be calculated from the gamma attenuation (Kayen and others, 1999). Because only gamma rays pass through the sediment core, the original concentration of Cs-137 in the core is unchanged. The gamma bulk-density sensor was calibrated daily using two standards: (1) an aluminum calibration standard housed in a core liner identical to that in which the sediment cores were collected and (2) a core liner filled with deionized water.

Magnetic susceptibility (MS) refers to whether a magnetic field applied to a material becomes strengthened (positive MS) or weakened (negative MS) in the presence of the material (Geotek, 2014). In this study, MS was measured by a Bartington loop sensor (Bartington Instruments, Witney, England). The sensor produces an alternating magnetic field (0.565 kilohertz) using an oscillator circuit. Any magnetic material in the sediment core can cause a change in the oscillator frequency. Changes in the oscillator frequency were converted to magnetic susceptibility values. A positive MS value indicates the material is paramagnetic, ferromagnetic, ferrimagnetic, or antiferromagnetic; negative MS values indicate that the material is diamagnetic (Geotek, 2014).

The magnetic-susceptibility sensor was calibrated electronically by the manufacturer, so daily calibration was not necessary. The core-liner caps were made of material different from that of the liner, which causes spurious data. The data for the top and bottom 3 cm of each core section were deleted to exclude spurious data caused by the core-liner caps.

P-waves are primary pressure waves that vary in velocity according to the density and moduli of incompressibility and rigidity of the material through which they pass (Geotek, 2014). The P-wave velocity was measured without success in this study, most likely because of lack of water saturation in the cores, cracks in the sediment, or incomplete contact of the sediment core with the liner; therefore p-wave velocity results are not included in this report.

Core Splitting

Approximately half of all cores collected were split for further analysis. The decision to split a particular core was based largely on the results from the MSCL scan and borehole recovery. A core splitter manufactured by Geotek, Ltd. (Daventry, United Kingdom) and owned and maintained by the USGS CMGP was used to split cores. The core splitter consists of a 4-m-long track and has vibratory cutters and hooked slitting blades on an adjustable mount. The core was placed on the track and remained stationary while the mounted cutters and blades were manually driven by a wheel along the length of the core. Once the liner was sliced, the sediment was split manually with a metal wire. The resulting core halves were designated as either "working" or "archive." Archive halves were then taken to be photographed, and working halves were used to describe the physical appearance of the sediment. Once the working half had been described, the core was either subsampled for chemical analysis or wrapped in plastic, placed in a D-tube (extruded polystyrene container), and stored in a walk-in refrigerator at 4 degrees Celsius (°C). In some cases, archive halves were also subsampled for chemical analysis after being photographed.

Core Photography and Archiving

Cores were photographed using a Geotek Geoscan III camera mounted on the MSCL. The Geotek Geoscan III camera uses line-scan imaging and operates at a scan speed of 3 minutes per meter. Prior to being photographed, the surface of each split core was scraped with a clean, stainless-steel spatula to remove any residue from the splitting process and to reveal a fresh surface. Once photographed, the archive half was wrapped in plastic, placed in a D-tube, and stored at 4 °C.

Core Descriptions and Database

The physical appearance of the working half of each split core was methodically described for color (Munsell®, 2000, color system), lithology (grain size, bedding, contact layers), accessories (for example, carbonate nodules, mottling, organic material), and disturbance (such as slough, empty core space, cracks). Accessories appropriate for carbon-14 radiometric dating were also sampled at this time (results to be reported separately). The core descriptions were recorded in a FileMaker® Pro (version 6, FileMaker, Inc., Santa Clara, Calif.) database.

Core Subsampling for Laboratory Analysis

Composite samples were collected from sediment cores in 20 cm and 3 cm lengths. The subsample method and specific laboratory analyses for each composite-sample length are described in this section.

Composite samples 20 cm in length were taken at five pre-determined depths at each borehole site to measure total mercury (THg), MeHg, iron speciation, total reduced sulfur (TRS), percentage dry weight, percentage loss on ignition (LOI), porosity, and grain size by two methods—sieving to determine sand and "silt or finer" proportions (percentage of fines) and laser scattering to determine detailed grain-size distribution. Iron (Fe) species included ferrous iron, Fe(II); amorphous (poorly crystalline) ferric iron, $Fe(III)_a$; and crystalline ferric iron, $Fe(III)_c$. Core subsamples were taken using a plastic, U-shaped, channel sampler, 2 cm by 2 cm in cross-section. Two 10-cm-long channel samplers were used in series for the 20-cm composite core subsamples. A total of 80 cubic centimeters was collected for each core subsample.

Sediment for each core subsample was homogenized in a plastic, zippered bag and, then, spooned into clean polyethylene terephthalate (PET) vials for each different analyte. For each borehole, core subsamples were taken at the following approximate depths from the surface: 10–30 cm, 70–90 cm, 150–170 cm, 450–470 cm, and 750–770 cm (corresponding approximately to 1, 3, 5, 15, and 25 ft below land surface). If a core section was disturbed or missing at a pre-determined depth, the closest intact 20-cm section was subsampled. Core subsamples were collected from the "working" half in most cases; however, if the "working" half was disturbed, the "archive" half was subsampled. Core subsamples for chemical analysis were stored frozen at –15 °C.

Composite samples 3 cm in length were collected from cores at sites #9–15. The number of 3-cm-long composite subsamples taken from cores from each site varied. In general, the first 2 to 4 meters of each site was subsampled from a combination of boreholes (a, b, c). Additional 3-cm-long composite samples were taken from cores collected from greater depths (6 to 13 m) relative to the surface at sites #10, #11, and #15. Core subsamples were analyzed for Cs-137, lead-210 (Pb-210), radium-226 (Ra-226), THg, percent dry weight, and LOI. Subsample decisions were based on site and exploratory Cs-137 values. Further details are outlined in the laboratory analysis methods section for Cs-137 and other radionuclides. Core subsamples were taken using a plastic, U-shaped, channel sampler, 2 cm by 2 cm in cross-section. A total of 12 cubic centimeters was collected for each subsample. Sediment for each core subsample was homogenized in a pre-cleaned, pre-weighed, 60-milliliter I-Chem jar. Once filled, jars were frozen, then freeze dried.

Sediment-filled jars were weighed before and after freeze drying to assess dry-weight percentage. Once freeze dried, core subsamples were stored in a desiccator until further analysis.

Laboratory Analysis

Core subsamples collected for the measurement of THg, MeHg, Fe speciation, TRS, dry weight percentage, LOI percentage, porosity, fines percentage, and Cs-137 were all analyzed at the USGS Branch of Regional Research-Western Region (BRR-WR) laboratory (Menlo Park, Calif.). Core subsamples collected for grain-size determination by laser scattering (Coulter) were analyzed by the USGS California Water Science Center (CAWSC), Sacramento, Calif. Each analytical method is described in following sections.

Quality-Assurance Overview

Tabular results of quality-assurance metrics are given in appendix 1 (appendix tables 1–1 to 1–5). Holding times from the date of field sampling to the date of core splitting and subsampling ranged from 28 to 588 days. Holding times from the date of subsampling to the date of analyte-specific quantification are summarized in appendix table 1–1. Unlike aqueous samples, where prescribed holding-time information typically exists (for example, 90 days for THg in an acid-preserved, filtered-water sample, according to Title 40 Code of Federal Regulations Part 136.3, Table II, available at http://www.ecfr.gov/cgi-bin/text-idx?SID=6c7636ba9572571700a9ea83964fa054&mc=true&node=se40.23.136_13&rgn=div8), there is little information on prescribed holding-time limits for frozen sediment. According to the Code of Federal Regulations (CFR) governing U.S. Environmental Protection Agency procedures, with respect to the determination of metals and trace elements, "*Solid samples require no preservation prior to analysis other than storage at 4 °C. There is no established holding time limitation for solid samples.*" (Title 40 CFR, Part 136, Appendix C, Section 8.4, available at http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=6c7636ba9572571700a9ea83964fa054&mc=true&n=pt40.23.136&r=PART&ty=HTML#ap40.23.136_17.c). Further, as noted in the USGS method for the assay of THg in solids (Olund and others, 2004), a solid-phase National Institute of Standards and Technology (NIST) certified reference material (CRM) for Hg was shown to be stable for at least 9 years. Studies on the preservation of MeHg in frozen sediment are scarce, but at least one study has demonstrated no change in MeHg concentration for deep-frozen (–18 °C to –22 °C) sediment during storage lasting at least 8 months (Horvat and others, 1993). Thus, there is no reason to suspect that the extended holding times observed in this study (greater than 1 year in some cases) affected the analytical results for the given suite of analytes, because (1) visual evidence of chemical oxidation of sediment in unsplit cores (stored refrigerated at 4 °C prior to subsampling) was either nonexistent or limited to only a few millimeters; (2) subsamples were taken within hours of core splitting from the length-wise center of the core, away from any potentially oxidized outer edge; and (3) once collected, all analytical splits were preserved frozen at –15 °C until further analysis.

Method detection limits, reporting limits, and method blank results (as appropriate) are summarized in appendix table 1–2. For THg, MeHg, Fe species, and TRS, the method detection limit (MDL) was determined from the variance associated with multiple (typically 10) repeated analyses of a single, low-concentration standard, as detailed in 40 CFR Part 136, Appendix B, Revision 1.11 (accessed July 1, 2015, at http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=6c7636ba9572571700a9ea83964fa054&mc=true&n=pt40.23.136&r=PART&ty=HTML#ap40.23.136_17.b). The reporting limit (RL) is defined as the lowest standard used in the standard curve for that analyte in a given batch run. Data were censored as less than the MDL or RL at the level of instrument detection (final quantification step) to avoid computational issues arising from differences in sample-specific masses assayed or variations in dilutions or in extraction subsample volumes. Practical reporting limits (PRL), given in the final units for the analyte (for example, nanogram per gram, or ng/g, sediment dry weight), were back-calculated from the detection-level RL values, taking into account the sample-specific (or typical) mass assayed, dilution, and subsample volume, as described later in this report for the various assays. Values greater than the MDL, but less than the RL, were flagged as "estimated" concentrations.

The CRM recovery-percentage data assayed with every analytical batch run for THg and MeHg are summarized in appendix table 1–3. Of the 46 CRM samples analyzed, recoveries of THg or MeHg for 45 samples (or 98 percent) were within the acceptance criterion of ±20 percent of the certified value (80–120 percent of certified). There were no CRMs commercially available for Fe speciation, TRS, LOI percentage, or fines percentage.

The matrix spike (MS) percentage recovery for samples assayed with every batch run for THg, MeHg, Fe species (ferrous, Fe(II), and ferric crystalline, $Fe(III)_c$), and TRS is summarized in appendix table 1–4. The standard acceptance criterion used for MS recovery was ±20 percent of the theoretical value (80–120 percent). Results for MS recovery are discussed for each analyte.

Approximately 10 percent of the samples were run as analytical duplicates. The results of analytical duplicates for each analyte are summarized in appendix table 1–5 and are reported as the relative percentage of deviation (RPDEV) of two assays of the same sample. The RPDEV was calculated as one-half of the absolute difference between the two analytical results, divided by mean of the two analytical results, multiplied by 100. Resulting estimates of precision for the duplicates are discussed for each analyte.

Total Mercury

In the case of core subsamples collected from 20-cm depth intervals, sediment was first thawed from frozen storage, then 0.2–0.5 gram (g) core subsamples were collected and weighed. The THg analysis was done on a wet-weight basis, and the results were converted to dry weight on the basis of the percentage dry weight determination detailed later in this report. In the case of core subsamples collected from 3-cm depth intervals, the sediment was initially frozen, then freeze dried and stored in a desiccator prior to THg analysis. For these latter samples, core subsample weights for THg analysis were in the range of 0.1–0.3 g, with the exact weight recorded. In both cases, an acid extraction method was used overnight in concentrated acid (nitric acid plus hydrochloric acid), followed by addition of the oxidant bromine monochloride (BrCl) and overnight heating at 60 °C to ensure that all of the Hg was in the divalent inorganic form—Hg(II)—in accordance with standard USGS protocol (Olund and others, 2004). The Hg(II) in the aqueous digest was then quantified using an automated THg analyzer (Tekran 2600, Tekran® Instruments Corporation, Toronto, Canada), according to the U.S. Environmental Protection Agency method 1631e (U.S. Environmental Protection Agency, 2001, 2002).

Each batch of analytical THg samples was accompanied by the analysis of the following minimum number of quality-assurance (QA) samples: one certified reference material sample, one matrix spike sample, one analytical duplicate, one method blank, and calibration standards prepared from a commercially certified mercuric chloride ($HgCl_2$) solution. The MDL and mean RL for the THg assay were 0.1 ng/L and 0.5 ng/L, respectively, at the level of the autoanalyzer, based on 20 batch runs (appendix table 1–2). The PRL ranged over nearly two orders of magnitude (6–520 ng/g dry weight), had a mean and standard error of 55±3 ng/g dry weight, and a median value of 41 ng/g dry weight, based on the 451 samples assayed, the batch-specific RLs, and variations in sample mass, dilutions required, and digest subsample volumes. The mean and standard error of the CRM (appendix table 1–3) and MS (appendix table 1–4) recoveries were 94.4±1.3 percent (sample count, or N, =38, median = 93.0 percent) and 107.6±3.9 percent (N=44, median = 107.4 percent), respectively. Of the 44 MS recoveries for THg, 55 percent were within the 80–120 percent range. The RPDEV for the combined set of all analytical duplicates assayed for THg had a mean and standard error of 13.8±1.7 percent (N=46, median = 10.3 percent; appendix table 1–5).

Methylmercury

After thawing from frozen storage a sediment core subsample to be analyzed, MeHg first was extracted with a solution of 25 percent potassium hydroxide (KOH) in methanol at 60 °C for 4 hours (Xianchao and others, 2005). The MeHg in the extract was then quantified using an automated MeHg analyzer (MERX Analyzer, Brooks Rand, Seattle, Wash.) after ethylation of the analyte. Further method details are reported in Marvin-DiPasquale and others (2011).

Each batch of environmental samples analyzed was accompanied by the following minimum number of QA samples: one certified reference material sample; one matrix-spike sample; one analytical duplicate; one method blank; and calibration standards prepared from commercial, crystalline methylmercury chloride (MeHgCl) compared to a separate, commercially available MeHg standard solution. The MDL and mean RL for the MeHg assay were both 0.3 picograms (pg) at the level of the autoanalyzer (appendix table 1–2), based on four batch runs. The PRL ranged from 0.02 to 0.12 ng/g dry weight, had a mean and standard error of 0.06±0.03 ng/g dry weight, and had a median value of 0.05 ng/g dry weight, based on the 75 samples assayed, the batch-specific RLs, and variations in sample mass, dilutions required, and digest subsample volumes. The mean and standard error of the CRM (appendix table 1–3) and MS (appendix table 1–4) recoveries were 120.4±2.8 percent (N=8, median = 120.9 percent) and 99.9±1.6 percent (N=16, median = 99.1 percent), respectively. All eight of the MS samples (100 percent) had MeHg recovery within the acceptable range of 80–120 percent. The RPDEV for the combined set of all analytical duplicates assayed for MeHg had a mean and standard error of 9.5±3.0 percent (N=4, median = 11.5 percent; appendix table 1–5).

Iron Speciation

The three iron species—Fe(II), $Fe(III)_a$ and $Fe(III)_c$—were assayed according to the extraction and colorimetric method outlined by Marvin-DiPasquale and others (2008). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate; one matrix spike for Fe(II) and $Fe(III)_c$ fractions only; one method blank; and ferrous sulfate ($FeSO_4$) calibration standards prepared from analytical grade, crystalline reagents. No CRM was commercially available for these method-defined iron species. A rigorous MDL for this assay has not been determined. The mean and standard error for the RL was 0.04 micrograms per milliliter (µg/ml) at the level of the spectrophotometer, based on three batch runs (appendix table 1–2). The PRL for Fe(II) ranged from 0.03 to 0.55 milligrams per gram (mg/g) dry weight, had a mean and standard error of 0.10±0.08 mg/g dry weight, and had a median value of 0.08 mg/g dry weight, based on all samples assayed (N=76); the batch-specific RLs; and variations in sample mass, dilutions required, and digest subsample volumes. The PRL for dithionite-extractable Fe(III), used to calculate $Fe(III)_c$, ranged from 0.32 to 0.66 mg/g dry weight, had a mean and standard error of 0.51±0.01 mg/g dry weight, and had a median value of 0.51 mg/g dry weight, based on the 76 samples assayed. The mean and standard error of the MS (appendix table 1–4) recoveries for Fe(II) and $Fe(III)_c$ were 89.2±4.6 percent (N=4, median = 86.2 percent) and 98.4±5.0 percent (N=4, median = 95.1 percent), respectively. No confidence interval was computed; thus, a negative bias could exist. All MS results for Fe(II) and $Fe(III)_c$ were within 80–120 percent. The RPDEV for the combined set of all analytical duplicates assayed for each Fe-species had a mean and standard error (appendix table 1–5) as follows: Fe(II), 5.7±2.6 percent (N=6, median = 4.2 percent); $Fe(III)_a$, 6.8±2.3 percent (N=6, median = 6.3 percent); and $Fe(III)_c$, 2.7±0.9 percent (N=6, median = 2.1 percent).

Total Reduced Sulfur

After thawing core subsamples from frozen storage, TRS was extracted by a single-step, hot-acid, chromium-reduction approach and quantified spectrophotometrically (Marvin-DiPasquale and others, 2008). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate, one matrix spike, one method blank, and zinc-sulfide (ZnS) calibration standards. No CRM was commercially available for the TRS assay. A rigorous MDL for this assay has not been determined. The mean and standard error of the RL was 0.8 nanomole per milliliter (nmol/ml) at the level of the spectrophotometer, based on three batch runs (appendix table 1–2). The PRL ranged from 0.02 to 0.55 µmol/g dry weight, had a mean and standard error of 0.07±0.01 µmol/g dry weight and a median value of 0.05 µmol/g dry weight, based on the 76 samples assayed, the batch specific RLs, and variations in sample mass, dilutions required, and digest subsample volumes. The mean and standard error of all the MS recoveries (appendix table 1–4) was 111±15 percent (N=4, median = 122 percent), and only one of the four MS results was within 80–120 percent. The RPDEV for the combined set of all analytical duplicates assayed for TRS had a mean and standard error of 18.1±5.1 percent (N=5, median = 11.0 percent; appenidix table 1–5).

Grain Size—Sand and Silt-Clay Fractions

After thawing sediment from frozen storage, the sediment core subsamples were wet sieved, and the resulting size fractions (less than 63 micrometers (µm), the silt-clay fraction, and greater than 63 µm, the sand fraction) were oven dried. The percentage of fines was assayed as the weight percentage of dry sediment less than 63 µm (Matthes and others, 1992). Each batch of analytical samples was accompanied by one analytical duplicate. No CRM was commercially available for grain-size analysis. A rigorous MDL for this assay has not been determined. An RL of 2.0 percent (weight percentage less than 63 µm) was previously determined for this method by examining the RPDEV of 192 samples and duplicates in our database. The RPDEV for the combined set of all analytical duplicates assayed for percentage of fines in this study had a mean and standard error of 3.2±1.3 percent (N=13, median = 1.2 percent; appendix table 1–5).

Grain Size—Laser Scattering

Detailed grain-size distribution was determined using a model LS 13 320 laser diffraction particle-size analyzer (LDPSA, Beckman Coulter, Inc., Brea, Calif.) at the USGS CAWSC laboratory in Sacramento, Calif. Prior to analysis, samples were dried at 55 °C and were split into representative aliquots using a “Sieving Riffler®” (Quantachrome Instruments, Boynton Beach, Fla.). Material that did not fit through a 1-millimeter sieve was excluded. Approximately 500 mg of sediment was placed in the LDPSA unit, which uses a 5 milliwatt laser diode with a wavelength of 750 nanometers. The composite light-scattering pattern was measured by 126 detectors placed at angles up to approximately 35 degrees from the optical axis (Beckman Coulter, Inc., 2011). In the LDPSA, the composite scattering pattern was deconvolved to a set of individual numbers, one for each size classification, and the relative amplitude of each number is a measure of the relative volume of equivalent spherical particles of that size. This deconvolution is based on the Fraunhofer optical model, the instrument default, which assumes that the particle diameter is much larger than the wavelength of the light and that the refractive index of the particles is different than that of the transport medium, in this case, water (Beckman Coulter, Inc., 2011).

Each sample was run in duplicate, and the median grain-size (D50) values for the two runs were compared by relative percentage difference (RPD) similar to Marineau and Wright (2017). The RPD was calculated as the absolute difference between the two results, divided by mean of the two results, multiplied by 100. If the RPD was greater than 10 percent, then additional aliquots were analyzed. In the cited method, pairs of aliquots were reanalyzed, and only values for the second pair were reported, whereas in this study, the data from the additional aliquots were combined with the data from the original aliquots. A total of 19 sample pairs (26 percent) had an initial RPD greater than 10 percent and were resubsampled and analyzed. In one case (out of 76 total samples), a third aliquot pair was needed to produce an RPD value of less than 10 percent.

Raw data from the LDPSA were post-processed using MATLAB (The MathWorks, Inc., Natick, Mass.) to produce tabular data in ¼-phi size bins and to compute the proportions of sand, silt, and clay in each sample. The phi scale for sediment particles is equal to the negative log (base 2) of the particle diameter in millimeters (Poppe and others, 2003). Nominal particle diameters were assigned using the Wentworth grade scale: gravel (greater than 2.0 mm), sand (less than 2.0 mm to greater than 62.5 µm), silt (less than 62.5 µm to greater than 4.0 µm) and clay (less than 4.0 µm; Wentworth, 1922). Phi values of 0, 2, 4, and 8 correspond to sediment particles measuring 1 mm, 0.25 mm, 0.0625 mm, and 0.004 mm, respectively.

Cesium-137 and Other Radionuclides

Environmental levels of Pb-210 and Cs-137 have been used for many decades to radiometrically date recent sedimentary deposits (less than 100 years; for example, see Appleby and Oldfield, 1992). The anthropogenic radionuclide Cs-137 (half-life of 30.1 years) can be used to constrain sediment-accumulation rates and chronology because of its well-known input history and strong sorption to sediments. The Cs-137 sorbed to soils and sediments comes from atmospheric fallout from aboveground nuclear-weapons testing that took place during the 1950s and first half of the 1960s. The first such testing is commonly dated to the year 1952 with maximum deposition during the years 1963 and 1964. Atmospheric fallout decreased following this period, and no measurable fallout was detected after 1976 (Callender and Robbins, 1993). The profile of Cs-137 in an undisturbed sediment profile should reflect this atmospheric fallout history, thereby providing time horizons to establish sediment-accumulation rates reflecting the history of contaminant inputs.

The isotope Pb-210 is a natural radioisotope of Pb in the U-238 decay series and has a half-life of 22.3 years. The Pb-210 activity in sediments results from a supported component produced in the sediment by radioactive decay of its long-lived parent radium-226 through intermediate, short-lived isotopes such as radon-222 (Rn-222) and from an unsupported Pb-210 component in excess of its parent activity. Unsupported Pb-210 is derived from Rn-222 that diffuses from continental land masses to the general atmosphere, where it decays to Pb-210, which adheres to aerosols and particulates that are subsequently deposited on the land surface by atmospheric fallout. Unsupported Pb-210 typically decreases with increasing depth as it decays over time to the supported activity, providing a means to date sediments up to approximately 100 years old (Appleby and Oldfield, 1992).

Freeze-dried subsections of sediment cores were analyzed for Pb-210, Ra-226, and Cs-137 activity to estimate sediment accumulation rates by assigning radiometric dates to core profiles, which are to be reported in other publications. Activities of total Pb-210, Ra-226, and Cs-137 were measured simultaneously by gamma spectrometry using previously published methods (Fuller and others, 1999; Van Metre and others, 2004). The supported Pb-210 activity, defined by its long-lived progenitor Ra-226, was determined from the average of the activity of the Ra-226 daughters Pb-214 and bismuth-214 (Bi-214). Pb-214 and Bi-214 were quantified from the 352-kiloelectron-volts (keV) and 609-keV gamma-emission lines, respectively. Unsupported Pb-210 was calculated as the difference between the total Pb-210 activity and its supported activity (Ra-226). Because a portion of the low energy (46-keV) Pb-210 gamma emission is absorbed by the sample matrix (self-absorption), Pb-210 count rates were corrected for self-absorption using an attenuation factor for each counting vial calculated from an empirical relationship between self-absorption and the sample bulk density (measured gamma bulk density) developed for the counting geometry based on the method of Cutshall and others (1983). Self-absorption of the Pb-214, Bi-214, and the 661.5-keV Cs-137 gamma-emission lines was negligible, and therefore, count rates for these radioisotopes were not corrected. Detector efficiency for each isotope was determined using NIST-traceable standards. NIST and International Atomic Energy Agency reference materials were used to check detector calibration. The uncertainty in the measured activity calculated from the random counting error of samples and background spectra is reported at the one-standard-deviation level. The uncertainty in unsupported Pb-210 is propagated from the uncertainty in Pb-210 and Ra-226. Measured activities of Cs-137 were decay-corrected for the period between sample collection and analysis.

The detection limit for unsupported Pb-210 was determined from detection limits for total Pb-210 and the supported activity defined by Ra-226. Because the unsupported Pb-210 is the difference between two measured values, its uncertainty increases as the activity of total Pb-210 approaches the supported activity. The detection limit for Pb-210 and Ra-226 was defined as three times the average of the standard deviation of the one-sigma uncertainty in the detector background-count rate for the respective emission lines of these radionuclides and converted to an activity per gram basis using the average sample weight. The detection limit for unsupported Pb-210 was defined by propagating the total Pb-210 and Ra-226 detection limits using standard statistical relationships that treat these detection limits as uncertainties where the unsupported Pb-210 detection limit equals the square root of the sum of the square of the total Pb-210 detection limit and the square of the Ra-226 detection limit. The detection limit for unsupported Pb-210 was 0.3 disintegrations per minute per gram dry sediment (dpm/g). The measured unsupported Pb-210 activity exceeded this detection limit in less than 8 percent of all sediment samples analyzed. The unsupported Pb-210 activity of these samples was within a factor of 1.5 of the detection limit, and these samples were distributed randomly throughout the depth range of the cores. The average total Pb-210 and Ra-226 activities and standard deviation of the 273 CCSB sediment samples analyzed were 1.06±0.22 dpm/g and 1.03±0.15, respectively. As a result, Pb-210 cannot be used to date the CCSB sediments and is not reported. The low, unsupported Pb-210 activities were likely the result of low atmospheric Pb-210 deposition rates in the western United States (Fuller and Hammond, 1983) combined with a large mass of sediment derived from bank erosion in the Cache Creek watershed. Combined, these factors resulted in unsupported Pb-210 activity values near or below the MDL.

The Cs-137 activity in the CCSB sediments also was relatively low compared to other locations that have recently deposited sediment, and these low levels of Cs-137 activity most likely resulted from dilution by sediments that had no detectable Cs-137 activity, such as sediment eroded from the watershed that had not been exposed to atmospheric deposition of Cs-137. A detection limit for Cs-137 of 0.017 picocuries per gram (pCi/g) dry sediment was determined from the average uncertainty in the detector background-count rate for the 661.5-keV emission line. The Cs-137 detection limit was refined by analysis of 11 sediment samples from depth intervals between 450- and 1330-cm below land surface. These samples were from depths that had likely ages greater than 200 years since deposition, based on an estimated sedimentation rate in the CCSB of 2 centimeters per year (United States Army Corps of Engineers, 1997), and, thus, likely were buried before the onset of Cs-137 atmospheric fallout in 1952. The measured Cs-137 activities of these 11 samples ranged from −0.017±0.002 to 0.010±0.009 pCi/g. The reported uncertainty for these activities is the one standard-deviation uncertainty of the calculated activity, as described previously. A negative activity value results when the integrated count rate of the Cs-137 gamma emission energy region for a sample is less than the detector background-count rate for the same region, which is subtracted from the sample-count rate. All of the measured activities of these deep samples were less than the 0.017 pCi/g detection limit defined from the average uncertainty in background-corrected count rates. The practical detection limit for CCSB was therefore defined at 0.010 pCi/g on the basis of these deep samples.

Dry Weight, Bulk Density, Porosity, and Organic Content

For samples collected at 20-cm depth intervals, sediment bulk density, percentage dry weight, porosity, and organic content (as the percentage loss on ignition, or LOI) were analyzed consecutively from single sediment subsamples (after thawing from frozen storage), as previously detailed (Marvin-DiPasquale and others, 2008). For samples collected at 3-cm depth intervals, percentage dry weight and percentage LOI were determined, but bulk density and porosity were not determined. For 3-cm depth intervals, percentage dry weight was measured as the percentage change in weight from before and after freeze drying the sediment subtracted from 100.

Each batch of analytical samples was accompanied by the analysis of an analytical duplicate. No CRM was commercially available for this suite of sediment analyses. The MDLs established for these parameters are as follows: (1) 0.04 grams per cubic centimeter bulk density, (2) 1.0 percent (weight percentage) dry weight, (3) 0.02 milliliter of pore water per cubic centimeter for porosity, and (4) 0.3 percent (weight percentage) for organic content as percentage LOI. None of the measurements associated with the deep-core sample set were below these analyte-specific MDL levels. The combined set of all analytical duplicates assayed for this suite of parameters had mean and standard error RPDEV values as follows: (1) 2.6±0.6 percent for bulk density (N=12, median = 2.0 percent), (2) 0.3±0.1 percent for dry weight (N=12, median = 0.2 percent), (3) 3.8±1.3 percent for porosity (N=11, median = 2.2 percent), and (4) 4.2±0.7 percent for organic content (LOI; N=42, median = 3.4 percent; appendix table 1–5).

Graphics Software

The graphical depictions of the cores included in appendix 2 of this report were created using AppleCore (version 10.1; GeoMEM, Ltd., Dundee, Scotland) borehole logging software.

Coring Results

Tables 1 and 2 summarize the core recovery, as a percentage, for each borehole and each core section, respectively. The mean recovery for the 31 boreholes collected was 93.1 percent, and the median was 95.7 percent. Borehole 6b had the lowest recovery at 55.2 percent, and borehole 9b had the greatest recovery at 111.9 percent. Recovery greater than 100 percent was most likely caused by slough from the preceding (overlying) core section, because the bore holes were not lined.

Graphical Core Descriptions

The results of the MSCL scans, digital photographs, and core descriptions are graphically depicted in appendix 2 for each 152-cm (5-ft), or shorter, core section. The depth intervals of 20-cm and 3-cm subsamples are indicated.

Laboratory Analysis Results

Concentrations of THg and MeHg in sediment from 20-cm sample intervals are reported in table 3. The THg concentrations ranged from 48 to 2,410 ng/g dry weight. The sample with the lowest concentration of THg was from core section 9a #2P, and the highest concentration of THg was in a sample from core section 4b #1A. The MeHg concentrations ranged from less than 0.05 to 3.68 ng/g dry weight. More than 25 percent of the samples had MeHg concentrations less than the median practical reporting limit of 0.05 ng/g dry weight. The sample with the highest measured concentration of MeHg was from core section 12a #4A.

Considering the data from all 15 drill sites, the depth interval with the highest median THg concentration was 70–90 cm (3 ft), and the depth interval with the lowest median THg concentration was 450–470 cm (15 ft). The depth interval that had the highest median concentration of MeHg was 10–30 cm (1 ft), and the lowest median concentration of MeHg was found at 750–770 cm (25 ft) depth. The highest median percentage of mercury as MeHg (computed as 100 times the ratio MeHg/THg, or percent MeHg) was also found at 10–30 cm depth and the lowest median percent MeHg was also found at 750–770 cm depth.

The THg, Cs-137, and organic content (LOI) data from the subsampled 3-cm depth intervals are presented by core section in table 4. The results of additional analyses of the selected 20-cm depth intervals, including Fe species, TRS, organic content (LOI), bulk density, and fines percentage, are reported in tables 5 and 6. The concentrations of Fe(II), $Fe(III)_a$, and $Fe(III)_c$ ranged from 0.06 to 3.70, 0.18 to 2.81, and 4.9 to 18.4 mg/g dry weight, respectively. The sample with the highest concentrations of each Fe species was collected from the following core sections: 12a #4A for Fe(II); 15b #1A for $Fe(III)_a$; and 1b #1P for $Fe(III)_c$. The depth intervals with the highest median concentration of each Fe species were 70–90 cm (3 ft) for Fe(II); 150–170 cm (5 ft) for $Fe(III)_a$; and 450–470 cm (15 ft) for $Fe(III)_c$. The concentration of TRS in sediment ranged from 0.01 to 10.5 micromoles per gram dry weight. The sample with the highest TRS concentration was collected from core section 12a #4A. The sediment depth interval with the highest median TRS concentration was 10–30 cm (1 ft).

Table 7 shows grain-size distribution results of individual samples; a statistical summary of results by depth interval for grain-size distribution and other analytes measured for this study is presented in table 8. The depth intervals with the highest mean sand, silt, and clay percentages were 70–90 cm (3 ft), 750–770 cm (25 ft), and 450–470 cm (15 ft), respectively. Plots showing results are to be published in a separate interpretive report by USGS. That report is intended to present a discussion of sediment deposition rate in the CCSB and the history of Hg transport and deposition in the Cache Creek drainage basin in relation to historical mining activities.

Table 3. Mercury speciation in sediment at selected 20-centimeter intervals subsampled from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ). The deviation is equal to the difference from the mean of two samples. The methylmercury method detection limit is 0.3 picogram (absolute mass as mercury) at the level of the autoanalyzer. The median practical reporting limit is 0.05 ng/g dry wt. The National Water Information System (NWIS) parameter codes are included where possible. **Abbreviations:** cm, centimeter; decimal ft, decimal feet; dry wt, dry weight; MeHg, methylmercury; ng/g, nanogram per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	THg dry wt. (ng/g) parameter code 62978		MeHg dry wt. (ng/g) parameter code 62979		MeHg (as percent THg)
1b #1P	0.0–3.8	10–30	0.3–1.0	10–30	0.3–1.0	261	—	1.18	—	0.45
1b #1P	0.0–3.8	70–90	2.3–3.0	70–90	2.3–3.0	395	—	1.34	—	0.34
1b #2H	3.8–9.3	36–56	1.2–1.8	153–173	5.0–5.7	587	—	0.38	—	0.06
1b #4P	14.0–18.1	30–50	1.0–1.6	457–477	15.0–15.6	84.7	—	0.20	—	0.24
1b #6P	23.3–28.1	40–60	1.3–2.0	749–769	24.6–25.2	64.2	(6.0)	<0.05	—	<0.02
2c #1P	0.0–4.1	11–31	0.4–1.0	11–31	0.4–1.0	426	—	0.83	(0.11)	0.19
2c #1P	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	917	—	1.31	—	0.14
2c #2P	4.1–8.9	25–45	0.8–1.5	149–169	4.9–5.5	1,670	—	2.19	—	0.13
2c #4P	13.9–18.8	30–50	1.0–1.6	454–474	14.9–15.6	69.2	—	<0.05	—	<0.06
2c #6PH	23.7–27.1	30–50	1.0–1.6	751–771	24.6–25.3	161	—	<0.05	—	<0.01
3b #1A	0.0–3.4	10–30	0.3–1.0	10–30	0.3–1.0	173	—	0.89	—	0.52
3b #1A	0.0–3.4	70–90	2.3–3.0	70–90	2.3–3.0	609	—	0.90	—	0.15
3b #2A	3.4–7.8	50–70	1.6–2.3	154–174	5.1–5.7	133	—	0.27	—	0.21
3b #4A	13.1–18.2	60–80	2.0–2.6	459–479	15.1–15.7	61.3	—	<0.05	—	<0.03
3b #6A	23.2–28.3	63–83	2.1–2.7	769–789	25.2–25.9	124	(6)	<0.05	—	<0.01
4b #1A	0.0–3.0	15–35	0.5–1.1	15–35	0.5–1.1	1,010	—	0.50	—	0.05
4b #1A	0.0–3.0	65–85	2.1–2.8	65–85	2.1–2.8	2,410	—	0.76	—	0.03
4b #2A	3.0–8.1	60–80	2.0–2.6	151–171	5.0–5.6	123	—	0.33	—	0.27
4b #4A	13.0–18.1	60–80	2.0–2.6	456–476	15.0–15.6	121	—	<0.05	—	<0.01
4b #6A	23.0–27.9	50–70	1.6–2.3	751–771	24.6–25.3	180	—	<0.05	—	<0.01
5a #1A	0.0–4.3	10–30	0.3–1.0	10–30	0.3–1.0	821	—	1.47	—	0.18
5a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	316	—	0.39	—	0.12
5a #2A	4.3–9.4	20–40	0.7–1.3	152–172	5.0–5.6	829	—	0.35	—	0.04
5a #4A	14.5–17.2	16–36	0.5–1.2	458–478	15.0–15.7	65.0	—	<0.05	—	<0.03
5a #6A	24.2–27.8	25–45	0.8–1.5	762–782	25.0–25.7	103	(4)	<0.05	—	<0.02
6a #1A	0.0–4.6	10–30	0.3–1.0	10–30	0.3–1.0	335	—	1.49	—	0.44
6a #1A	0.0–4.6	70–90	2.3–3.0	70–90	2.3–3.0	862	—	0.76	—	0.09
6a #2A	4.6–9.2	18–38	0.6–1.2	153–173	5.0–5.7	710	—	1.39	—	0.20
6a #4A	14.4–19.5	18–38	0.6–1.2	457–477	15.0–15.6	50.6	—	0.12	—	0.24
6a #6A	24.3–29.3	10–30	0.3–1.0	752–772	24.7–25.3	93.5	—	<0.05	—	<0.02

Table 3. Mercury speciation in sediment at selected 20-centimeter intervals subsampled from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ). The deviation is equal to the difference from the mean of two samples. The methylmercury method detection limit is 0.3 picogram (absolute mass as mercury) at the level of the autoanalyzer. The median practical reporting limit is 0.05 ng/g dry wt. The National Water Information System (NWIS) parameter codes are included where possible. **Abbreviations:** cm, centimeter; decimal ft, decimal feet; dry wt, dry weight; MeHg, methylmercury; ng/g, nanogram per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	THg dry wt. (ng/g) parameter code 62978		MeHg dry wt. (ng/g) parameter code 62979		MeHg (as percent THg)
7a #1A	0.0–4.1	10–30	0.3–1.0	10–30	0.3–1.0	1,020	—	0.37	(0.05)	0.04
7a #1A	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	449	—	0.74	—	0.16
7a #2A	4.1–8.8	28–48	0.9–1.6	152–172	5.0–5.6	243	—	0.78	—	0.32
7a #4A	13.8–18.8	38–58	1.2–1.9	457–477	15.0–15.6	101	—	<0.05	—	<0.02
7a #6A	23.8–28.8	38–58	1.2–1.9	762–782	25.0–25.7	127	(14)	<0.05	—	<0.01
8b #1P	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	429	—	—	—	0.18
8b #1P	0.0–3.3	65–85	2.1–2.8	65–85	2.1–2.8	572	—	0.71	—	0.12
8b #2P	3.3–7.9	50–70	1.6–2.3	152–172	5.0–5.6	97.9	—	0.41	—	0.41
8b #4P	12.0–17.0	90–110	3.0–3.6	456–476	15.0–15.6	56.0	—	<0.05	—	<0.06
9a #1PHP	0.0–4.8	10–30	0.3–1.0	10–30	0.3–1.0	472	—	1.43	—	0.30
9a #1PHP	0.0–4.8	68–88	2.2–2.9	68–88	2.2–2.9	1,000	—	0.68	—	0.07
9a #2P	4.8–9.5	15–35	0.5–1.1	162–182	5.3–6.0	48.4	(0.9)	0.12	—	0.24
9a #3P	9.5–15.3	118–138	3.9–4.5	408–428	13.4–14.0	68.4	—	<0.05	—	<0.03
9a #5P	20.3–25.3	132–152	4.3–5.0	749–769	24.6–25.2	86.5	—	<0.05	—	<0.02
10b #1A	0.0–3.5	10–30	0.3–1.0	10–30	0.3–1.0	279	—	1.34	—	0.48
10b #1A	0.0–3.5	70–90	2.3–3.0	70–90	2.3–3.0	1,000	—	1.60	—	0.16
10b #2A	3.5–8.3	50–70	1.6–2.3	158–178	5.2–5.8	602	—	0.68	—	0.11
10b #4A	13.3–18.3	30–50	1.0–1.6	436–456	14.3–15.0	47.9	—	<0.05	—	<0.04
10b #6A	23.3–28.3	70–90	2.3–3.0	781–801	25.6–26.3	64.4	(0.5)	<0.05	—	<0.02
11c #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	302	—	1.50	—	0.50
11c #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	793	—	1.49	—	0.19
11c #2A	4.4–9.5	15–35	0.5–1.1	150–170	4.9–5.6	544	—	0.29	—	0.05
11b #4A	12.9–17.9	56–76	1.8–2.5	450–470	14.8–15.4	210	—	0.07	(0.00)	0.03
11b #6A	22.8–27.8	56–76	1.8–2.5	749–769	24.6–25.2	118	(7)	<0.05	—	<0.03
11b #8A	32.7–37.4	70–90	2.3–3.0	1,066–1,086	35.0–35.6	331	—	<0.05	—	<0.01
11b #10A	42.8–46.8	47–67	1.5–2.2	1,350–1,370	44.3–44.9	115	—	<0.05	—	<0.02
12a #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	428	—	2.19	—	0.51
12a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	488	—	1.35	—	0.28
12a #2A	4.4–9.4	15–35	0.5–1.1	150–170	4.9–5.6	781	—	1.34	—	0.17
12a #4A	14.6–19.6	5–25	0.2–0.8	450–470	14.8–15.4	1,260	—	3.68	—	0.29
12a #6A	24.5–29.6	12–32	0.4–1.0	760–780	24.9–25.6	104	—	0.35	—	0.34

Table 3. Mercury speciation in sediment at selected 20-centimeter intervals subsampled from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ). The deviation is equal to the difference from the mean of two samples. The methylmercury method detection limit is 0.3 picogram (absolute mass as mercury) at the level of the autoanalyzer. The median practical reporting limit is 0.05 ng/g dry wt. The National Water Information System (NWIS) parameter codes are included where possible. **Abbreviations:** cm, centimeter; decimal ft, decimal feet; dry wt, dry weight; MeHg, methylmercury; ng/g, nanogram per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	THg dry wt. (ng/g) parameter code 62978		MeHg dry wt. (ng/g) parameter code 62979		MeHg (as percent THg)
13b #1A	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	522	—	2.00	—	0.38
13b #1A	0.0–3.3	70–90	2.3–3.0	70–90	2.3–3.0	686	—	1.11	—	0.16
13b #2A	3.3–8.4	51–71	1.7–2.3	150–170	4.9–5.6	1,200	—	1.52	—	0.13
13b #4A	13.3–18.4	45–65	1.5–2.1	450–470	14.8–15.4	82.6	—	0.08	—	0.10
13b #6A	23.4–28.4	36–56	1.2–1.8	750–770	24.6–25.3	86.0	—	<0.05	—	<0.03
14a #1A	0.0–4.3	10–20	0.3–0.7	10–20	0.3–0.7	782	—	2.01	—	0.26
14a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	1,740	—	2.84	—	0.16
14b #2A	2.8–8.0	64–84	2.1–2.8	150–170	4.9–5.6	1,310	(183)	1.63	—	0.12
14b #4A	13.0–17.8	55–75	1.8–2.5	450–470	14.8–15.4	78.8	—	0.07	—	0.09
14b #6A	22.7–27.9	58–78	1.9–2.6	750–770	24.6–25.3	193	—	0.07	—	0.04
15b #1A	0.0–2.8	10–30	0.3–1.0	10–30	0.3–1.0	568	—	1.54	—	0.27
15a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	552	—	1.53	—	0.28
15b #2A	2.8–7.8	66–86	2.2–2.8	150–170	4.9–5.6	1,230	—	3.22	(0.30)	0.26
15a #4A	14.4–19.5	10–30	0.3–1.0	449–469	14.7–15.4	67.5	—	0.17	—	0.26
15a #6A	24.3–29.0	8–28	0.3–0.9	750–770	24.6–25.3	106	(14)	0.11	—	0.10

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the "working" half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the "working" and "archive" halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
9a #1PHP	0.0–4.8	12–15	12–15	274	—	0.014	0.008	6.48	—
9a #1PHP	0.0–4.8	24–27	24–27	303	—	0.033	0.010	2.97	—
9a #1PHP	0.0–4.8	36–39	36–39	740	—	0.038	0.007	3.70	—
9a #1PHP	0.0–4.8	48–51	48–51	925	—	0.049	0.008	3.77	—
9a #1PHP	0.0–4.8	54–57	54–57	641	(164)	0.042	0.008	3.87	—
9a #1PHP	0.0–4.8	60–63	60–63	458	—	0.044	0.008	3.38	—
9a #1PHP	0.0–4.8	66–69	66–69	760	—	0.041	0.008	2.83	—
9a #1PHP	0.0–4.8	72–75	72–75	2,030	—	0.037	0.008	2.56	—
9a #1PHP	0.0–4.8	78–81	78–81	783	—	0.039	0.008	2.95	—
9a #1PHP	0.0–4.8	84–87	84–87	287	—	0.027	0.007	2.38	—
9a #1PHP	0.0–4.8	90–93	90–93	521	—	0.073	0.009	3.79	—
9a #1PHP	0.0–4.8	96–99	96–99	945	—	0.073	0.010	4.09	(0.05)
9a #1PHP	0.0–4.8	99–102	99–102	658	—	0.109	0.010	4.73	—
9a #1PHP	0.0–4.8	102–105	102–105	841	—	0.218	0.013	4.77	(0.44)
9a #1PHP	0.0–4.8	105–108	105–108	1,210	—	0.127	0.015	5.02	—
9a #1PHP	0.0–4.8	108–111	108–111	1,040	(154)	0.109	0.013	3.50	—
9a #1PHP	0.0–4.8	111–114	111–114	498	—	0.051	0.012	4.52	—
9a #1PHP	0.0–4.8	116–119	116–119	135	—	0.021	0.008	5.59	—
9a #1PHP	0.0–4.8	119–122	119–122	176	—	0.049	0.009	5.09	—
9a #1PHP	0.0–4.8	122–125	122–125	174	—	0.022	0.008	5.73	—
9a #1PHP	0.0–4.8	126–129	126–129	110	—	<0.010	—	5.38	—
9a #2P	4.8–9.5	6–9	153–156	355	(21)	0.046	0.008	3.45	—
9a #2P	4.8–9.5	18–21	165–168	67.6	—	<0.010	—	5.31	—
9a #2P	4.8–9.5	27–30	174–177	269	—	<0.010	—	4.55	—
9a #2P	4.8–9.5	48–51	195–198	94.0	—	<0.010	—	4.42	—
10b #1A	0.0–3.5	12–15	12–15	435	—	0.026	0.009	4.90	—
10b #1A	0.0–3.5	24–27	24–27	305	—	0.028	0.008	5.40	—
10b #1A	0.0–3.5	36–39	36–39	861	—	0.028	0.010	5.35	(0.03)
10b #1A	0.0–3.5	48–51	48–51	426	—	0.048	0.009	4.65	—
10b #1A	0.0–3.5	51–54	51–54	748	—	0.058	0.008	3.59	—
10b #1A	0.0–3.5	54–57	54–57	409	(47)	0.036	0.008	4.34	—
10b #1A	0.0–3.5	57–60	57–60	1,080	—	0.043	0.008	3.15	—
10b #1A	0.0–3.5	60–63	60–63	357	—	0.046	0.009	4.67	(0.00)
10b #1A	0.0–3.5	63–66	63–66	791	—	0.085	0.011	3.56	—

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the "working" half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the "working" and "archive" halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
10b #1A	0.0–3.5	66–69	66–69	505	—	0.091	0.009	4.64	—
10b #1A	0.0–3.5	69–72	69–72	864	—	0.104	0.012	3.98	—
10b #1A	0.0–3.5	72–75	72–75	652	—	0.096	0.011	4.58	(0.04)
10b #1A	0.0–3.5	75–78	75–78	1,650	—	0.056	0.010	3.63	—
10b #1A	0.0–3.5	78–81	78–81	977	—	0.105	0.011	4.48	—
10b #1A	0.0–3.5	81–84	81–84	751	—	0.148	0.013	4.25	(0.00)
10b #1A	0.0–3.5	84–87	84–87	504	—	0.051	0.009	4.11	—
10b #1A	0.0–3.5	90–93	90–93	595	—	0.023	0.009	3.64	—
10b #2A	3.5–8.3	6–9	114–117	1,310	—	<0.010	—	3.31	—
10b #2A	3.5–8.3	12–15	120–123	322	—	<0.010	—	3.43	—
10b #2A	3.5–8.3	15–18	123–126	791	—	<0.010	—	4.41	—
10b #2A	3.5–8.3	18–21 archive	126–129	816	—	0.027	0.009	4.14	—
10b #2A	3.5–8.3	18–21 working	126–129	1,000	—	0.016	0.007	3.95	—
10b #2A	3.5–8.3	21–24	129–132	828	—	<0.010	—	3.93	—
10b #2A	3.5–8.3	24–27	132–135	805	—	0.021	0.015	4.78	—
10b #2A	3.5–8.3	27–30	135–138	1,450	(124)	<0.010	—	3.83	—
10b #2A	3.5–8.3	30–33	138–141	939	—	<0.010	—	3.17	—
10b #2A	3.5–8.3	33–36	141–144	1,440	—	<0.010	—	4.20	(0.01)
10b #2A	3.5–8.3	36–39	144–147	372	(20)	<0.010	—	3.51	—
10b #2A	3.5–8.3	39–42	147–150	172	—	<0.010	—	2.58	—
10b #2A	3.5–8.3	42–45	150–153	78.1	—	<0.010	—	2.00	—
10b #2A	3.5–8.3	45–48	153–156	121	—	<0.010	—	2.66	—
10b #2A	3.5–8.3	48–51	156–159	477	—	<0.010	—	2.79	—
10b #2A	3.5–8.3	51–54	159–162	660	—	<0.010	—	2.90	(0.01)
10b #2A	3.5–8.3	54–57	162–165	782	—	<0.010	—	3.26	—
10b #2A	3.5–8.3	63–66	171–174	1,040	—	<0.010	—	3.82	—
10b #2A	3.5–8.3	75–78	183–186	1,290	—	<0.010	—	3.38	—
10b #5A	18.3–23.3	66–69	625–628	124	—	<0.010	—	2.55	—
10b #6A	23.3–28.3	81–84	792–795	66.1	—	<0.010	—	3.73	—
11c #1A	0.0–4.4	12–15	12–15	265	—	<0.010	—	2.99	—
11c #1A	0.0–4.4	24–27	24–27	409	—	0.031	0.013	4.52	—
11c #1A	0.0–4.4	36–39	36–39	871	—	0.039	0.013	4.34	—
11c #1A	0.0–4.4	48–51	48–51	275	—	0.019	0.010	3.84	—
11c #1A	0.0–4.4	54–57	54–57	637	(138)	0.019	0.008	3.59	—

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the "working" half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the "working" and "archive" halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
11c #1A	0.0–4.4	60–63	60–63	1,090	—	0.051	0.009	3.54	—
11c #1A	0.0–4.4	66–69	66–69	1,240	—	0.065	0.009	3.29	—
11c #1A	0.0–4.4	72–75	72–75	545	—	0.049	0.011	3.93	(0.12)
11c #1A	0.0–4.4	75–78	75–78	372	—	0.052	0.010	4.38	—
11c #1A	0.0–4.4	78–81	78–81	3,640	—	0.063	0.012	3.37	—
11c #1A	0.0–4.4	81–84	81–84	612	—	0.070	0.008	2.96	—
11c #1A	0.0–4.4	84–87	84–87	437	—	0.069	0.011	2.85	—
11c #1A	0.0–4.4	87–90	87–90	822	—	0.064	0.008	3.58	—
11c #1A	0.0–4.4	90–93	90–93	723	—	0.066	0.008	3.35	—
11c #1A	0.0–4.4	93–96	93–96	264	—	0.040	0.012	2.12	—
11c #1A	0.0–4.4	96–99	96–99	518	—	0.054	0.011	2.73	—
11c #1A	0.0–4.4	99–102	99–102	264	(106)	0.037	0.011	1.51	—
11c #1A	0.0–4.4	102–105	102–105	154	—	<0.010	—	1.50	—
11c #1A	0.0–4.4	105–108	105–108	92.2	—	<0.010	—	1.56	—
11c #1A	0.0–4.4	108–111	108–111	88.9	—	<0.010	—	1.64	—
11c #1A	0.0–4.4	111–114	111–114	241	—	<0.010	—	1.47	—
11c #1A	0.0–4.4	114–117	114–117	82.0	—	<0.010	—	1.50	(0.08)
11c #1A	0.0–4.4	117–120	117–120	158	—	<0.010	—	3.30	—
11c #2A	4.4–9.5	3–6	138–141	5,500	—	<0.010	—	1.27	—
11c #2A	4.4–9.5	6–9	141–144	5,270	—	n.a.	—	1.12	(0.05)
11c #2A	4.4–9.5	9–12	144–147	79.4	—	n.a.	—	1.50	—
11c #2A	4.4–9.5	12–15	147–150	61.0	—	<0.010	—	1.25	—
11c #2A	4.4–9.5	15–18	150–153	101	—	n.a.	—	1.26	—
11c #2A	4.4–9.5	18–21	153–156	169	(52)	n.a.	—	1.57	—
11c #2A	4.4–9.5	21–24	156–159	932	—	n.a.	—	2.04	—
11c #2A	4.4–9.5	24–27	159–162	168	—	<0.010	—	1.85	—
11c #2A	4.4–9.5	27–30	162–165	165	—	n.a.	—	2.54	—
11c #2A	4.4–9.5	30–33	165–168	88.9	—	n.a.	—	1.95	—
11c #2A	4.4–9.5	33–36	168–171	926	—	0.045	0.009	2.89	(0.26)
11c #2A	4.4–9.5	36–39	171–174	1,020	—	0.049	0.010	3.85	—
11c #2A	4.4–9.5	39–42	174–177	724	—	0.053	0.007	3.91	—
11c #2A	4.4–9.5	42–45	177–180	185	—	0.019	0.007	1.67	—
11c #2A	4.4–9.5	45–48	180–183	343	—	0.015	0.005	12.0	—
11c #2A	4.4–9.5	48–51	183–186	670	—	0.019	0.009	4.22	—
11c #2A	4.4–9.5	51–54	186–189	853	—	0.026	0.009	3.47	—

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the "working" half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the "working" and "archive" halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
11c #2A	4.4–9.5	54–57	189–192	1,540	(286)	0.035	0.008	4.26	—
11c #2A	4.4–9.5	57–60	192–195	1,720	—	0.019	0.012	3.94	—
11c #2A	4.4–9.5	60–63	195–198	847	—	<0.010	—	4.17	—
11c #2A	4.4–9.5	63–66	198–201	1,280	—	<0.010	—	3.78	(0.27)
11c #2A	4.4–9.5	69–72	204–207	1,260	—	<0.010	—	4.23	—
11c #2A	4.4–9.5	75–78	210–213	1,400	—	<0.010	—	5.32	—
11c #2A	4.4–9.5	78–81	213–216	638	—	<0.010	—	4.11	—
11c #2A	4.4–9.5	81–84	216–219	136	—	<0.010	—	4.39	—
11c #2A	4.4–9.5	87–90	222–225	49.8	(4.0)	<0.010	—	6.51	—
11c #2A	4.4–9.5	93–96	228–231	42.0	—	<0.010	—	4.61	—
11c #2A	4.4–9.5	99–102	234–237	42.4	—	<0.010	—	3.81	—
11c #2A	4.4–9.5	105–108	240–243	45.8	—	<0.010	—	4.66	—
11b #5A	17.9–22.8	123–126	669–672	82.5	—	<0.010	—	3.22	—
11b #6A	22.8–27.8	120–123	813–816	121	—	<0.010	—	3.78	(0.20)
11b #8A	32.7–37.4	138–141	1,134–1,137	110	—	<0.010	—	2.45	—
11b #10A	42.8–46.8	27–30	1,330–1,333	88.2	(1.4)	<0.010	—	3.30	—
12a #1A	0.0–4.4	12–15	12–15	261	—	n.a.	—	4.86	—
12a #1A	0.0–4.4	24–27	24–27	1,900	—	0.031	0.006	4.72	—
12a #1A	0.0–4.4	36–39	36–39	542	—	n.a.	—	2.95	—
12a #1A	0.0–4.4	48–51	48–51	562	—	n.a.	—	3.34	—
12a #1A	0.0–4.4	54–57	54–57	452	—	0.034	0.009	3.83	—
12a #1A	0.0–4.4	60–63	60–63	527	(102)	n.a.	—	4.75	—
12a #1A	0.0–4.4	66–69	66–69	607	—	n.a.	—	3.54	—
12a #1A	0.0–4.4	72–75	72–75	739	—	0.045	0.009	3.50	(0.26)
12a #1A	0.0–4.4	75–78	75–78	633	—	n.a.	—	4.86	—
12a #1A	0.0–4.4	78–81	78–81	394	—	n.a.	—	3.22	—
12a #1A	0.0–4.4	81–84	81–84	646	—	0.030	0.006	3.49	—
12a #1A	0.0–4.4	84–87	84–87	382	—	n.a.	—	3.17	—
12a #1A	0.0–4.4	87–90	87–90	639	—	n.a.	—	2.99	—
12a #1A	0.0–4.4	90–93	90–93	197	—	0.040	0.008	2.99	—
12a #1A	0.0–4.4	93–96	93–96	454	—	n.a.	—	2.95	—
12a #1A	0.0–4.4	96–99	96–99	447	(79)	n.a.	—	2.25	(0.03)
12a #1A	0.0–4.4	99–102	99–102	105	—	0.023	0.008	2.10	—
12a #1A	0.0–4.4	102–105	102–105	3,170	—	0.042	0.006	3.14	—

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the "working" half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the "working" and "archive" halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
12a #1A	0.0–4.4	105–108	105–108	289	—	0.037	0.008	3.19	—
12a #1A	0.0–4.4	108–111	108–111	413	—	0.026	0.009	2.72	—
12a #1A	0.0–4.4	111–114	111–114	791	—	0.040	0.007	3.05	—
12a #1A	0.0–4.4	114–117	114–117	161	—	0.035	0.007	2.04	—
12a #1A	0.0–4.4	117–120	117–120	420	—	0.058	0.008	3.17	—
12a #1A	0.0–4.4	120–123	120–123	458	—	0.083	0.008	3.58	—
12a #2A	4.4–9.4	5–8	140–143	642	—	0.054	0.008	3.65	—
12a #2A	4.4–9.4	8–11	143–146	638	—	0.127	0.009	4.11	—
12a #2A	4.4–9.4	11–14	146–149	727	—	0.037	0.006	3.26	—
12a #2A	4.4–9.4	14–17	149–152	1,300	—	0.021	0.008	2.35	—
12a #2A	4.4–9.4	17–20	152–155	516	(187)	0.032	0.009	3.38	—
12a #2A	4.4–9.4	20–23	155–158	682	—	0.047	0.008	3.91	—
12a #2A	4.4–9.4	23–26	158–161	349	—	0.038	0.009	3.24	—
12a #2A	4.4–9.4	26–29	161–164	719	—	0.041	0.009	4.43	(0.21)
12a #2A	4.4–9.4	29–32	164–167	674	—	0.034	0.009	4.18	—
12a #2A	4.4–9.4	35–38	170–173	562	—	0.030	0.010	4.48	—
12a #2A	4.4–9.4	41–44	176–179	1,280	—	0.033	0.009	4.54	—
12a #2A	4.4–9.4	47–50	182–185	425	—	0.028	0.008	3.97	—
12a #2A	4.4–9.4	56–59	191–194	963	—	<0.010	—	3.90	—
12a #2A	4.4–9.4	65–68	200–203	1,460	—	<0.010	—	4.02	—
12a #2A	4.4–9.4	74–77	209–212	3,700	—	<0.010	—	4.09	—
12a #2A	4.4–9.4	83–86	218–221	1,327	—	<0.010	—	4.09	—
12a #2A	4.4–9.4	92–95	227–230	671	—	<0.010	—	3.03	—
12a #2A	4.4–9.4	101–104	236–239	1,010	—	<0.010	—	3.03	(0.06)
12a #2A	4.4–9.4	110–113	245–248	769	(160)	<0.010	—	2.85	—
12a #2A	4.4–9.4	119–122	254–257	863	—	0.019	0.012	3.89	—
12a #2A	4.4–9.4	128–131	263–266	1,570	—	0.024	0.007	3.99	—
12a #2A	4.4–9.4	134–137	269–272	2,390	—	0.052	0.006	4.75	—
12a #3A	9.4–14.6	6–9	293–296	1,490	—	0.011	0.010	2.57	—
12a #3A	9.4–14.6	9–12	296–299	1,160	—	0.013	0.009	2.53	—
12a #3A	9.4–14.6	15–18	302–305	1,550	—	<0.010	—	2.75	—
12a #3A	9.4–14.6	21–24	308–311	869	—	<0.010	—	4.02	—
12a #3A	9.4–14.6	27–30	314–317	1,520	(37)	<0.010	—	4.27	—
12a #3A	9.4–14.6	36–39	323–326	188	—	<0.010	—	1.60	—
12a #3A	9.4–14.6	45–48	332–335	312	—	<0.010	—	2.48	—

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the "working" half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the "working" and "archive" halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
12a #3A	9.4–14.6	54–57	341–344	383	—	0.022	0.011	2.95	—
12a #3A	9.4–14.6	63–66	350–353	636	—	<0.010	—	3.64	—
12a #3A	9.4–14.6	72–75	359–362	858	—	0.017	0.009	3.92	—
12a #3A	9.4–14.6	80–83	367–370	1,460	(60)	0.016	0.010	4.71	—
12a #4A	14.6–19.6	5–8	449–452	634	—	<0.010	—	10.4	—
12a #4A	14.6–19.6	13–16	457–460	1,400	—	<0.010	—	5.86	(0.80)
12a #4A	14.6–19.6	22–25	466–469	1,670	—	<0.010	—	7.48	—
13b #1A	0.0–3.3	12–15	12–15	367	—	0.022	0.011	4.37	—
13b #1A	0.0–3.3	24–27	24–27	366	—	n.a.	—	4.42	—
13b #1A	0.0–3.3	36–39	36–39	476	—	n.a.	—	2.72	—
13b #1A	0.0–3.3	48–51	48–51	371	—	<0.010	—	2.82	—
13b #1A	0.0–3.3	54–57	54–57	453	(150)	n.a.	—	4.46	—
13b #1A	0.0–3.3	60–63	60–63	730	—	n.a.	—	3.29	—
13b #1A	0.0–3.3	63–66	63–66	353	—	0.020	0.009	3.25	—
13b #1A	0.0–3.3	66–69	66–69	586	—	n.a.	—	2.65	—
13b #1A	0.0–3.3	69–72	69–72	656	—	n.a.	—	2.97	—
13b #1A	0.0–3.3	72–75	72–75	565	—	0.027	0.014	2.37	—
13b #1A	0.0–3.3	75–78	75–78	1,040	—	0.027	0.008	1.67	—
13b #1A	0.0–3.3	78–81	78–81	358	—	0.034	0.008	1.60	—
13b #1A	0.0–3.3	81–84	81–84	427	—	0.023	0.007	2.07	—
13b #1A	0.0–3.3	84–87	84–87	385	—	0.012	0.010	2.91	—
13b #1A	0.0–3.3	87–90	87–90	800	(15)	0.025	0.012	3.04	—
13b #1A	0.0–3.3	90–93	90–93	345	—	<0.010	—	2.29	—
13b #2A	3.3–8.4	3–6	102–105	587	—	0.033	0.009	3.19	—
13b #2A	3.3–8.4	6–9	105–108	1,460	—	0.045	0.013	2.35	—
13b #2A	3.3–8.4	9–12	108–111	708	—	0.053	0.012	3.67	—
13b #2A	3.3–8.4	12–15	111–114	794	—	0.061	0.010	2.86	—
13b #2A	3.3–8.4	15–18	114–117	340	—	0.061	0.012	2.45	—
13b #2A	3.3–8.4	18–21	117–120	741	—	0.073	0.012	2.86	—
13b #2A	3.3–8.4	21–24	120–123	753	—	0.088	0.010	2.82	—
13b #2A	3.3–8.4	24–27	123–126	561	(13)	0.015	0.010	2.68	—
13b #2A	3.3–8.4	27–30	126–129	870	—	0.014	0.009	10.3	—
13b #2A	3.3–8.4	30–33	129–132	421	—	<0.010	—	3.69	—

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the “working” half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the “working” and “archive” halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
13b #2A	3.3–8.4	33–36	132–135	1,210	—	<0.010	—	3.27	—
13b #2A	3.3–8.4	36–39	135–138	486	—	<0.010	—	3.15	—
13b #2A	3.3–8.4	39–42	138–141	922	—	<0.010	—	2.73	—
13b #2A	3.3–8.4	42–45	141–144	4,010	—	<0.010	—	3.48	—
13b #2A	3.3–8.4	48–49	147–148	478	—	<0.010	—	3.35	—
13b #2A	3.3–8.4	54–57	153–156	528	—	<0.010	—	3.74	—
13b #2A	3.3–8.4	60–63	159–162	537	—	<0.010	—	4.48	—
13b #2A	3.3–8.4	66–69	165–168	1,220	(117)	<0.010	—	3.31	—
13b #2A	3.3–8.4	72–75	171–174	577	—	<0.010	—	3.86	—
13b #2A	3.3–8.4	81–84	180–183	577	—	<0.010	—	16.5	—
13b #2A	3.3–8.4	90–93	189–192	774	—	<0.010	—	3.28	—
13b #2A	3.3–8.4	99–102	198–201	624	—	<0.010	—	2.81	—
14a #1A	0.0–4.3	30–33	30–33	1,270	—	0.030	0.008	4.22	—
14a #1A	0.0–4.3	45–48	45–48	445	—	0.027	0.006	3.95	—
14a #1A	0.0–4.3	60–63	60–63	601	—	0.035	0.008	3.74	—
14a #1A	0.0–4.3	63–66	63–66	505	—	n.a.	—	2.94	—
14a #1A	0.0–4.3	66–69	66–69	682	—	n.a.	—	3.42	—
14a #1A	0.0–4.3	72–75	72–75	685	—	0.050	0.008	2.84	—
14a #1A	0.0–4.3	75–78	75–78	1,870	—	n.a.	—	4.14	—
14a #1A	0.0–4.3	78–81	78–81	1,060	(134)	0.042	0.008	3.35	—
14a #1A	0.0–4.3	81–84	81–84	1,340	(112)	n.a.	—	3.44	—
14a #1A	0.0–4.3	90–93	90–93	933	—	0.033	0.008	2.90	—
14a #1A	0.0–4.3	99–102	99–102	1,270	—	0.033	0.008	3.13	—
14a #1A	0.0–4.3	108–111	108–111	1,120	—	<0.010	—	2.83	(0.19)
14b #2A	2.8–8.0	4–7	90–93	910	—	0.036	0.008	2.61	—
14b #2A	2.8–8.0	7–10	93–96	1,140	—	0.041	0.006	2.75	—
14b #2A	2.8–8.0	10–13	96–99	1,240	—	0.040	0.006	2.39	—
14b #2A	2.8–8.0	13–16	99–102	1,120	—	0.031	0.007	3.26	—
14b #2A	2.8–8.0	16–19	102–105	1,830	—	0.041	0.010	2.21	—
14b #2A	2.8–8.0	19–22	105–108	1,250	—	0.018	0.005	2.04	—
14b #2A	2.8–8.0	22–25	108–111	1,490	(315)	0.019	0.010	3.49	—
14b #2A	2.8–8.0	25–28	111–114	1,150	—	0.014	0.007	1.62	—
14b #2A	2.8–8.0	28–31	114–117	960	—	<0.010	—	3.17	—

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the “working” half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the “working” and “archive” halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
14b #2A	2.8–8.0	31–34	117–120	1,250	—	<0.010	—	3.04	(0.11)
14b #2A	2.8–8.0	34–37	120–123	1,320	—	<0.010	—	2.73	—
14b #2A	2.8–8.0	37–40	123–126	1,610	—	<0.010	—	2.79	—
14b #2A	2.8–8.0	40–43	126–129	1,210	—	<0.010	—	2.30	—
14b #2A	2.8–8.0	46–49	132–135	4,860	—	<0.010	—	5.06	—
14b #2A	2.8–8.0	49–52	135–138	1,060	—	<0.010	—	2.20	—
14b #2A	2.8–8.0	52–55	138–141	612	—	<0.010	—	2.90	—
14b #2A	2.8–8.0	55–58	141–144	1,300	(547)	<0.010	—	2.73	—
14b #2A	2.8–8.0	58–61	144–147	2,590	—	<0.010	—	2.98	—
14b #2A	2.8–8.0	61–64	147–150	1,010	—	<0.010	—	2.87	—
14b #2A	2.8–8.0	64–67	150–153	534	—	<0.010	—	1.82	(0.05)
14b #2A	2.8–8.0	67–70	153–156	157	—	<0.010	—	1.65	—
14b #2A	2.8–8.0	70–73	156–159	512	—	<0.010	—	2.38	—
14b #2A	2.8–8.0	73–76	159–162	1,470	—	n.a.	—	2.85	—
14b #2A	2.8–8.0	76–79	162–165	2,230	—	n.a.	—	2.14	—
14b #2A	2.8–8.0	79–82	165–168	965	—	n.a.	—	3.49	—
14b #2A	2.8–8.0	88–91	174–177	736	—	n.a.	—	3.41	—
14b #2A	2.8–8.0	97–100	183–186	611	(23)	<0.010	—	5.02	—
15a #1A	0.0–4.4	12–15	12–15	286	—	0.022	0.009	4.45	—
15a #1A	0.0–4.4	24–27	24–27	490	—	0.021	0.010	5.13	—
15a #1A	0.0–4.4	36–39	36–39	426	—	0.024	0.008	5.83	—
15a #1A	0.0–4.4	48–51	48–51	635	(241)	<0.010	—	5.53	—
15a #1A	0.0–4.4	54–57	54–57	443	—	0.033	0.011	5.42	—
15a #1A	0.0–4.4	60–63	60–63	425	—	<0.010	—	4.39	—
15a #1A	0.0–4.4	66–69	66–69	624	—	<0.010	—	4.18	—
15a #1A	0.0–4.4	72–75	72–75	591	—	0.013	0.007	2.51	—
15a #1A	0.0–4.4	78–81	78–81	257	—	0.025	0.011	3.77	—
15a #1A	0.0–4.4	84–87	84–87	1,130	—	0.015	0.011	3.33	—
15a #1A	0.0–4.4	90–93	90–93	789	—	0.016	0.008	2.91	—
15a #1A	0.0–4.4	96–99	96–99	829	(271)	0.033	0.008	3.34	—
15a #1A	0.0–4.4	99–102	99–102	674	—	0.030	0.012	2.84	—
15a #1A	0.0–4.4	102–105	102–105	602	—	0.038	0.008	3.33	(0.23)
15a #1A	0.0–4.4	105–108	105–108	647	—	0.035	0.009	3.71	(0.22)

Table 4. Total mercury, cesium-137, and organic content by loss on ignition at 3-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. Samples were collected from the "working" half of each split core in all cases, except core section 10b #2A, where a sample was collected from both the "working" and "archive" halves. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of the two samples. Reporting limit for Cs-137 is equal to 0.010 pCi/g dry weight. **Abbreviations**: cm, centimeter; Cs-137, cesium-137; decimal ft, decimal foot; dry wt., dry weight; LOI, loss on ignition; n.a., not analyzed; ng/g, nanogram per gram; pCi/g, picocurie per gram; THg, total mercury; <, less than; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth relative to surface (cm)	THg (ng/g) dry wt. parameter code 62978		Cs-137 (pCi/g) dry wt. parameter code 22709	Cs-137 1-sigma error parameter code 22710	LOI (percent) parameter code 63740	
15a #1A	0.0–4.4	108–111	108–111	497	—	0.021	0.010	1.65	—
15a #1A	0.0–4.4	111–114	111–114	1,380	—	0.031	0.010	3.52	—
15a #1A	0.0–4.4	114–117	114–117	477	—	0.030	0.008	2.93	—
15a #1A	0.0–4.4	117–120	117–120	1,710	—	0.026	0.010	4.97	—
15a #1A	0.0–4.4	120–123	120–123	756	—	0.027	0.007	4.02	—
15b #2A	2.8–7.8	3–6	87–90	581	—	0.024	0.007	3.21	—
15b #2A	2.8–7.8	9–12	93–96	721	—	0.025	0.006	3.14	—
15b #2A	2.8–7.8	15–18	99–102	536	—	0.029	0.008	3.46	—
15b #2A	2.8–7.8	21–24	105–108	624	—	0.026	0.008	3.73	(0.01)
15b #2A	2.8–7.8	24–27	108–111	879	(26)	0.037	0.009	3.00	(0.68)
15b #2A	2.8–7.8	27–30	111–114	1,050	—	0.055	0.009	3.82	—
15b #2A	2.8–7.8	30–33	114–117	661	—	0.045	0.009	4.15	—
15b #2A	2.8–7.8	33–36	117–120	738	—	0.038	0.010	3.99	—
15b #2A	2.8–7.8	36–39	120–123	813	—	0.061	0.009	4.74	—
15b #2A	2.8–7.8	39–42	123–126	873	—	0.073	0.010	4.37	—
15b #2A	2.8–7.8	42–45	126–129	662	—	0.038	0.010	8.62	—
15b #2A	2.8–7.8	45–48	129–132	865	—	0.040	0.008	3.85	—
15b #2A	2.8–7.8	48–51	132–135	635	—	0.044	0.009	3.62	(0.30)
15b #2A	2.8–7.8	57–60	141–144	809	(22)	0.027	0.012	4.65	—
15b #2A	2.8–7.8	66–69	150–153	1,060	—	0.022	0.009	4.59	—
15b #2A	2.8–7.8	75–78	159–162	557	—	0.033	0.012	4.19	—
15b #2A	2.8–7.8	84–87	168–171	904	—	0.040	0.008	4.06	(0.04)
15b #2A	2.8–7.8	93–96	177–180	878	—	0.043	0.009	4.77	—
15b #2A	2.8–7.8	102–105	186–189	1,010	—	0.043	0.005	4.44	(0.17)
15b #2A	2.8–7.8	111–114	195–198	1,380	—	0.022	0.008	4.43	—
15b #2A	2.8–7.8	120–123	204–207	612	—	0.033	0.007	3.74	—
15b #2A	2.8–7.8	129–132	213–216	991	—	0.030	0.007	4.64	—
15b #3A	7.8–12.9	9–12	246–249	1,590	—	<0.010	—	4.03	—
15b #3A	7.8–12.9	18–21	255–258	1,600	—	<0.010	—	6.47	(0.60)
15b #3A	7.8–12.9	27–30	264–267	399	—	<0.010	—	4.52	—
15b #3A	7.8–12.9	33–36	270–273	558	—	<0.010	—	4.84	—
15b #3A	7.8–12.9	42–45	279–282	584	—	<0.010	—	3.74	—
15a #5A	19.5–24.3	108–111	702–705	153	—	<0.010	—	3.60	—
15a #6A	24.3–29.0	78–81	820–823	66.0	—	<0.010	—	3.33	—

Table 5. Concentrations of iron species and total reduced sulfur in subsamples of selected 20-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of two samples. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; dry wt., dry weight; Fe(II), ferrous iron; $Fe(III)_a$, poorly crystalline ferric iron; $Fe(III)_c$, crystalline ferric iron; mg/g, milligram per gram; TRS, total reduced sulfur; µmol/g, micromole per gram; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	Mid-point of interval relative to surface (cm)	Fe(II) concentration (mg/g) dry wt., parameter code: 52673		$Fe(III)_a$ concentration (mg/g) dry wt., parameter code: 52674		$Fe(III)_c$ concentration (mg/g) dry wt., parameter code: 52675		TRS concentration, (µmol/g) dry wt., parameter code: 52672	
1b #1P	0.0–3.8	10–30	0.3–1.0	10–30	0.3–1.0	20	0.62	—	0.45	—	15.0	—	2.80	(0.31)
1b #1P	0.0–3.8	70–90	2.3–3.0	70–90	2.3–3.0	80	0.38	—	0.47	—	18.4	—	1.03	—
1b #2H	3.8–9.3	36–56	1.2–1.8	153–173	5.0–5.7	163	0.26	(0.02)	0.51	(0.03)	11.7	(0.1)	0.90	—
1b #4P	14.0–18.1	30–50	1.0–1.6	457–477	15.0–15.6	467	0.17	—	0.31	—	15.9	—	0.28	—
1b #6P	23.3–28.1	40–60	1.3–2.0	749–769	24.6–25.2	759	0.12	—	0.28	—	12.3	—	0.08	—
2c #1P	0.0–4.1	11–31	0.4–1.0	11–31	0.4–1.0	21	0.60	—	0.42	—	15.5	—	0.84	—
2c #1P	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	80	0.30	—	0.50	—	14.9	—	0.27	—
2c #2P	4.1–8.9	25–45	0.8–1.5	149–169	4.9–5.5	159	0.48	—	0.49	—	16.5	—	0.20	—
2c #4P	13.9–18.8	30–50	1.0–1.6	454–474	14.9–15.6	464	0.12	—	0.31	—	14.4	—	0.09	—
2c #6PH	23.7–27.1	30–50	1.0–1.6	751–771	24.6–25.3	761	0.10	—	0.25	—	11.9	—	0.07	—
3b #1A	0.0–3.4	10–30	0.3–1.0	10–30	0.3–1.0	20	0.23	—	0.38	—	15.1	—	0.07	(0.02)
3b #1A	0.0–3.4	70–90	2.3–3.0	70–90	2.3–3.0	80	0.21	—	0.34	—	11.2	—	0.19	—
3b #2A	3.4–7.8	50–70	1.6–2.3	154–174	5.1–5.7	164	0.20	—	0.36	—	10.2	—	0.26	—
3b #4A	13.1–18.2	60–80	2.0–2.6	459–479	15.1–15.7	469	0.16	—	0.34	—	13.5	—	0.08	—
3b #6A	23.2–28.3	63–83	2.1–2.7	769–789	25.2–25.9	779	0.13	—	0.26	—	13.0	—	0.04	—
4b #1A	0.0–3.0	15–35	0.5–1.1	15–35	0.5–1.1	25	0.40	—	0.30	—	10.4	—	0.53	—
4b #1A	0.0–3.0	65–85	2.1–2.8	65–85	2.1–2.8	75	0.45	—	0.37	—	9.27	—	0.43	—
4b #2A	3.0–8.1	60–80	2.0–2.6	151–171	5.0–5.6	161	0.41	—	0.41	—	16.6	—	0.24	—
4b #4A	13.0–18.1	60–80	2.0–2.6	456–476	15.0–15.6	466	0.14	(0.01)	0.18	(0.00)	14.5	(1.0)	0.40	—
4b #6A	23.0–27.9	50–70	1.6–2.3	751–771	24.6–25.3	761	0.11	—	0.24	—	12.0	—	0.21	—

Table 5. Concentrations of iron species and total reduced sulfur in subsamples of selected 20-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of two samples. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; dry wt., dry weight; Fe(II), ferrous iron; $Fe(III)_a$, poorly crystalline ferric iron; $Fe(III)_c$, crystalline ferric iron; mg/g, milligram per gram; TRS, total reduced sulfur; µmol/g, micromole per gram; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	Mid-point of interval relative to surface (cm)	Fe(II) concentration (mg/g) dry wt., parameter code: 52673		$Fe(III)_a$ concentration (mg/g) dry wt., parameter code: 52674		$Fe(III)_c$ concentration (mg/g) dry wt., parameter code: 52675		TRS concentration, (µmol/g) dry wt., parameter code: 52672	
5a #1A	0.0–4.3	10–30	0.3–1.0	10–30	0.3–1.0	20	0.24	—	0.40	—	13.2	—	0.59	—
5a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	80	0.42	—	0.37	—	11.5	—	0.56	—
5a #2A	4.3–9.4	20–40	0.7–1.3	152–172	0.7–1.3	162	0.19	—	0.41	—	12.2	—	0.86	—
5a #4A	14.5–17.2	16–36	0.5–1.2	458–478	0.5–1.2	468	0.14	—	0.30	—	12.2	—	0.04	—
5a #6A	24.2–27.8	25–45	0.8–1.5	762–782	0.8–1.5	772	0.34	—	0.36	—	14.7	—	0.09	—
6a #1A	0.0–4.6	10–30	0.3–1.0	10–30	0.3–1.0	20	0.15	—	0.42	—	12.7	—	0.63	—
6a #1A	0.0–4.6	70–90	2.3–3.0	70–90	2.3–3.0	80	0.11	—	0.34	—	13.6	—	0.70	—
6a #2A	4.6–9.2	18–38	0.6–1.2	153–173	5.0–5.7	163	0.14	—	0.47	—	14.5	—	0.61	—
6a #4A	14.4–19.5	18–38	0.6–1.2	457–477	15.0–15.6	467	0.12	—	0.36	—	14.7	—	0.29	—
6a #6A	24.3–29.3	10–30	0.3–1.0	752–772	24.7–25.3	762	0.09	—	0.20	—	10.2	—	0.25	—
7a #1A	0.0–4.1	10–30	0.3–1.0	10–30	0.3–1.0	20	0.22	(0.00)	0.37	(0.04)	11.4	(0.2)	0.64	—
7a #1A	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	80	0.26	—	0.54	—	15.4	—	0.87	—
7a #2A	4.1–8.8	28–48	0.9–1.6	152–172	5.0–5.6	162	0.17	—	0.50	—	16.3	—	0.48	—
7a #4A	13.8–18.8	38–58	1.2–1.9	457–477	15.0–15.6	467	0.10	—	0.26	—	14.7	—	0.08	—
7a #6A	23.8–28.8	38–58	1.2–1.9	762–782	25.0–25.7	772	0.09	—	0.26	—	14.0	—	0.01	—
8b #1P	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	20	0.19	—	0.50	—	13.7	—	0.68	—
8b #1P	0.0–3.3	65–85	2.1–2.8	65–85	2.1–2.8	75	0.18	—	0.40	—	13.7	—	0.61	—
8b #2P	3.3–7.9	50–70	1.6–2.3	152–172	5.0–5.6	162	0.27	—	0.55	—	13.3	—	0.14	—
8b #4P	12.0–17.0	90–110	3.0–3.6	456–476	15.0–15.6	466	0.10	—	0.36	—	14.7	—	0.02	—

Table 5. Concentrations of iron species and total reduced sulfur in subsamples of selected 20-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of two samples. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; dry wt., dry weight; Fe(II), ferrous iron; $Fe(III)_a$, poorly crystalline ferric iron; $Fe(III)_c$, crystalline ferric iron; mg/g, milligram per gram; TRS, total reduced sulfur; µmol/g, micromole per gram; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	Mid-point of interval relative to surface (cm)	Fe(II) concentration (mg/g) dry wt., parameter code: 52673		$Fe(III)_a$ concentration (mg/g) dry wt., parameter code: 52674		$Fe(III)_c$ concentration (mg/g) dry wt., parameter code: 52675		TRS concentration, (µmol/g) dry wt., parameter code: 52672	
9a #1PHP	0.0–4.8	10–30	0.3–1.0	10–30	0.3–1.0	20	0.35	—	0.53	—	13.2	—	0.47	—
9a #1PHP	0.0–4.8	68–88	2.2–2.9	68–88	2.2–2.9	78	0.19	—	0.49	—	12.4	—	0.37	—
9a #2P	4.8–9.5	15–35	0.5–1.1	162–182	5.3–6.0	172	0.10	—	0.40	—	13.5	—	0.23	—
9a #3P	9.5–15.3	118–138	3.9–4.5	408–428	13.4–14.0	418	0.12	(0.00)	0.44	(0.03)	15.4	(0.4)	0.02	—
9a #5P	20.3–25.3	132–152	4.3–5.0	749–769	24.6–25.2	759	0.09	—	0.35	—	15.5	—	0.12	—
10b #1A	0.0–3.5	10–30	0.3–1.0	10–30	0.3–1.0	20	0.27	—	0.60	—	15.0	—	0.53	—
10b #1A	0.0–3.5	70–90	2.3–3.0	70–90	2.3–3.0	80	0.20	—	0.57	—	13.7	—	0.69	—
10b #2A	3.5–8.3	50–70	1.6–2.3	158–178	5.2–5.8	168	0.17	—	0.56	—	14.9	—	0.69	—
10b #4A	13.3–18.3	30–50	1.0–1.6	436–456	14.3–15.0	446	0.20	—	0.33	—	12.5	—	0.38	—
10b #6A	23.3–28.3	70–90	2.3–3.0	781–801	25.6–26.3	791	0.08	—	0.40	—	16.0	—	0.34	—
11c #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	20	0.72	—	2.58	—	9.83	—	2.70	—
11c #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	80	0.28	—	2.19	—	11.3	—	0.49	—
11c #2A	4.4–9.5	15–35	0.5–1.1	150–170	4.9–5.6	160	0.26	—	1.20	—	7.88	—	0.20	—
11b #4A	12.9–17.9	56–76	1.8–2.5	450–470	14.8–15.4	460	0.11	—	0.53	—	14.0	—	0.09	(0.01)
11b #6A	22.8–27.8	56–76	1.8–2.5	749–769	24.6–25.2	759	0.08	—	0.42	—	13.5	—	0.08	—
11b #8A	32.7–37.4	70–90	2.3–3.0	1,066–1,086	35.0–35.6	1,076	0.12	—	0.41	—	8.52	—	0.06	—
11b #10A	42.8–46.8	47–67	1.5–2.2	1,350–1,370	44.3–44.9	1,360	0.09	—	0.47	—	11.2	—	0.04	—
12a #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	20	0.18	—	1.63	—	11.5	—	0.32	—
12a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	80	0.37	—	2.58	—	8.81	—	0.19	—
12a #2A	4.4–9.4	15–35	0.5–1.1	150–170	4.9–5.6	160	0.28	—	2.51	—	9.90	—	0.14	—
12a #4A	14.6–19.6	5–25	0.2–0.8	450–470	14.8–15.4	460	3.70	—	2.40	—	4.85	—	10.5	—
12a #6A	24.5–29.6	12–32	0.4–1.0	760–780	24.9–25.6	770	0.12	(0.02)	0.62	(0.10)	12.5	(0.3)	0.11	—

Table 5. Concentrations of iron species and total reduced sulfur in subsamples of selected 20-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger(A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of two samples. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; dry wt., dry weight; Fe(II), ferrous iron; $Fe(III)_a$, poorly crystalline ferric iron; $Fe(III)_c$, crystalline ferric iron; mg/g, milligram per gram; TRS, total reduced sulfur; µmol/g, micromole per gram; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	Mid-point of interval relative to surface (cm)	Fe(II) concentration (mg/g) dry wt., parameter code: 52673		$Fe(III)_a$ concentration (mg/g) dry wt., parameter code: 52674		$Fe(III)_c$ concentration (mg/g) dry wt., parameter code: 52675		TRS concentration, (µmol/g) dry wt., parameter code: 52672	
13b #1A	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	20	0.30	—	2.26	—	11.6	—	0.40	(0.04)
13b #1A	0.0–3.3	70–90	2.3–3.0	70–90	2.3–3.0	80	0.25	—	2.34	—	8.71	—	0.44	—
13b #2A	3.3–8.4	51–71	1.7–2.3	150–170	4.9–5.6	160	0.15	(0.00)	1.71	(0.02)	10.0	(0.1)	0.47	—
13b #4A	13.3–18.4	45–65	1.5–2.1	450–470	14.8–15.4	460	0.12	—	0.67	—	15.0	—	0.24	—
13b #6A	23.4–28.4	36–56	1.2–1.8	750–770	24.6–25.3	760	0.06	—	0.33	—	11.1	—	0.46	—
14a #1A	0.0–4.3	10–20	0.3–0.7	10–20	0.3–0.7	20	0.21	—	2.25	—	10.6	—	0.29	—
14a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	80	0.28	—	1.72	—	12.7	—	0.48	—
14b #2A	2.8–8.0	64–84	2.1–2.8	150–170	4.9–5.6	160	0.10	—	1.39	—	10.8	—	0.35	(0.10)
14b #4A	13.0–17.8	55–75	1.8–2.5	450–470	14.8–15.4	460	0.14	—	1.14	—	12.1	—	0.27	—
14b #6A	22.7–27.9	58–78	1.9–2.6	750–770	24.6–25.3	760	0.21	—	1.09	—	13.0	—	0.14	—
15b #1A	0.0–2.8	10–30	0.3–1.0	10–30	0.3–1.0	20	0.35	—	2.81	—	12.0	—	3.22	—
15a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	80	0.30	—	2.12	—	9.09	—	0.49	—
15b #2A	2.8–7.8	66–86	2.2–2.8	150–170	4.9–5.6	160	0.21	—	1.98	—	12.3	—	0.43	—
15a #4A	14.4–19.5	10–30	0.3–1.0	449–469	14.7–15.4	459	0.20	—	1.04	—	16.5	—	0.08	—
15a #6A	24.3–29.0	8–28	0.3–0.9	750–770	24.6–25.3	760	0.10	—	0.58	—	15.1	—	0.19	—

Table 6. Percentage loss on ignition, wet bulk density, and percentage of fines in subsamples of selected 20-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of two samples. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; g/cm³, gram per cubic centimeter; LOI, loss on ignition, a measure of sediment organic content; <, less than; µm, micrometer; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	LOI (percent) parameter code 63740		Bulk density (g/cm³ wet sediment) parameter code 62947		Fines by sieving <63 µm (percent)	
1b #1P	0.0–3.8	10–30	0.3–1.0	10–30	0.3–1.0	4.45	(0.04)	1.00	(0.01)	83.5	(0.2)
1b #1P	0.0–3.8	70–90	2.3–3.0	70–90	2.3–3.0	4.76	—	0.94	—	87.1	(1.0)
1b #2H	3.8–9.3	36–56	1.2–1.8	153–173	5.0–5.7	2.00	—	0.99	—	38.1	(0.2)
1b #4P	14.0–18.1	30–50	1.0–1.6	457–477	15.0–15.6	4.19	—	1.79	—	23.1	(0.6)
1b #6P	23.3–28.1	40–60	1.3–2.0	749–769	24.6–25.2	2.48	—	1.19	—	9.6	—
2c #1P	0.0–4.1	11–31	0.4–1.0	11–31	0.4–1.0	4.80	—	1.05	—	46.1	(0.2)
2c #1P	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	4.20	(0.00)	0.96	(0.02)	91.8	—
2c #2P	4.1–8.9	25–45	0.8–1.5	149–169	4.9–5.5	5.12	—	1.66	—	96.3	—
2c #4P	13.9–18.8	30–50	1.0–1.6	454–474	14.9–15.6	4.76	—	1.91	—	86.4	(1.5)
2c #6PH	23.7–27.1	30–50	1.0–1.6	751–771	24.6–25.3	2.64	—	1.90	—	48.2	(0.3)
3b #1A	0.0–3.4	10–30	0.3–1.0	10–30	0.3–1.0	5.52	—	1.19	—	47.8	(3.2)
3b #1A	0.0–3.4	70–90	2.3–3.0	70–90	2.3–3.0	2.66	(0.09)	1.18	(0.06)	48.4	—
3b #2A	3.4–7.8	50–70	1.6–2.3	154–174	5.1–5.7	2.28	—	1.08	—	9.8	(0.7)
3b #4A	13.1–18.2	60–80	2.0–2.6	459–479	15.1–15.7	3.53	—	1.05	—	30.2	(5.0)
3b #6A	23.2–28.3	63–83	2.1–2.7	769–789	25.2–25.9	3.87	—	1.69	—	70.3	(1.8)
4b #1A	0.0–3.0	15–35	0.5–1.1	15–35	0.5–1.1	2.73	—	1.19	—	27.8	—
4b #1A	0.0–3.0	65–85	2.1–2.8	65–85	2.1–2.8	2.87	—	1.15	—	47.4	—
4b #2A	3.0–8.1	60–80	2.0–2.6	151–171	5.0–5.6	5.59	—	0.87	—	95.1	(0.3)
4b #4A	13.0–18.1	60–80	2.0–2.6	456–476	15.0–15.6	4.31	(0.20)	1.71	(0.09)	86.5	—
4b #6A	23.0–27.9	50–70	1.6–2.3	751–771	24.6–25.3	4.52	—	1.30	—	63.3	—
5a #1A	0.0–4.3	10–30	0.3–1.0	10–30	0.3–1.0	3.63	—	1.10	—	55.0	—
5a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	2.89	—	1.14	—	48.5	—
5a #2A	4.3–9.4	20–40	0.7–1.3	152–172	0.7–1.3	2.51	—	1.69	—	51.2	—
5a #4A	14.5–17.2	16–36	0.5–1.2	458–478	0.5–1.2	3.17	—	1.91	—	80.6	—
5a #6A	24.2–27.8	25–45	0.8–1.5	762–782	0.8–1.5	4.11	(0.08)	1.78	(0.02)	97.4	—
6a #1A	0.0–4.6	10–30	0.3–1.0	10–30	0.3–1.0	3.29	(0.06)	1.09	(0.01)	39.4	—
6a #1A	0.0–4.6	70–90	2.3–3.0	70–90	2.3–3.0	3.93	—	0.97	—	61.8	—
6a #2A	4.6–9.2	18–38	0.6–1.2	153–173	5.0–5.7	4.56	—	1.80	—	92.3	—
6a #4A	14.4–19.5	18–38	0.6–1.2	457–477	15.0–15.6	5.88	—	1.31	—	83.0	—
6a #6A	24.3–29.3	10–30	0.3–1.0	752–772	24.7–25.3	3.74	—	1.04	—	78.0	—

Table 6. Percentage loss on ignition, wet bulk density, and percentage of fines in subsamples of selected 20-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of two samples. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; g/cm^3, gram per cubic centimeter; LOI, loss on ignition, a measure of sediment organic content; <, less than; µm, micrometer; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	LOI (percent) parameter code 63740		Bulk density (g/cm^3 wet sediment) parameter code 62947		Fines by sieving <63 µm (percent)	
7a #1A	0.0–4.1	10–30	0.3–1.0	10–30	0.3–1.0	2.99	—	1.14	—	79.5	—
7a #1A	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	4.85	(0.19)	0.86	(0.01)	97.5	—
7a #2A	4.1–8.8	28–48	0.9–1.6	152–172	5.0–5.6	6.11	—	1.11	—	97.2	—
7a #4A	13.8–18.8	38–58	1.2–1.9	457–477	15.0–15.6	4.79	—	1.28	—	95.1	—
7a #6A	23.8–28.8	38–58	1.2–1.9	762–782	25.0–25.7	4.50	—	1.04	—	98.1	—
8b #1P	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	3.63	—	0.93	—	69.2	—
8b #1P	0.0–3.3	65–85	2.1–2.8	65–85	2.1–2.8	4.85	—	0.82	—	99.5	—
8b #2P	3.3–7.9	50–70	1.6–2.3	152–172	5.0–5.6	6.75	(0.00)	1.71	(0.04)	91.9	—
8b #4P	12.0–17.0	90–110	3.0–3.6	456–476	15.0–15.6	3.60	—	1.85	—	87.1	—
9a #1PHP	0.0–4.8	10–30	0.3–1.0	10–30	0.3–1.0	4.27	—	1.05	—	74.0	—
9a #1PHP	0.0–4.8	68–88	2.2–2.9	68–88	2.2–2.9	3.08	—	1.07	—	64.2	—
9a #2P	4.8–9.5	15–35	0.5–1.1	162–182	5.3–6.0	5.77	—	1.85	—	90.5	—
9a #3P	9.5–15.3	118–138	3.9–4.5	408–428	13.4–14.0	5.00	—	1.86	—	91.1	—
9a #5P	20.3–25.3	132–152	4.3–5.0	749–769	24.6–25.2	4.82	(0.18)	1.69	(0.11)	77.9	—
10b #1A	0.0–3.5	10–30	0.3–1.0	10–30	0.3–1.0	5.14	—	1.04	—	86.1	(0.8)
10b #1A	0.0–3.5	70–90	2.3–3.0	70–90	2.3–3.0	4.35	—	1.05	—	94.3	—
10b #2A	3.5–8.3	50–70	1.6–2.3	158–178	5.2–5.8	3.34	—	1.79	—	91.3	—
10b #4A	13.3–18.3	30–50	1.0–1.6	436–456	14.3–15.0	3.74	(0.01)	1.25	(0.04)	78.2	—
10b #6A	23.3–28.3	70–90	2.3–3.0	781–801	25.6–26.3	4.85	—	1.58	—	95.8	—
11c #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	3.78	—	1.08	—	75.0	—
11c #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	2.84	—	1.11	—	59.2	—
11c #2A	4.4–9.5	15–35	0.5–1.1	150–170	4.9–5.6	1.86	(0.04)	1.28	(0.03)	7.95	—
11b #4A	12.9–17.9	56–76	1.8–2.5	450–470	14.8–15.4	3.17	—	1.73	—	89.7	—
11b #6A	22.8–27.8	56–76	1.8–2.5	749–769	24.6–25.2	3.04	—	1.85	—	86.0	—
11b #8A	32.7–37.4	70–90	2.3–3.0	1,066–1,086	35.0–35.6	2.07	—	1.85	—	67.5	—
11b #10A	42.8–46.8	47–67	1.5–2.2	1,350–1,370	44.3–44.9	2.70	—	1.86	—	56.8	—
12a #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	4.48	—	1.11	—	73.7	—
12a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	2.85	—	1.11	—	69.9	—
12a #2A	4.4–9.4	15–35	0.5–1.1	150–170	4.9–5.6	3.64	—	1.53	—	77.3	—
12a #4A	14.6–19.6	5–25	0.2–0.8	450–470	14.8–15.4	5.17	—	1.75	—	95.0	—
12a #6A	24.5–29.6	12–32	0.4–1.0	760–780	24.9–25.6	2.75	—	1.83	—	77.8	(0.9)

Table 6. Percentage loss on ignition, wet bulk density, and percentage of fines in subsamples of selected 20-centimeter depth intervals from sediment cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. The National Water Information System (NWIS) parameter codes are included where possible. The deviation for analytical duplicates of the same sample, when assayed, is given in parentheses ( ); the deviation is equal to the difference from the mean of two samples. **Abbreviations**: cm, centimeter; decimal ft, decimal foot; g/cm³, gram per cubic centimeter; LOI, loss on ignition, a measure of sediment organic content; <, less than; µm, micrometer; —, not applicable]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	LOI (percent) parameter code 63740		Bulk density (g/cm³ wet sediment) parameter code 62947		Fines by sieving <63 µm (percent)	
13b #1A	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	4.09	—	1.72	—	39.9	—
13b #1A	0.0–3.3	70–90	2.3–3.0	70–90	2.3–3.0	1.81	—	1.53	—	36.5	—
13b #2A	3.3–8.4	51–71	1.7–2.3	150–170	4.9–5.6	2.31	(0.18)	1.79	(0.01)	79.7	—
13b #4A	13.3–18.4	45–65	1.5–2.1	450–470	14.8–15.4	4.23	—	1.69	—	78.7	—
13b #6A	23.4–28.4	36–56	1.2–1.8	750–770	24.6–25.3	2.70	—	1.86	—	86.3	—
14a #1A	0.0–4.3	10–20	0.3–0.7	10–20	0.3–0.7	3.18	—	1.46	—	81.3	—
14a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	2.89	—	1.18	—	85.3	—
14b #2A	2.8–8.0	64–84	2.1–2.8	150–170	4.9–5.6	2.21	—	1.80	—	69.8	—
14b #4A	13.0–17.8	55–75	1.8–2.5	450–470	14.8–15.4	3.42	—	1.62	—	94.5	—
14b #6A	22.7–27.9	58–78	1.9–2.6	750–770	24.6–25.3	1.72	—	1.92	—	81.8	—
15b #1A	0.0–2.8	10–30	0.3–1.0	10–30	0.3–1.0	3.96	—	0.91	—	92.7	—
15a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	3.28	—	0.93	—	64.8	—
15b #2A	2.8–7.8	66–86	2.2–2.8	150–170	4.9–5.6	3.80	—	1.12	—	86.5	—
15a #4A	14.4–19.5	10–30	0.3–1.0	449–469	14.7–15.4	3.05	—	1.62	—	97.2	—
15a #6A	24.3–29.0	8–28	0.3–0.9	750–770	24.6–25.3	2.15	—	1.85	—	66.2	(0.8)

Table 7. Summary of sediment grain-size distribution in subsamples of selected 20-centimeter depth intervals from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. **Abbreviations:** cm, centimeter; D10, particle diameter representing the 10th percentile of the cumulative frequency distribution (10 percent of the particles in the sediment sample are finer than the D10 grain size); D50, particle diameter representing the 50th percentile of the cumulative frequency distribution or median size (half of the particles in the sediment sample are finer than the D50 grain size); D90, particle diameter representing the 90th percentile of the cumulative frequency distribution (90 percent of the particles in the sediment sample are finer than the D90 grain size); decimal ft, decimal foot; mm, milllimeter; nd, not determined; µm, micrometer; <, less than]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	Grain-size distribution, by laser scattering					
						Sand, 63 µm–1 mm (percent)	Silt, 4–63 µm (percent)	Clay, <4 µm (percent)	D10 (µm)	D50 (µm)	D90 (µm)
1b #1P	0.0–3.8	10–30	0.3–1.0	10–30	0.3–1.0	11.8	67.7	20.5	1.8	14.0	67.9
1b #1P	0.0–3.8	70–90	2.3–3.0	70–90	2.3–3.0	0.0	64.4	35.6	1.2	6.0	22.5
1b #2H	3.8–9.3	36–56	1.2–1.8	153–173	5.0–5.7	56.4	36.1	7.5	6.0	74.0	189
1b #4P	14.0–18.1	30–50	1.0–1.6	457–477	15.0–15.6	0.0	51.1	48.9	0.9	4.1	23.0
1b #6P	23.3–28.1	40–60	1.3–2.0	749–769	24.6–25.2	30.8	57.4	11.8	3.3	33.3	156
2c #1P	0.0–4.1	11–31	0.4–1.0	11–31	0.4–1.0	0.0	61.1	38.9	1.0	5.7	25.1
2c #1P	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	5.6	67.9	26.5	1.3	11.1	50.3
2c #2P	4.1–8.9	25–45	0.8–1.5	149–169	4.9–5.5	0.0	64.7	35.3	1.1	6.4	25.8
2c #4P	13.9–18.8	30–50	1.0–1.6	454–474	14.9–15.6	0.0	53.5	46.5	0.8	4.5	25.4
2c #6PH	23.7–27.1	30–50	1.0–1.6	751–771	24.6–25.3	34.2	52.3	13.5	2.8	34.5	148
3b #1A	0.0–3.4	10–30	0.3–1.0	10–30	0.3–1.0	20.7	54.9	24.3	1.6	11.5	128
3b #1A	0.0–3.4	70–90	2.3–3.0	70–90	2.3–3.0	64.5	26.1	9.5	4.3	116	263
3b #2A	3.4–7.8	50–70	1.6–2.3	154–174	5.1–5.7	68.9	23.3	7.8	5.6	126	247
3b #4A	13.1–18.2	60–80	2.0–2.6	459–479	15.1–15.7	31.7	56.6	11.8	3.3	34.6	139
3b #6A	23.2–28.3	63–83	2.1–2.7	769–789	25.2–25.9	0.0	59.1	40.9	1.1	5.2	25.9
4b #1A	0.0–3.0	15–35	0.5–1.1	15–35	0.5–1.1	53.6	37.0	9.5	4.3	71.8	249
4b #1A	0.0–3.0	65–85	2.1–2.8	65–85	2.1–2.8	43.9	43.9	12.2	3.1	47.4	225
4b #2A	3.0–8.1	60–80	2.0–2.6	151–171	5.0–5.6	8.7	73.1	18.2	1.9	17.2	59.3
4b #4A	13.0–18.1	60–80	2.0–2.6	456–476	15.0–15.6	0.0	59.7	40.3	0.9	5.7	30.5
4b #6A	23.0–27.9	50–70	1.6–2.3	751–771	24.6–25.3	19.1	62.9	18.0	2.1	20.0	100.0
5a #1A	0.0–4.3	10–30	0.3–1.0	10–30	0.3–1.0	42.5	42.1	15.4	2.4	44.1	219
5a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	50.8	36.7	12.5	3.0	64.2	182
5a #2A	4.3–9.4	20–40	0.7–1.3	152–172	0.7–1.3	48.4	42.5	9.1	4.5	60.5	131
5a #4A	14.5–17.2	16–36	0.5–1.2	458–478	0.5–1.2	30.1	47.4	22.5	1.4	25.6	139
5a #6A	24.2–27.8	25–45	0.8–1.5	762–782	0.8–1.5	9.6	71.1	19.3	1.8	16.4	61.2
6a #1A	0.0–4.6	10–30	0.3–1.0	10–30	0.3–1.0	37.6	50.8	11.7	3.3	40.2	191
6a #1A	0.0–4.6	70–90	2.3–3.0	70–90	2.3–3.0	30.7	58.3	10.9	3.6	34.1	163
6a #2A	4.6–9.2	18–38	0.6–1.2	153–173	5.0–5.7	17.5	70.3	12.2	3.1	28.2	80.9
6a #4A	14.4–19.5	18–38	0.6–1.2	457–477	15.0–15.6	0.0	56.0	44.0	1.0	4.7	18.8
6a #6A	24.3–29.3	10–30	0.3–1.0	752–772	24.7–25.3	29.5	58.2	12.3	3.1	32.1	139

Table 7. Summary of sediment grain-size distribution in subsamples of selected 20-centimeter depth intervals from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. **Abbreviations:** cm, centimeter; D10, particle diameter representing the 10th percentile of the cumulative frequency distribution (10 percent of the particles in the sediment sample are finer than the D10 grain size); D50, particle diameter representing the 50th percentile of the cumulative frequency distribution or median size (half of the particles in the sediment sample are finer than the D50 grain size); D90, particle diameter representing the 90th percentile of the cumulative frequency distribution (90 percent of the particles in the sediment sample are finer than the D90 grain size); decimal ft, decimal foot; mm, milllimeter; nd, not determined; µm, micrometer; <, less than]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	Grain-size distribution, by laser scattering					
						Sand, 63 µm–1 mm (percent)	Silt, 4–63 µm (percent)	Clay, <4 µm (percent)	D10 (µm)	D50 (µm)	D90 (µm)
7a #1A	0.0–4.1	10–30	0.3–1.0	10–30	0.3–1.0	60.9	33.3	5.9	8.2	89.0	209
7a #1A	0.0–4.1	70–90	2.3–3.0	70–90	2.3–3.0	19.3	69.7	11.0	3.5	29.0	90.9
7a #2A	4.1–8.8	28–48	0.9–1.6	152–172	5.0–5.6	0.4	70.0	29.6	1.3	8.0	32.5
7a #4A	13.8–18.8	38–58	1.2–1.9	457–477	15.0–15.6	9.2	69.8	21.0	1.7	14.5	60.4
7a #6A	23.8–28.8	38–58	1.2–1.9	762–782	25.0–25.7	0.0	62.9	37.1	1.2	5.8	22.2
8b #1P	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	55.9	39.0	5.1	10.7	71.4	167
8b #1P	0.0–3.3	65–85	2.1–2.8	65–85	2.1–2.8	21.2	70.0	8.9	4.7	37.0	83.4
8b #2P	3.3–7.9	50–70	1.6–2.3	152–172	5.0–5.6	8.4	65.8	25.8	1.5	10.2	56.9
8b #4P	12.0–17.0	90–110	3.0–3.6	456–476	15.0–15.6	13.6	66.6	19.8	1.9	16.4	76.8
9a #1PHP	0.0–4.8	10–30	0.3–1.0	10–30	0.3–1.0	16.3	59.8	23.8	1.6	12.4	91.1
9a #1PHP	0.0–4.8	68–88	2.2–2.9	68–88	2.2–2.9	51.8	38.6	9.6	4.2	66.0	174
9a #2P	4.8–9.5	15–35	0.5–1.1	162–182	5.3–6.0	0.0	61.3	38.7	1.1	5.7	29.6
9a #3P	9.5–15.3	118–138	3.9–4.5	408–428	13.4–14.0	23.8	59.8	16.4	2.2	24.1	114
9a #5P	20.3–25.3	132–152	4.3–5.0	749–769	24.6–25.2	6.9	73.5	19.6	1.8	15.4	54.6
10b #1A	0.0–3.5	10–30	0.3–1.0	10–30	0.3–1.0	9.1	66.1	24.8	1.5	10.2	58.3
10b #1A	0.0–3.5	70–90	2.3–3.0	70–90	2.3–3.0	14.0	69.1	16.9	2.1	20.6	74.0
10b #2A	3.5–8.3	50–70	1.6–2.3	158–178	5.2–5.8	29.9	58.0	12.1	3.2	38.4	108
10b #4A	13.3–18.3	30–50	1.0–1.6	436–456	14.3–15.0	0.0	62.2	37.8	1.4	5.3	25.3
10b #6A	23.3–28.3	70–90	2.3–3.0	781–801	25.6–26.3	2.1	72.8	25.1	1.4	9.8	36.4
11c #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	10.0	73.1	16.9	2.1	16.8	62.4
11c #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	22.1	66.5	11.4	3.4	26.2	130
11c #2A	4.4–9.5	15–35	0.5–1.1	150–170	4.9–5.6	59.5	34.2	6.3	7.1	112	300
11b #4A	12.9–17.9	56–76	1.8–2.5	450–470	14.8–15.4	0.0	52.6	47.4	1.0	4.3	14.6
11b #6A	22.8–27.8	56–76	1.8–2.5	749–769	24.6–25.2	0.0	74.1	25.9	1.4	10.1	36.7
11b #8A	32.7–37.4	70–90	2.3–3.0	1,066–1,086	35.0–35.6	0.0	62.8	37.2	1.1	6.2	27.7
11b #10A	42.8–46.8	47–67	1.5–2.2	1,350–1,370	44.3–44.9	25.2	57.5	17.3	2.0	23.1	124
12a #1A	0.0–4.4	10–30	0.3–1.0	10–30	0.3–1.0	5.6	70.3	24.2	1.6	10.7	48.4
12a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	25.3	61.3	13.4	2.8	31.9	108
12a #2A	4.4–9.4	15–35	0.5–1.1	150–170	4.9–5.6	nd	nd	nd	1.7	15.6	nd
12a #4A	14.6–19.6	5–25	0.2–0.8	450–470	14.8–15.4	4.9	67.0	28.0	1.4	9.8	51.9
12a #6A	24.5–29.6	12–32	0.4–1.0	760–780	24.9–25.6	0.0	64.6	35.4	1.2	6.3	26.9

Table 7. Summary of sediment grain-size distribution in subsamples of selected 20-centimeter depth intervals from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Two boreholes (a, b) were drilled at each site. In some cases, a third borehole (c) was drilled if recovery of one of the first two holes was poor. Nearly all boreholes were drilled in six core sections (#). Three primary methods—push (P), hammer (H), auger (A)—were employed to drill core sections, which are denoted in the core-section name following the core-section number; in some cases, multiple methods were used to drill the core section. **Abbreviations:** cm, centimeter; D10, particle diameter representing the 10th percentile of the cumulative frequency distribution (10 percent of the particles in the sediment sample are finer than the D10 grain size); D50, particle diameter representing the 50th percentile of the cumulative frequency distribution or median size (half of the particles in the sediment sample are finer than the D50 grain size); D90, particle diameter representing the 90th percentile of the cumulative frequency distribution (90 percent of the particles in the sediment sample are finer than the D90 grain size); decimal ft, decimal foot; mm, milllimeter; nd, not determined; µm, micrometer; <, less than]

Core section	Depth interval (decimal ft)	Depth from top of core section (cm)	Depth from top of core section (decimal ft)	Depth relative to surface (cm)	Depth relative to surface (decimal ft)	Grain-size distribution, by laser scattering					
						Sand, 63 µm–1 mm (percent)	Silt, 4–63 µm (percent)	Clay, <4 µm (percent)	D10 (µm)	D50 (µm)	D90 (µm)
13b #1A	0.0–3.3	10–30	0.3–1.0	10–30	0.3–1.0	0.0	63.4	36.6	1.1	6.1	22.7
13b #1A	0.0–3.3	70–90	2.3–3.0	70–90	2.3–3.0	33.8	52.1	14.2	2.5	33.2	146
13b #2A	3.3–8.4	51–71	1.7–2.3	150–170	4.9–5.6	29.7	56.7	13.6	2.6	41.4	98.4
13b #4A	13.3–18.4	45–65	1.5–2.1	450–470	14.8–15.4	0.5	43.6	55.9	0.8	3.3	14.8
13b #6A	23.4–28.4	36–56	1.2–1.8	750–770	24.6–25.3	16.2	55.6	28.2	1.2	11.1	96.4
14a #1A	0.0–4.3	10–20	0.3–0.7	10–20	0.3–0.7	0.0	60.0	40.0	1.0	5.5	22.9
14a #1A	0.0–4.3	70–90	2.3–3.0	70–90	2.3–3.0	0.0	63.8	36.2	1.1	6.4	24.2
14b #2A	2.8–8.0	64–84	2.1–2.8	150–170	4.9–5.6	44.3	42.4	13.3	2.8	51.0	170
14b #4A	13.0–17.8	55–75	1.8–2.5	450–470	14.8–15.4	0.0	49.9	50.1	1.0	4.0	14.7
14b #6A	22.7–27.9	58–78	1.9–2.6	750–770	24.6–25.3	0.0	68.9	31.1	1.1	9.9	35.4
15b #1A	0.0–2.8	10–30	0.3–1.0	10–30	0.3–1.0	0.3	66.4	33.3	1.1	7.0	27.7
15a #1A	0.0–4.4	70–90	2.3–3.0	70–90	2.3–3.0	30.0	59.7	10.2	3.9	38.4	111
15b #2A	2.8–7.8	66–86	2.2–2.8	150–170	4.9–5.6	1.5	67.0	31.4	1.2	8.0	35.3
15a #4A	14.4–19.5	10–30	0.3–1.0	449–469	14.7–15.4	10.9	63.8	25.3	1.5	11.6	64.9
15a #6A	24.3–29.0	8–28	0.3–0.9	750–770	24.6–25.3	0.1	65.2	34.7	1.3	6.2	31.3

Table 8. Summary statistics by depth interval for sediment mercury speciation, iron speciation, total reduced sulfur, loss on ignition, wet bulk density, and grain-size distribution for subsamples collected at selected 20-centimeter intervals from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.

[BD, bulk density; cm, centimeter; d.w., dry weight; D10, particle diameter representing the 10th percentile of the cumulative frequency distribution (10 percent of the particles in the sediment sample are finer than the D10 grain size); D50, particle diameter representing the 50th percentile of the cumulative frequency distribution or median size (half of the particles in the sediment sample are finer than the D50 grain size); D90, particle diameter representing the 90th percentile of the cumulative frequency distribution (90-percent of the particles in the sediment sample are finer than the D90 grain size); Fe(II), ferrous iron; Fe(III)a, poorly crystalline ferric iron; Fe(III)c, crystalline ferric iron; g/cm3, gram per cubic centimeter; LDPSA, laser diffraction partical-size analyzer; LOI, loss on ignition; MeHg, methylmercury; mg/g, milligram per gram; n.d., not determined; ng/g, nanogram per gram; THg, total mercury; TRS, total reduced sulfur; w.w., wet weight; <, less than; µm, micrometer; µmol/g, micromole per gram]

	THg d.w. (ng/g)	MeHg d.w. (ng/g)	MeHg (percent)	Fe(II) d.w. (mg/g)	$Fe(III)_a$ d.w. (mg/g)	$Fe(III)_c$ d.w. (mg/g)	TRS d.w. (µmol/g)	LOI (percent)	BD w.w. (g/cm^3)	Fines by sieving <63 µm (percent)	Sand, 63 µm–1 mm LDPSA (percent)	Silt, 4–63 µm LDPSA (percent)	Clay, <4 µm LDPSA (percent)	D10 (µm)	D50 (µm)	D90 (µm)
Depth from surface: 10–30 cm																
Mean	522	1.30	0.32	0.34	1.06	12.7	0.98	4.00	1.14	64.7	21.6	56.3	22.1	2.9	27.8	106
Standard deviation	268	0.54	0.17	0.18	0.95	1.85	1.02	0.80	0.21	20.2	22.3	12.9	11.5	2.8	28.4	80.5
Minimum	173	0.37	0.04	0.15	0.30	9.83	0.07	2.73	0.91	27.8	0.0	33.3	5.1	1.0	5.5	22.7
25th percentile	302	0.83	0.18	0.21	0.40	11.4	0.40	3.29	1.04	46.1	0.3	42.1	11.7	1.1	7.0	27.7
Median	429	1.43	0.30	0.27	0.50	12.7	0.59	3.96	1.09	73.7	11.8	60.0	23.8	1.6	12.5	67.9
75th percentile	782	1.54	0.48	0.40	2.25	15.0	0.84	4.48	1.19	81.3	42.5	66.4	33.3	3.3	44.1	191
Maximum	1,020	2.19	0.52	0.72	2.81	15.5	3.22	5.52	1.72	92.7	60.9	73.1	40.0	10.7	89.0	249
Number of samples	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Depth from surface: 70–90 cm																
Mean	853	1.17	0.16	0.28	1.02	12.3	0.52	3.47	1.07	70.4	27.5	56.5	15.9	3.0	37.8	123
Standard deviation	554	0.60	0.08	0.10	0.87	2.76	0.24	0.94	0.17	20.8	19.2	13.9	9.2	1.1	28.0	70.2
Minimum	316	0.39	0.03	0.11	0.34	8.71	0.19	1.81	0.82	36.5	0.0	26.1	8.9	1.1	6.0	22.5
25th percentile	488	0.74	0.12	0.20	0.37	9.27	0.37	2.85	0.94	48.5	14.0	43.9	10.2	2.1	20.6	74.0
Median	686	1.11	0.16	0.28	0.50	12.4	0.49	3.08	1.07	64.8	25.3	61.3	12.2	3.1	33.2	111
75th percentile	1,000	1.49	0.19	0.37	2.12	13.7	0.69	4.35	1.15	91.8	43.9	67.9	16.9	3.9	47.4	174
Maximum	2,410	2.84	0.34	0.45	2.58	18.4	1.03	4.85	1.53	99.5	64.5	70.0	36.2	4.8	116	263
Number of samples	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Depth from surface: 150–170 cm																
Mean	674	0.99	0.18	0.23	0.90	12.7	0.41	3.86	1.47	73.2	26.7	54.7	18.6	3.0	40.2	112
Standard deviation	504	0.88	0.11	0.11	0.69	2.69	0.25	1.68	0.35	32.1	24.9	15.9	11.2	2.0	38.5	86.2
Minimum	48.4	0.12	0.04	0.10	0.36	7.88	0.14	1.86	0.87	7.9	0.0	23.3	6.3	1.1	5.7	25.8
25th percentile	133	0.33	0.11	0.15	0.41	10.2	0.20	2.28	1.11	51.2	1.2	40.8	8.8	1.3	8.0	34.6
Median	602	0.68	0.17	0.20	0.51	12.3	0.35	3.64	1.66	86.5	23.6	59.7	13.5	2.6	28.2	89.6
75th percentile	1,200	1.52	0.26	0.27	1.39	14.9	0.61	5.59	1.79	91.9	50.4	67.8	30.1	4.6	60.5	97.9
Maximum	1,670	3.22	0.41	0.48	2.51	16.6	0.90	6.75	1.85	95.1	68.9	73.1	38.7	7.1	126	95.1
Number of samples	15	15	15	15	15	15	15	15	15	15	14	14	14	15	15	14

Table 8. Summary statistics by depth interval for sediment mercury speciation, iron speciation, total reduced sulfur, loss on ignition, wet bulk density, and grain-size distribution for subsamples collected at selected 20-centimeter intervals from cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[BD, bulk density; cm, centimeter; d.w., dry weight; D10, particle diameter representing the 10th percentile of the cumulative frequency distribution (10 percent of the particles in the sediment sample are finer than the D10 grain size); D50, particle diameter representing the 50th percentile of the cumulative frequency distribution or median size (half of the particles in the sediment sample are finer than the D50 grain size); D90, particle diameter representing the 90th percentile of the cumulative frequency distribution (90-percent of the particles in the sediment sample are finer than the D90 grain size); Fe(II), ferrous iron; Fe(III)a, poorly crystalline ferric iron; Fe(III)c, crystalline ferric iron; g/cm3, gram per cubic centimeter; LDPSA, laser diffraction partical-size analyzer; LOI, loss on ignition; MeHg, methylmercury; mg/g, milligram per gram; n.d., not determined; ng/g, nanogram per gram; THg, total mercury; TRS, total reduced sulfur; w.w., wet weight; <, less than; µm, micrometer; µmol/g, micromole per gram]

	THg d.w. (ng/g)	MeHg d.w. (ng/g)	MeHg (percent)	Fe(II) d.w. (mg/g)	$Fe(III)_a$ d.w. (mg/g)	$Fe(III)_c$ d.w. (mg/g)	TRS d.w. (µmol/g)	LOI (percent)	BD w.w. (g/cm^3)	Fines by sieving <63 µm (percent)	Sand, 63 µm–1 mm LDPSA (percent)	Silt, 4–63 µm LDPSA (percent)	Clay, <4 µm LDPSA (percent)	D10 (µm)	D50 (µm)	D90 (µm)
Depth from surface: 450–470 cm																
Mean	162	n.d.	n.d.	0.38	0.60	13.7	0.86	4.13	1.62	79.8	8.3	57.3	34.4	1.4	11.5	54.2
Standard deviation	308	n.d.	n.d.	0.92	0.57	2.75	2.68	0.85	0.27	22.4	11.5	7.7	14.3	0.7	9.7	44.6
Minimum	47.9	<0.05	<0.01	0.10	0.18	4.85	0.02	3.05	1.05	23.1	0.0	43.6	11.8	0.8	3.3	14.6
25th percentile	61.3	<0.05	<0.03	0.12	0.31	12.5	0.08	3.42	1.31	78.7	0.0	51.1	21.0	0.9	4.3	18.8
Median	69.2	<0.05	<0.06	0.14	0.36	14.5	0.09	4.19	1.71	86.5	0.5	56.6	37.8	1.4	5.7	30.5
75th percentile	101	0.12	0.24	0.17	0.67	15.0	0.29	4.79	1.85	94.5	13.6	63.8	47.4	1.7	16.4	76.8
Maximum	1,270	3.68	0.29	3.70	2.40	16.5	10.5	5.88	1.91	97.2	31.7	69.8	55.9	3.3	34.6	139
Number of samples	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Depth from surface: 750–770 cm																
Mean	115	n.d.	n.d.	0.12	0.40	13.2	0.16	3.42	1.61	74.0	10.6	64.2	25.2	1.8	15.4	69.3
Standard deviation	39.5	n.d.	n.d.	0.07	0.24	1.70	0.12	1.05	0.32	23.2	13.0	7.1	9.7	0.8	10.6	48.9
Minimum	64.2	<0.05	<0.01	0.06	0.20	10.2	0.01	1.72	1.04	9.6	0.0	52.3	11.8	1.1	5.2	22.2
25th percentile	86.4	<0.05	<0.01	0.09	0.26	12.0	0.08	2.60	1.27	65.5	0.0	58.0	16.9	1.2	6.2	30.2
Median	105	<0.05	<0.02	0.10	0.34	13.0	0.12	3.39	1.73	77.9	4.5	63.8	25.5	1.4	10.6	45.6
75th percentile	136	<0.05	<0.04	0.13	0.46	14.8	0.22	4.50	1.85	88.7	21.7	71.5	34.9	2.3	23.0	110
Maximum	193	0.35	0.34	0.34	1.09	16.0	0.46	4.85	1.92	98.1	34.2	74.1	40.9	3.3	34.5	156
Number of samples	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14

Summary

Cache Creek Settling Basin (CCSB) was constructed in 1937 to trap sediment from Cache Creek before delivery into Yolo Bypass, a flood conveyance for the Sacramento River system that is tributary to the Sacramento–San Joaquin Delta. Sediment management options being considered by stakeholders in the CCSB include sediment excavation; however, that could expose deposits containing elevated mercury (Hg) concentrations from historical Hg mining in the watershed. In cooperation with the California Department of Water Resources, the U.S. Geological Survey undertook sediment-coring campaigns in 2011–12 to (1) describe areal and vertical distribution of Hg concentrations in sediment in the CCSB and (2) improve constraint of estimates of the deposition rate of sediment in the CCSB. This report contains information about the 15 drill sites; the drilling, sectioning, subsampling, and analytical methods used; and the results for each sediment-core section.

The methods and results are presented for geochemical and geophysical analyses of sediment samples collected from two deep-coring campaigns at CCSB, Yolo County, California. During the first coring campaign, in October–November 2011, 20 boreholes were drilled at 10 sites; an additional 11 boreholes were drilled at 5 sites during the second campaign in August 2012. Total core depths ranged from approximately 4.6 to 13.7 meters (15 to 45 feet), with penetration to about 9.1 meters (30 feet) at most locations. Intact core sections (roughly 5 feet in length) were analyzed for geophysical properties including gamma bulk density and magnetic susceptibility. After geophysical property analysis, cores from each location were split, photographed, and described macroscopically with regard to color, approximate median grain size, disturbances (such as fracturing), and accessories (such as carbonate nodules and organic material). Subsamples (76) were collected as 20-centimeter (cm) intervals from 5 predetermined depths (approximately 1, 3, 5, 15, and 25 feet below land surface) at each of the 15 sites and analyzed for total mercury (THg), methylmercury, iron speciation, total reduced sulfur, organic content (LOI), bulk density, and a detailed grain-size distribution (by laser scattering). For 6 locations along an east–west transect in the southern part of the CCSB and one off-transect location to the north, an additional 305 subsamples were collected at 3-cm intervals and analyzed for radionuclides (including Cs-137, used for dating), THg, and organic content (LOI).

Results presented in this report are to be used by the U.S. Geological Survey, the California Department of Water Resources, and other stakeholders to interpret the deposition rate of sediment in the CCSB and to improve knowledge of the spatial distribution of mercury and other constituents in the sediments. Interpretation of the data presented in this report is planned to be published separately. The chemical data are useful for determining appropriate handling procedures and possible uses for the material, should it be excavated in the future.

References

Appleby, P.G., and Oldfield, Frank, 1992, Application of lead-210 to sedimentation studies, chap. 21 *in* Ivanovich, Miro, and Harmon, R.S., eds., Uranium-series disequilibrium—Application to earth, marine, and environmental sciences (2d ed.): Oxford, United Kingdom, Clarendon Press, p. 731–778.

Beckman Coulter, Inc., 2011, Instruction for use, LS 13 320 laser diffraction particle size analyzer: Brea, Calif., Beckman Coulter, ver. PN B05577AB, October 2011, 246 p., https://www.beckmancoulter.com/wsrportal/techdocs?docname=B05577AB.pdf.

Callender, Edward, and Robbins, J.A., 1993, Transport and accumulation of radionuclides and stable elements in a Missouri River reservoir: Water Resources Research, v. 29, no. 6, p. 1787–1804, http://dx.doi.org/10.1029/93WR00387.

Carr, K.J., Ercan, Ali, and Kavvas, M.L., 2010, Hydraulic and sediment transport modeling for Cache Creek Settling Basin, Woodland, California: World Environmental and Water Resources Congress 2010, p. 1634–1642, http://dx.doi.org/10.1061/41114(371)172.

Carr, K.J., Tu, Tongbi, Ercan, Ali, Kavvas, M.L., and Nosacka, John, 2015, Two-dimensional unsteady flow modeling of flood inundation in a leveed basin: World Environmental and Water Resources Congress 2015, p. 1597–1606, http://dx.doi.org/10.1061/9780784479162.156.

Cooke, Janis, and Morris, Patrick, 2005, Amendments to the water quality control plan for the Sacramento River and San Joaquin River basins for the control of mercury in Cache Creek, Bear Creek, and Harley Gulch: Sacramento, Calif., Central Valley Regional Water Quality Control Board, Final Staff Report, 99 p., http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/cache_sulphur_creek/index.shtml.

Cutshall, N.H., Larsen, I.L., and Olsen, C.R., 1983, Direct analysis of ^{210}Pb in sediment samples—Self-absorption corrections: Nuclear Instruments and Methods in Physics Research, v. 206, no. 1–2, p. 309–312, https://doi.org/10.1016/0167-5087(83)91273-5.

Domagalski, J.L., Alpers, C.N., Slotton, D.G., Suchanek, T.H., and Ayers, S.M., 2004a, Mercury and methylmercury concentrations and loads in the Cache Creek watershed, California: Science of the Total Environment, v. 327, no. 1–3, p. 215–237, https://doi.org/10.1016/j.scitotenv.2004.01.013.

Domagalski, J.L., Alpers, C.N., Slotton, D.G., Suchanek, T.H., and Ayers, S.M., 2004b, Mercury and methylmercury concentrations and loads in Cache Creek Basin, California, January 2000 through May 2001: U.S. Geological Survey Scientific Investigations Report 2004–5037, 64 p., https://pubs.er.usgs.gov/publication/sir20045037.

Evans, H.B., 1965, GRAPE*—A device for continuous determination of material density and porosity, Society of Petrophysicists and Well-Log Analysts, Sixth Annual Logging Symposium: Dallas, Tex., January 1965, p. B1–B25, https://www.onepetro.org/conference-paper/SPWLA-1965-2B.

Fuller, C.C., and Hammond, D.E., 1983, The fallout rate of Pb-210 on the western coast of the United States: Geophysical Research Letters, v. 10, no. 12, p. 1164–1167, http://dx.doi.org/10.1029/GL010i012p01164.

Fuller, C.C., Van Geen, Alexander, Baskaran, Mark, and Anima, R.J., 1999, Sediment chronology in San Francisco Bay, California, defined by ^{210}Pb, ^{234}Th, ^{137}Cs, and ^{239,240}Pu: Marine Chemistry, v. 64, no. 1–2, p. 7–27, http://dx.doi.org/10.1016/S0304-4203(98)00081-4.

Geotek, 2014, Multi-Sensor Core Logger, ver. 17-02-14: Daventry, England, Geotek, users manual, 226 p.

Horvat, Milena, Bloom, N.S., and Liang, Lian, 1993, Comparison of distillation with other current isolation methods for the determination of methyl mercury compounds in low level environment samples—Part 1. Sediments: Analytica Chimica Acta, v. 281, no. 1, p. 135–152, https://doi.org/10.1016/0003-2670(93)85348-N.

Kayen, R.E., Edwards, B.D., and Lee, H.J., 1999, Nondestructive laboratory measurement of geotechnical and geoacoustic properties through intact core-liner, *in* Marr, W.A., and Fairhurst, C.E., eds., Nondestructive and automated testing for soil and rock properties, ASTM STP 1350: West Conshohocken, Pa., American Society for Testing and Materials, p. 83–94, https://doi.org/10.1520/STP13311S.

Marineau, M.D., and Wright, S.A., 2017, Bed-material characteristics of the Sacramento–San Joaquin Delta, California, 2010–13: U.S. Geological Survey Data Series 1026, 55 p., https://doi.org/10.3133/ds1026.

Marvin-DiPasquale, M.C., Lutz, M.A., Krabbenhoft, D.P., Aiken, G.R., Orem, W.H., Hall, B.D., DeWild, J.F., and Brigham, M.E., 2008, Total mercury, methylmercury, methylmercury production potential, and ancillary streambed-sediment and pore-water data for selected streams in Oregon, Wisconsin, and Florida, 2003–04: U.S. Geological Survey Data Series 375, 25 p., https://pubs.er.usgs.gov/publication/ds375.

Marvin-DiPasquale, Mark, Agee, J.L., Kakouros, Evangelos, Kieu, L.H., Fleck, J.A., and Alpers, C.N., 2011, The effects of sediment and mercury mobilization in the South Yuba River and Humbug Creek confluence area, Nevada County, California—Concentrations, speciation and environmental fate—Part 2, Laboratory experiments: U.S. Geological Survey Open-File Report 2010−1325-B, 53 p., https://pubs.er.usgs.gov/publication/ofr20101325B.

Matthes, W.J., Sholar, C.J., and George, J.R., 1992, Quality-assurance plan for the analysis of fluvial sediment by laboratories of the U.S. Geological Survey: U.S. Geological Survey Open-File Report 91–467, 31 p., https://pubs.er.usgs.gov/publication/ofr91467.

Munsell, 2000, Munsell soil color charts: Grand Rapids, Mich., Munsell Color, 152 p.

Olund, S.D., DeWild, J.F., Olson, M.L., and Tate, M.T., 2004, Methods for the preparation and analysis of solids and suspended solids for total mercury: U.S. Geological Survey Techniques and Methods 5-A8, 23 p., https://pubs.er.usgs.gov/publication/tm5A8.

Poppe, L.J., Paskevich,V.F., Williams, S.J., Hastings, M.E., Kelley, J.T., Belknap, D.F., Ward, L.G., FitzGerald, D.M., and Larsen, P.F, 2003, Surficial sediment data from the Gulf of Maine, Georges Bank, and vicinity—A GIS compilation: U.S. Geological Survey Open-File Report 2003–1, https://pubs.er.usgs.gov/publication/ofr031.

Schwarz, C.R., and Wade, E.B., 1990, The North American datum of 1983: Project methodology and execution: Journal of Geodesy, v. 64, no. 1, p. 28–62.

Shuter, Eugene, and Teasdale, W.E., 1989, Application of drilling, coring, and sampling techniques to test holes and wells: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 2, Chapter F1, 97 p., https://pubs.er.usgs.gov/publication/twri02F1.

U.S. Army Corps of Engineers, 1987, Cache Creek Settling Basin, final general design memorandum: U.S. Army Corps of Engineers, Sacramento District, https://calisphere.org/item/21957dc2-0ed1-41d7-aecb-7a35418c2f86/.

U.S. Army Corps of Engineers, 1997, Sediment deposition in the Cache Creek Training Channel: Technical memorandum CESPK-ED-D (1110-2-1150a), Work Order Request No. 97-2-5.

U.S. Environmental Protection Agency, 2001, Appendix to Method 1631—Total mercury in tissue, sludge, sediment, and soil by acid digestion and BrCl oxidation: Environmental Protection Agency EPA-821-R-01-013, 13 p., http://nepis.epa.gov/Exe/ZyPDF.cgi/40001F6A.PDF?Dockey=40001F6A.PDF.

U.S. Environmental Protection Agency, 2002, Method 1631, Revision E—Mercury in water by oxidation, purge and trap, and cold vapor atomic fluorescence spectrometry: U.S. Environmental Protection Agency, Office of Water, EPA-821-R-02-019, 36 p., https://www.epa.gov/sites/production/files/2015-08/documents/method_1631e_2002.pdf.

Van Metre, Peter, Wilson, J.T., Fuller, C.C., Callender, Edward, and Mahler, B.J., 2004, Collection, analysis, and age-dating of sediment cores from 56 U.S. lakes and reservoirs sampled by the U.S. Geological Survey, 1992–2001: U.S. Geological Survey Scientific Investigations Report 2004–5184, 187 p., https://pubs.er.usgs.gov/publication/sir20045184.

Wentworth, C.K., 1922, A scale of grade and class terms for clastic sediments: The Journal of Geology, v. 30, no. 5, p. 377–392, http://www.jstor.org/stable/30063207.

Wood, M.L., Foe, C.G., Cooke, Janis, and Louie, S.J., 2010a, Sacramento–San Joaquin Delta Estuary TMDL for methylmercury: Rancho Cordova, Calif., Regional Water Quality Control Board, Central Valley Region, Staff Report, 234 p., http://www.swrcb.ca.gov/rwqcb5/water_issues/tmdl/central_valley_projects/delta_hg/april_2010_hg_tmdl_hearing/apr2010_tmdl_staffrpt_final.pdf.

Wood, M.L., Morris, P.W., Cooke, Janis, and Louie, S.J., 2010b, Amendments to the water quality control plan for the Sacramento River and San Joaquin River Basins for the control of methylmercury and total mercury in the Sacramento–San Joaquin Delta Estuary: Rancho Cordova, Calif., Regional Water Quality Control Board, Central Valley Region, Staff Report, 332 p., http://www.swrcb.ca.gov/rwqcb5/water_issues/tmdl/central_valley_projects/delta_hg/april_2010_hg_tmdl_hearing/apr2010_bpa_staffrpt_final.pdf.

Xianchao, Yu, Chandrasekhar, T.M., and Tate, Kerry, 2005, Analysis of methyl mercury in sediment and tissue by KOH/CH_3OH digestion followed by aqueous phase ethylation: Florida Department of Environmental Protection (FDEP) HG-003-2.2.17, 20 p.

Appendix 1. Quality-Assurance Data Summary

Table 1–1. Sample preservation methods and holding times of sediment samples analyzed for total mercury, methylmercury, iron speciation, total reduced sulfur, cesium-137, loss on ignition, and grain size from deep cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Cs-137, cesium-137; Fe(II), ferrous iron; $Fe(III)_a$, amorphous ferric iron; $Fe(III)_c$, crystalline ferric iron; LOI, loss on ignition; MeHg, methylmercury; ml, milliliter; THg, total mercury; TRS, total reduced sulfur; °C, degrees Celcius; µm, micrometer; %, percent]

Parameter	Preservation	Maximum prescribed holding time	Holding time (date of subsample to date of analysis)
THg	Frozen –80 °C	Undetermined	14–455 days
MeHg	Frozen –80 °C	Undetermined	60–464 days
Fe(II)	Frozen –15 °C	Undetermined	13–421 days
$Fe(III)_a$	Frozen –15 °C	Undetermined	13–421 days
$Fe(III)_c$	Frozen –15 °C	Undetermined	13–421 days
TRS	5 ml 10% zinc-acetate/frozen –15 °C	Undetermined	132–544 days
Cs-137	Freeze dried	Undetermined	5–345 days
LOI	Frozen –15 °C	Undetermined	10–433 days
Fines by sieving <63 µm	Frozen –15 °C	Indefinite	245–480 days

Table 1–2. Method detection limits, reporting limits, and summary of method blank results for sediment samples analyzed for total mercury, methylmercury, iron speciation, total reduced sulfur, and cesium-137 from deep cores collected at Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Method detection limits (MDL) and reporting limits (RL) are assessed at the level of the final instrument analysis for all analytes. The RL is based on the lowest (non-censored) standard used in a batch run, and thus can vary slightly among batch runs. The RL reported below reflects the average (mean) of all batch runs for each analyte. Method blanks are summarized as the number (n) less than (<) MDL or < RL. For method blanks greater than (>) the RL, the mean of all >RL values is given. **Abbreviations**: Cs-137, cesium-137; Fe(II), ferrous iron; $Fe(III)_a$, amorphous ferric iron; $Fe(III)_c$, crystalline ferric iron; g, gram; Hg, mercury; MeHg, methylmercury; N/A, not applicable; ND, not determined; ng/L, nanogram per liter; nmol/ml, nanomole per milliliter; pCi, picocurie; pCi/g, picocurie per gram; pg, picogram; THg, total mercury; TRS, total reduced sulfur; µg/ml, microgram per milliliter; µm, micrometer; =, equal to; ±, plus or minus]

Parameter	Method detection limit	Reporting limit	Method blanks
THg	0.1 ng/L at the level of the Tekran® 2600 autoanalyzer	0.5 ng/L at the level of the Tekran® 2600 autoanalyzer	<MDL, n=22; <RL, n=12; >RL, n=1, 0.9 ng/L
MeHg	0.3 pg (absolute mass as Hg) at the level of the autoanalyzer	0.3 pg (absolute mass as Hg) at the level of the autoanalyzer	<MDL/RL, n=8
Fe(II)	ND	0.04 µg/ml at the level of the spectrophotometric analysis	<RL, n=3
$Fe(III)_a$	ND	0.04 µg/ml at the level of the spectrophotometric analysis	<RL, n=3
$Fe(III)_c$	ND	0.04 µg/ml at the level of the spectrophotometric analysis	<RL, n=3
TRS	ND	0.8 nmol/ml at the level of the spectrophotometric analysis	<RL, n=1; >RL, n=2, 1.3 ± 0.09 nmol/ml
Cs-137	0.08 pCi (absolute activity; average sample weight 7.8 g dry)	0.01 pCi/g	<RL, n=11; 0.002 ± 0.009 pCi/g
Fines by sieving <63 µm	ND	2.0 weight percent	N/A

Table 1–3. Certified reference material recovery results for sediment samples analyzed for total mercury and methylmercury from deep cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Percent recovery is equal to the measured value divided by the certified value. **Abbreviations**: d.w., dry weight; MeHg, methylmercury; ng/g, nanogram per gram; THg, total mercury; µg/g, microgram per gram]

Parameter	Units	Certified reference material	Certified value	Measured value	Recovery (percent)
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.89	95.1
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.59	85.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.73	89.9
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.94	96.7
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.15	103.5
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.59	85.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.67	88.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.76	90.7
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.80	92.2
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.66	87.4
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.65	87.2
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.72	89.6
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.55	84.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.55	116.9
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.23	106.3
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.92	95.9
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.97	97.6
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.23	106.2
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.07	101.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.98	98.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.00	98.6
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.15	103.5
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.09	101.7
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.65	87.1
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.74	90.1
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.15	103.5
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.09	101.7
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.80	92.2
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.89	94.9
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.52	82.9
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.67	88.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.63	86.5
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.60	85.6
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.70	88.7
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.84	93.4
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.07	101.0
THg	µg/g d.w.	PACS-2, marine sediment	3.04	2.82	92.7
THg	µg/g d.w.	PACS-2, marine sediment	3.04	3.03	99.6

Table 1–3. Certified reference material recovery results for sediment samples analyzed for total mercury and methylmercury from deep cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Percent recovery is equal to the measured value divided by the certified value. **Abbreviations**: d.w., dry weight; MeHg, methylmercury; ng/g, nanogram per gram; THg, total mercury; µg/g, microgram per gram]

Parameter	Units	Certified reference material	Certified value	Measured value	Recovery (percent)
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	79.2	113.1
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	81.9	117.0
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	84.9	121.3
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	89.2	127.4
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	86.5	123.6
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	92.8	132.5
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	75.3	107.6
MeHg	ng/g d.w.	CC-580, estuarine sediment	70.0	84.3	120.4

Table 1–4. Matrix spike recoveries for sediment samples analyzed for total mercury, methylmercury, iron speciation, and total reduced sulfur from deep cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Recovery is equal to measured value divided by theoretical spiked value. **Abbreviations**: cm, centimeter; d.w., dry weight; Fe(II), ferrous iron; $Fe(III)_c$, crystalline ferric iron; MeHg, methylmercury; mg/g, milligram per gram; ng/g, nanogram per gram; THg, total mercury; TRS, total reduced sulfur; w.w., wet weight; µmol/g, micromole per gram]

Parameter	Units	Sample amended		Measured value	Sample value (non-spiked)	Theoretical spiked value	Recovery (percent)
		Core section	Depth from top of core section (cm)				
THg	ng/g d.w.	2c #6PH	30–50	309	161	309	100.0
THg	ng/g d.w.	4b #6A	50–70	418	180	394	106.1
THg	ng/g d.w.	6a #6A	10–30	383	94.0	340	112.6
THg	ng/g d.w.	8b #4P	90–110	373	56.0	405	92.1
THg	ng/g d.w.	9a #5P	132–152	476	87.0	494	96.4
THg	ng/g d.w.	10b #2A	50–70	1,270	602	973	130.5
THg	ng/g d.w.	12a #6A	12–32	226	105	224	100.9
THg	ng/g d.w.	13b #2A	51–71	1,210	1,200	1,370	88.3
THg	ng/g d.w.	9a #1PHP	60–63	1,280	458	1,560	82.1
THg	ng/g d.w.	9a #2P	48–51	630	94.0	666	94.6
THg	ng/g d.w.	10b #1A	66–69	1,260	505	935	134.8
THg	ng/g d.w.	10b #2A	75–78	1,480	1,290	1,800	82.2
THg	ng/g d.w.	10b #1A	51–54	1,400	748	1,610	87.0
THg	ng/g d.w.	15a #1A	72–75	1,820	591	1,320	137.9
THg	ng/g d.w.	15a #1A	108–111	2,730	497	1,380	197.8
THg	ng/g d.w.	10b #2A	29–42	6,540	172	6,680	97.9
THg	ng/g d.w.	11c #1A	81–84	1,830	612	1,370	133.6
THg	ng/g d.w.	11c #1A	117–120	857	158	713	120.3
THg	ng/g d.w.	11c #2A	36–39	3,340	1,020	2,450	136.3
THg	ng/g d.w.	11c #2A	69–72	3,020	1,260	2,400	125.8
THg	ng/g d.w.	11c #2A	87–90	860	49.8	728	118.1
THg	ng/g d.w.	12a #2A	134–137	3,820	2,390	4,210	90.7
THg	ng/g d.w.	11c #2A	105–108	799	45.8	727	109.9
THg	ng/g d.w.	12a #2A	41–44	2,480	1,280	2,280	108.8
THg	ng/g d.w.	14b #2A	7–10	1,980	1,140	1,600	123.8
THg	ng/g d.w.	14b #2A	37–40	1,210	1,610	1,880	64.4
THg	ng/g d.w.	14b #2A	70–73	805	512	784	102.7
THg	ng/g d.w.	12a #3A	6–9	2,400	1,490	1,820	131.9
THg	ng/g d.w.	13b #1A	75–78	1,400	1,040	1,960	71.4
THg	ng/g d.w.	13b #2A	9–12	1,610	708	1,280	125.8
THg	ng/g d.w.	13b #2A	39–42	956	922	1,580	60.5
THg	ng/g d.w.	13b #2A	99–102	904	624	1,310	69.0
THg	ng/g d.w.	14b #2A	7–10	1,980	1,140	1,600	123.8
THg	ng/g d.w.	14b #2A	37–40	1,210	1,610	1,880	64.4
THg	ng/g d.w.	14b #2A	70–73	805	512	784	102.7
THg	ng/g d.w.	12a #3A	6–9	2,400	1,490	1,820	131.9
THg	ng/g d.w.	12a #4A	22–25	2,410	1,670	1,890	127.5
THg	ng/g d.w.	10b #6A	81–84	422	66.1	405	104.2

Table 1–4. Matrix spike recoveries for sediment samples analyzed for total mercury, methylmercury, iron speciation, and total reduced sulfur from deep cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.—Continued

[Recovery is equal to measured value divided by theoretical spiked value. **Abbreviations**: cm, centimeter; d.w., dry weight; Fe(II), ferrous iron; $Fe(III)_c$, crystalline ferric iron; MeHg, methylmercury; mg/g, milligram per gram; ng/g, nanogram per gram; THg, total mercury; TRS, total reduced sulfur; w.w., wet weight; µmol/g, micromole per gram]

Parameter	Units	Sample amended		Measured value	Sample value (non-spiked)	Theoretical spiked value	Recovery (percent)
		Core section	Depth from top of core section (cm)				
THg	ng/g d.w.	12a #4A	22–25	2,470	1,670	1,980	124.7
THg	ng/g d.w.	15a #6A	78–81	475	66.0	434	109.3
THg	ng/g d.w.	15b #2A	39–42	1,510	873	1,730	87.3
THg	ng/g d.w.	15b #2A	93–96	2,140	878	1,793	119.4
THg	ng/g d.w.	12a #1A	81–84	1,196	646	979	122.3
THg	ng/g d.w.	12a #1A	111–114	1,437	791	1,690	85.0
MeHg	ng/g w.w.	1b #2H	36–56	0.93	0.35	0.96	96.7
MeHg	ng/g w.w.	1b #2H	36–56	1.02	0.35	0.96	106.1
MeHg	ng/g w.w.	5a #1A	10–30	1.93	1.32	1.92	100.8
MeHg	ng/g w.w.	5a #1A	10–30	1.79	1.32	1.92	93.4
MeHg	ng/g w.w.	6a #2A	18–38	1.84	1.10	1.68	109.5
MeHg	ng/g w.w.	6a #2A	18–38	1.73	1.10	1.68	102.9
MeHg	ng/g w.w.	10b #1A	70–90	1.78	1.33	1.93	92.4
MeHg	ng/g w.w.	10b #1A	70–90	2.21	1.33	1.93	114.3
MeHg	ng/g w.w.	12a #2A	15–35	1.73	1.06	1.69	102.2
MeHg	ng/g w.w.	12a #2A	15–35	1.57	1.06	1.69	93.2
MeHg	ng/g w.w.	11c #2A	15–35	1.10	0.27	1.10	100.0
MeHg	ng/g w.w.	11c #2A	15–35	1.15	0.27	1.10	104.7
MeHg	ng/g w.w.	13b #6A	36–56	0.42	0.02	0.45	93.7
MeHg	ng/g w.w.	13b #6A	36–56	0.44	0.02	0.45	98.3
MeHg	ng/g w.w.	14b #6A	58–78	0.44	0.06	0.47	92.8
MeHg	ng/g w.w.	14b #6A	58–78	0.46	0.06	0.47	97.1
Fe(II)	mg/g d.w.	1b #2H	36–56	5.13	0.26	5.01	102.2
Fe(II)	mg/g d.w.	7a #1A	10–30	4.17	0.22	5.08	82.1
Fe(II)	mg/g d.w.	12a #6A	12–32	6.24	0.12	7.02	89.0
Fe(II)	mg/g d.w.	13b #2A	51–71	4.94	0.15	5.92	83.5
$Fe(III)_c$	mg/g d.w.	1b #2H	36–56	16.9	11.7	18.5	91.1
$Fe(III)_c$	mg/g d.w.	7a #1A	10–30	15.2	11.4	15.3	98.9
$Fe(III)_c$	mg/g d.w.	12a #6A	12–32	12.9	12.5	14.2	91.3
$Fe(III)_c$	mg/g d.w.	13b #2A	51–71	12.5	10.0	11.1	112.4
TRS	µmol/g w.w.	1b #1P	10–30	4.60	2.02	3.70	124.4
TRS	µmol/g w.w.	3b #1A	10–30	2.10	0.07	1.75	120.3
TRS	µmol/g w.w.	7a #1A	10–30	3.09	0.65	2.34	131.7
TRS	µmol/g w.w.	9a #1PHP	10–30	1.45	0.42	2.12	68.2

Table 1–5. Summary of relative percentage deviation results for laboratory duplicate analyses of sediment samples for analytes associated with deep cores collected from Cache Creek Settling Basin, Yolo County, California, 2011–12.

[Relative percentage deviation (RPDEV) is reported as the mean (± the standard error of the mean) and median of all RPDEV measurements for each analyte. Each individual deviation measurement is equal to half of the difference between n=2 analyses of a single sample. The RPDEV is equal to the deviation divided by mean concentration. **Abbreviations**: D50, particle diameter representing the 50 percent cumulative percentile or median value (half of the particles in the sediment sample are finer than the D50 grain size); Fe(II), ferrous iron; $Fe(III)_a$, amorphous ferric iron; $Fe(III)_c$, crystalline ferric iron; LOI, loss on ignition; MeHg, methylmercury; THg, total mercury; TRS, total reduced sulfur; wt., weight; <, less than; ±, plus or minus; µm, micrometer]

Parameter	Mean RPDEV	Median RPDEV	Number of samples
THg	13.8 ± 1.7	10.3	46
MeHg	9.5 ± 3.0	11.5	4
Fe(II)	5.7 ± 2.6	4.2	6
$Fe(III)_a$	6.8 ± 2.3	6.3	6
$Fe(III)_c$	2.7 ± 0.9	2.1	6
TRS	18.1 ± 5.1	11.0	5
Percentage LOI	4.2 ± 0.7	3.4	42
Bulk density	2.6 ± 0.6	2.0	12
Porosity	3.8 ± 1.3	2.2	11
Percentage dry wt.	0.3 ± 0.1	0.2	12
Fines by sieving <63 µm	3.2 ± 1.3	1.2	13
Grain size (D50)	3.7 ± 2.5	3.1	76

Appendix 2. Graphic Summary of 152-Centimeter Core Sections

For each core-section diagram in appendix 2, a linear depth scale (in meters and feet) is paired with all of the following types of information: continuous logs of gamma bulk density and magnetic susceptibility; discrete-interval classifications of soil color, predominant grain size, and core disturbance; the documentation for the digital photography imaged by the Geotek Geoscan III camera; and the accessories, other remarks, and a delineation of any depth intervals subsampled for laboratory analysis. The information contained in the heading and each column of a core-section diagram is described in the following list:

Heading. The heading includes the site name, core identification (ID), the date the core was drilled and collected, the section number (1–6, in most cases), the depth interval in meters and feet, the landsurface elevation in meters, and the U.S. Geological Survey station number.

Photograph. A photograph of the core section is displayed in the first column. Photographs are unedited except to crop out empty core space.

Ruler. The ruler is in meters and feet and represents the depth of the core from the surface.

Color. The abbreviated Munsell® color code is shown. A detailed legend with corresponding Munsell® value and common color name is included following the explanation.

Gamma bulk density. The gamma bulk density (in grams per cubic centimeter) measured from the multi-sensor core-logger (MSCL) scan is shown in green. The scale is listed below the column heading and varies for each core.

Magnetic susceptibility. The magnetic susceptibility, also measured from the MSCL scan, is shown in red. The scale is listed below the column heading and varies for each core.

Grain size. The lithology symbol is displayed in the sixth column. The grain size category (determined by macroscopic observation) is also listed in the last column, labeled 'Remarks.' Sediment intervals that were not recovered are denoted by 'X' and listed as "lost core." Lithology codes are defined in the explanation.

Contacts. Contacts describe the boundary structure between lithologic layers and are displayed with grain size in the same column. Contact codes are defined in the explanation.

Accessories. The complete list of accessories found in at least one core section includes charcoal-organic fragments, shell fragments, and disseminated organics. Accessory codes are defined in the explanation.

Ichnofossils. These are sometimes referred to as trace fossils and typically represent biological activity. The only ichnofossils found in the set of split cores were rootlets. The Ichnofossil code is defined in the explanation.

Diagenesis. Diagenesis refers to any changes in the sediment that occurred after initial deposition. Examples of diagenesis uncovered in the Cache Creek Settling Basin deep-core set include calcite concretions, carbonates, and oxidized as well as reduced mottles. Diagenesis codes are defined in the explanation.

Core disturbance. Cracks in the sediment core were described on a scale of moderately disturbed to highly fractured. Large gaps in the sediment core are described as "partial void." Core disturbance codes are defined in the explanation.

Samples. The depth intervals of collected samples are recorded in this column. Samples spanning a depth range of 20 centimeter (cm) were analyzed for mercury speciation, iron speciation, total reduced sulfur, the percentage of loss on ignition, bulk density, percentage of fines, and grain-size distribution. Samples collected from a depth range of 3 cm were analyzed for radionuclides (lead-210, radium-226, and cesium-137), total mercury, and percentage of loss on ignition.

Remarks. In addition to the grain-size category (lithology) determined by macroscopic observation, any notes or comments are recorded in this column.

EXPLANATION

Lithology

Sand
Silty sand
Clayey sand
Silt
Sandy silt
Clayey silt
Silty clay
Sandy clay
Clay
Sand-silt-clay
Gravelly sand
Gravelly silty sand
Gravelly clayey sand
Gravelly sandy silt
Gravelly clayey silt
Gravelly sandy clay
Gravelly silty clay
Not observed
Lost core

Contacts

Sharp
Diffuse/bioturbated
Uncertain
Gradational
Undulating
Faulted
Inclined
Stylolite

Lithologic accessories

Charcoal/coal/organic fragments
Shell fragments
Disseminated organics

Ichnofossils

Rootlets

Diagenesis

Calcite concretion
Ped. stage II carbonate
Mottles, oxidized
Carbonate nodules
Mottles, reduced

Core disturbance

Slightly disturbed
Moderately disturbed
Very disturbed
Soupy
Slightly fractured
Moderately fractured
Highly fractured
Biscuiting
Partial void

Table 2–1. Color legend—sorted by graphic color code.

Graphic color code	Munsell value	Color name
BK	10YR 2/1	Black
BK	7.5YR 2.5/1	Black
BR	10YR 4/3	Brown
BR	10YR 5/3	Brown
BR	7.5YR 4/2	Brown
BR	7.5YR 4/3	Brown
BR	7.5YR 4/4	Brown
BR	7.5YR 5/3	Brown
BR	7.5YR 5/4	Brown
dk BR	10YR 3/3	dark Brown
dk BR	7.5YR 3/3	dark Brown
dk BR	7.5YR 3/4	dark Brown
dk gn GY	10Y 3/1	dark greenish Gray
dk gn GY	10Y 4/1	dark greenish Gray
dk gn GY	5GY 4/1	dark greenish Gray
dk GY	10YR 4/1	dark Gray
dk GY	2.5Y 4/1	dark Gray
dk gy BR	10YR 4/2	dark grayish Brown
dk gy BR	2.5Y 4/2	dark grayish Brown
dk gy BR	7.5YR 3/2	dark grayish Brown
dk ye BR	10YR 3/4	dark yellowish Brown
dk ye BR	10YR 3/6	dark yellowish Brown
dk ye BR	10YR 4/4	dark yellowish Brown
dk ye BR	10YR 4/6	dark yellowish Brown
gn BK	10Y 2.5/1	greenish Black
gn GY	10Y 5/1	greenish Gray
gn GY	10Y 6/1	greenish Gray
GY	10YR 5/1	Gray
GY	10YR 6/1	Gray
GY	N 5/1	Gray
gy BR	10YR 5/2	grayish Brown
lt BR	7.5YR 6/4	light Brown
lt BR	7.5YR 6/3	light Brown
lt br GY	10YR 6/2	light brownish Gray
lt br GY	2.5Y 6/2	light brownish Gray
lt ol BR	2.5Y 5/3	light olive Brown
lt ol BR	2.5Y 5/4	light olive Brown
lt ye BR	10YR 6/4	light yellowish Brown
lt ye BR	2.5Y 6/3	light yellowish Brown
OL	5Y 5/3	Olive
ol BR	2.5Y 4/3	olive Brown
ol GY	5Y 5/2	olive Gray
ol YE	2.5Y 6/6	olive Yellow
pal BR	10YR 6/3	pale Brown
pal OL	10Y 6/2	pale Olive
pk GY	7.5YR 7/2	pinkish Gray
rd BR	5YR 4/3	reddish Brown
rd YE	7.5YR 6/6	reddish Yellow
str BR	7.5YR 4/6	strong Brown
vdk GY	10YR 3/1	very dark Gray
vdk gy BR	10YR 3/2	very dark grayish Brown
vpl BR	10YR 7/3	very pale Brown
vpl BR	10YR 7/4	very pale Brown
ye BR	10YR 5/4	yellowish Brown
ye RD	5YR 4/6	yellowish Red
ye RD	5YR 5/6	yellowish Red

Table 2–2. Color legend—sorted by Munsell value.

Munsell value	Graphic color code	Color name
10Y 2.5/1	gn BK	greenish Black
10Y 3/1	dk gn GY	dark greenish Gray
10Y 4/1	dk gn GY	dark greenish Gray
10Y 5/1	gn GY	greenish Gray
10Y 6/1	gn GY	greenish Gray
10Y 6/2	pal OL	pale Olive
10YR 2/1	BK	Black
10YR 3/1	vdk GY	very dark Gray
10YR 3/2	vdk gy BR	very dark grayish Brown
10YR 3/3	dk BR	dark Brown
10YR 3/4	dk ye BR	dark yellowish Brown
10YR 3/6	dk ye BR	dark yellowish Brown
10YR 4/1	dk GY	dark Gray
10YR 4/2	dk gy BR	dark grayish Brown
10YR 4/3	BR	Brown
10YR 4/4	dk ye BR	dark yellowish Brown
10YR 4/6	dk ye BR	dark yellowish Brown
10YR 5/1	GY	Gray
10YR 5/2	gy BR	grayish Brown
10YR 5/3	BR	Brown
10YR 5/4	ye BR	yellowish Brown
10YR 6/1	GY	Gray
10YR 6/2	lt br GY	light brownish Gray
10YR 6/3	pal BR	pale Brown
10YR 6/4	lt ye BR	light yellowish Brown
10YR 7/3	vpl BR	very pale Brown
10YR 7/4	vpl BR	very pale Brown
2.5Y 4/1	dk GY	dark Gray
2.5Y 4/2	dk gy BR	dark grayish Brown
2.5Y 4/3	ol BR	olive Brown
2.5Y 5/3	lt ol BR	light olive Brown
2.5Y 5/4	lt ol BR	light olive Brown
2.5Y 6/2	lt br GY	light brownish Gray
2.5Y 6/3	lt ye BR	light yellowish Brown
2.5Y 6/6	ol YE	olive Yellow
5GY 4/1	dk gn GY	dark greenish Gray
5Y 5/2	ol GY	olive Gray
5Y 5/3	OL	Olive
5YR 4/3	rd BR	reddish Brown
5YR 4/6	ye RD	yellowish Red
5YR 5/6	ye RD	yellowish Red
7.5YR 2.5/1	BK	Black
7.5YR 3/2	dk gy BR	dark grayish Brown
7.5YR 3/3	dk BR	dark Brown
7.5YR 3/4	dk BR	dark Brown
7.5YR 4/2	BR	Brown
7.5YR 4/3	BR	Brown
7.5YR 4/4	BR	Brown
7.5YR 4/6	str BR	strong Brown
7.5YR 5/3	BR	Brown
7.5YR 5/4	BR	Brown
7.5YR 6/3	lt BR	light Brown
7.5YR 6/4	lt BR	light Brown
7.5YR 6/6	rd YE	reddish Yellow
7.5YR 7/2	pk GY	pinkish Gray
N 5/1	GY	Gray

Table 2–3. Color legend—sorted by color name.

Color name	Graphic color code	Munsell value
Black	BK	10YR 2/1
Black	BK	7.5YR 2.5/1
Brown	BR	10YR 4/3
Brown	BR	10YR 5/3
Brown	BR	7.5YR 4/2
Brown	BR	7.5YR 4/3
Brown	BR	7.5YR 4/4
Brown	BR	7.5YR 5/3
Brown	BR	7.5YR 5/4
dark Brown	dk BR	10YR 3/3
dark Brown	dk BR	7.5YR 3/3
dark Brown	dk BR	7.5YR 3/4
dark Gray	dk GY	10YR 4/1
dark Gray	dk GY	2.5Y 4/1
dark grayish Brown	dk gy BR	10YR 4/2
dark grayish Brown	dk gy BR	2.5Y 4/2
dark grayish Brown	dk gy BR	7.5YR 3/2
dark greenish Gray	dk gn GY	10Y 3/1
dark greenish Gray	dk gn GY	10Y 4/1
dark greenish Gray	dk gn GY	5GY 4/1
dark yellowish Brown	dk ye BR	10YR 3/4
dark yellowish Brown	dk ye BR	10YR 3/6
dark yellowish Brown	dk ye BR	10YR 4/4
dark yellowish Brown	dk ye BR	10YR 4/6
Gray	GY	10YR 5/1
Gray	GY	10YR 6/1
Gray	GY	N 5/1
grayish Brown	gy BR	10YR 5/2

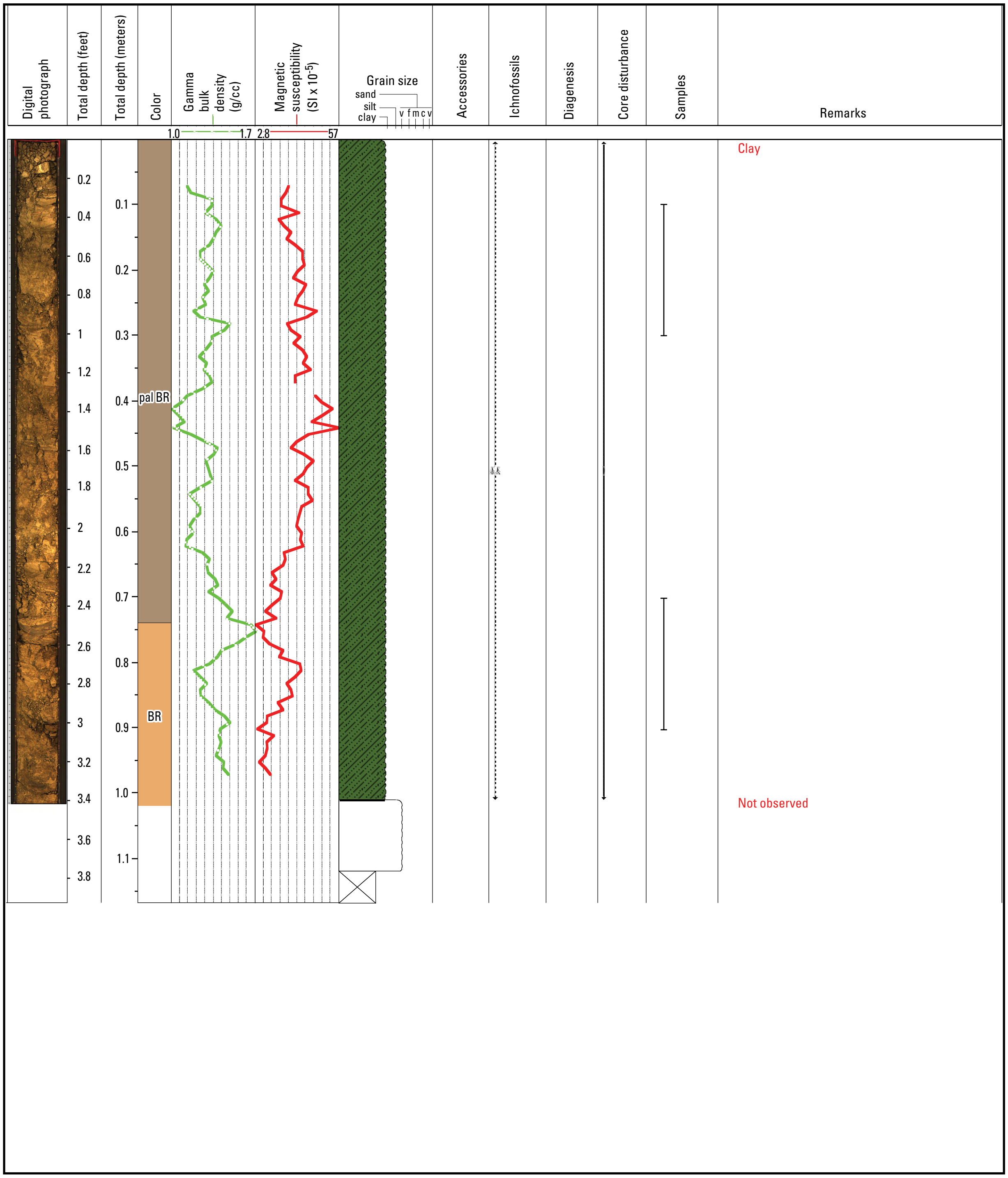
Color name	Graphic color code	Munsell value
greenish Black	gn BK	10Y 2.5/1
greenish Gray	gn GY	10Y 5/1
greenish Gray	gn GY	10Y 6/1
light Brown	lt BR	7.5YR 6/4
light Brown	lt BR	7.5YR 6/3
light brownish Gray	lt br GY	10YR 6/2
light brownish Gray	lt br GY	2.5Y 6/2
light olive Brown	lt ol BR	2.5Y 5/3
light olive Brown	lt ol BR	2.5Y 5/4
light yellowish Brown	lt ye BR	10YR 6/4
light yellowish Brown	lt ye BR	2.5Y 6/3
Olive	OL	5Y 5/3
olive Brown	ol BR	2.5Y 4/3
olive Gray	ol GY	5Y 5/2
olive Yellow	ol YE	2.5Y 6/6
pale Brown	pal BR	10YR 6/3
pale Olive	pal OL	10Y 6/2
pinkish Gray	pk GY	7.5YR 7/2
reddish Brown	rd BR	5YR 4/3
reddish Yellow	rd YE	7.5YR 6/6
strong Brown	str BR	7.5YR 4/6
very dark Gray	vdk GY	10YR 3/1
very dark grayish Brown	vdk gy BR	10YR 3/2
very pale Brown	vpl BR	10YR 7/3
very pale Brown	vpl BR	10YR 7/4
yellowish Brown	ye BR	10YR 5/4
yellowish Red	ye RD	5YR 4/6
yellowish Red	ye RD	5YR 5/6

U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-1b
Collected: Oct. 2, 2011
Land-surface elevation: 9.98 m
USGS station number: 384048121402603

Core: 1b #1P
Section 1 of 6 (0–1.17 meters; 0–3.83 feet)

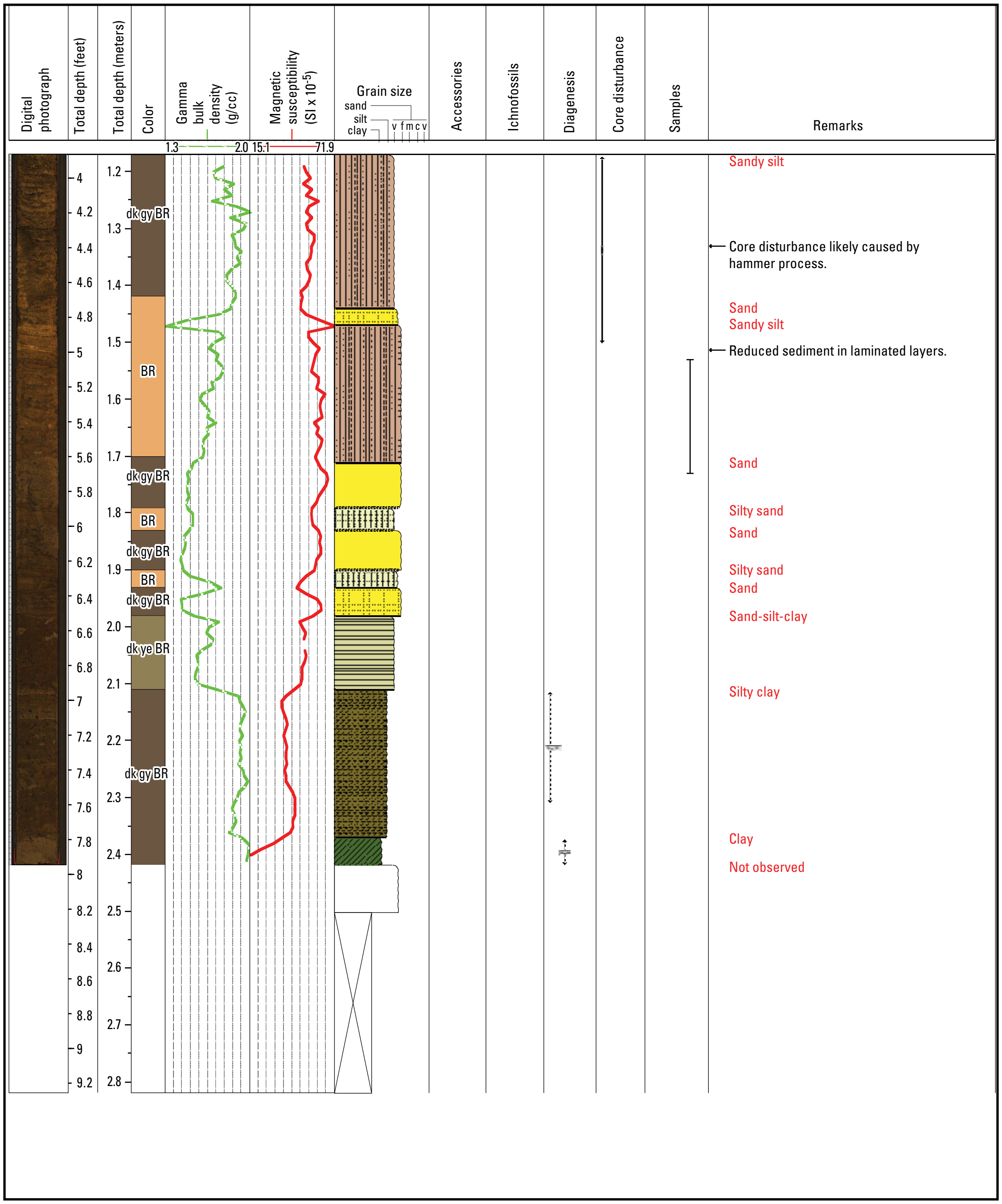


U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-1b
Collected: Oct. 2, 2011

Core: 1b #2H
Land-surface elevation: 9.98 m

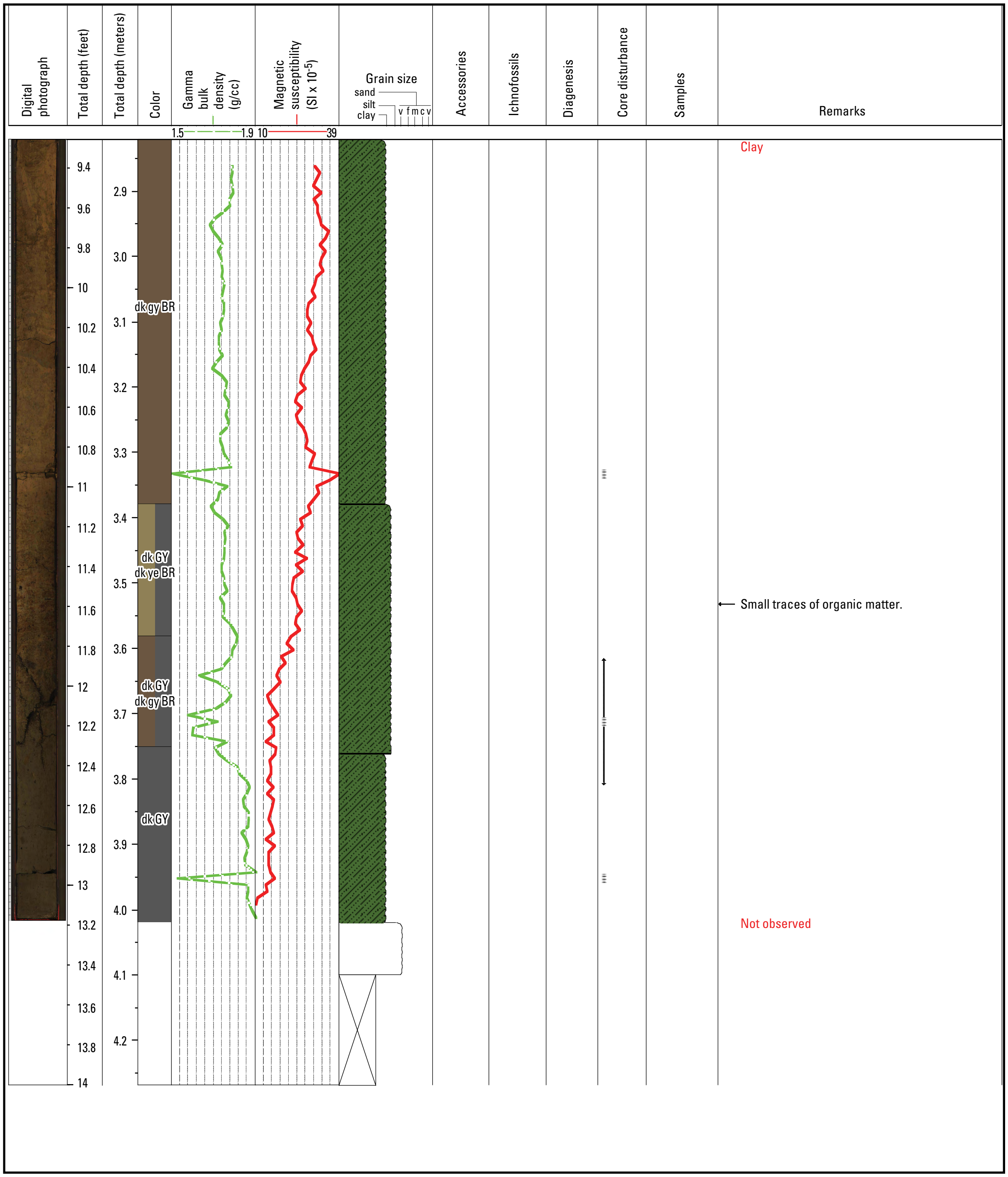
Section 2 of 6 (1.17–2.82 meters; 3.83–9.25 feet)
USGS station number: 384048121402603



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-1b
Collected: Oct. 2, 2011
Core: 1b #3P
Land surface elevation: 9.98 m
Section 3 of 6 (2.82–4.27 meters; 9.25–14.00 feet)
USGS station number: 384048121402603

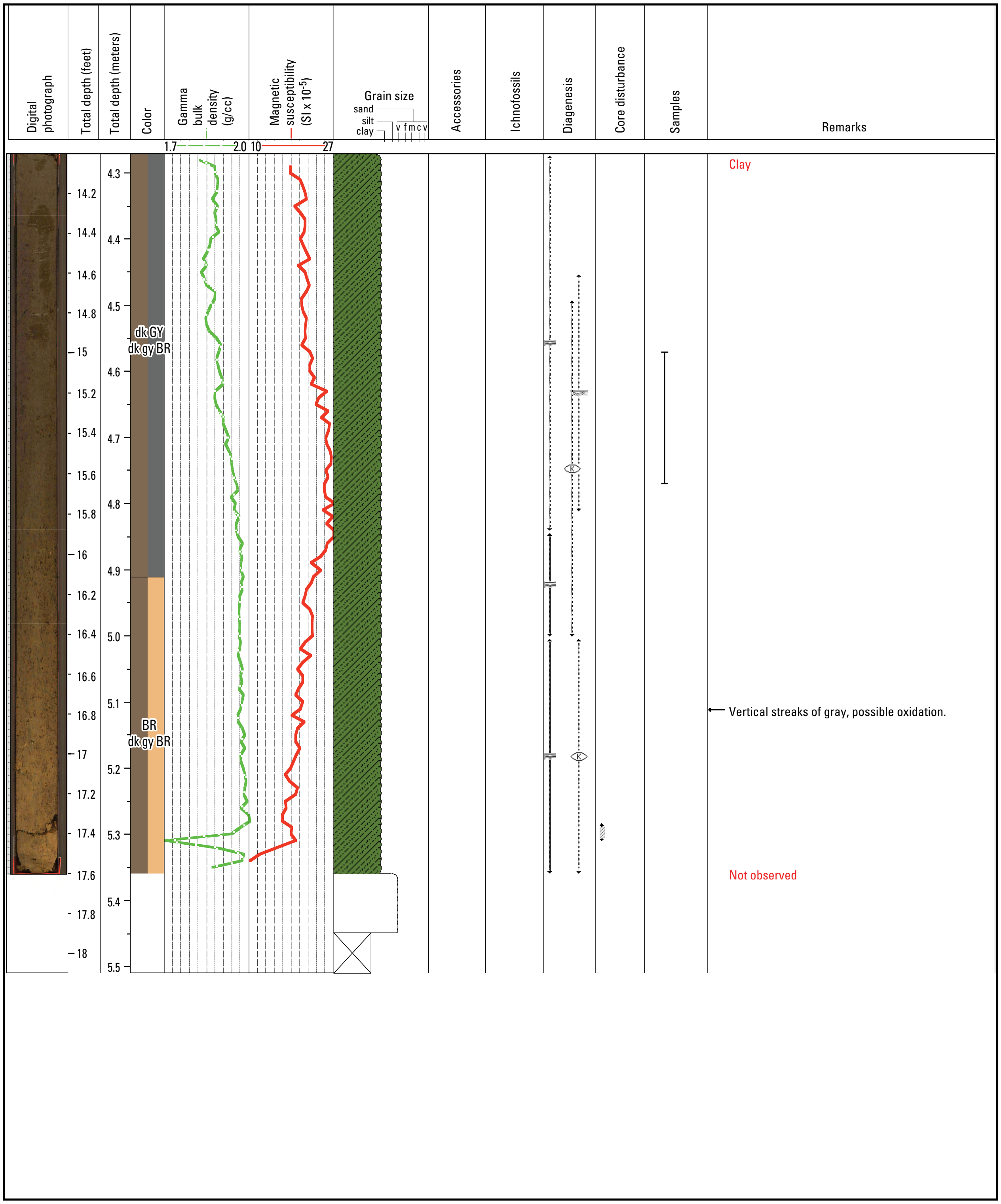


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-1b
Collected: Oct. 3, 2011
Land surface elevation: 9.98 m
USGS station number: 384048121402603

Core: 1b #4P
Section 4 of 6 (4.27–5.51 meters; 14.00–18.08 feet)

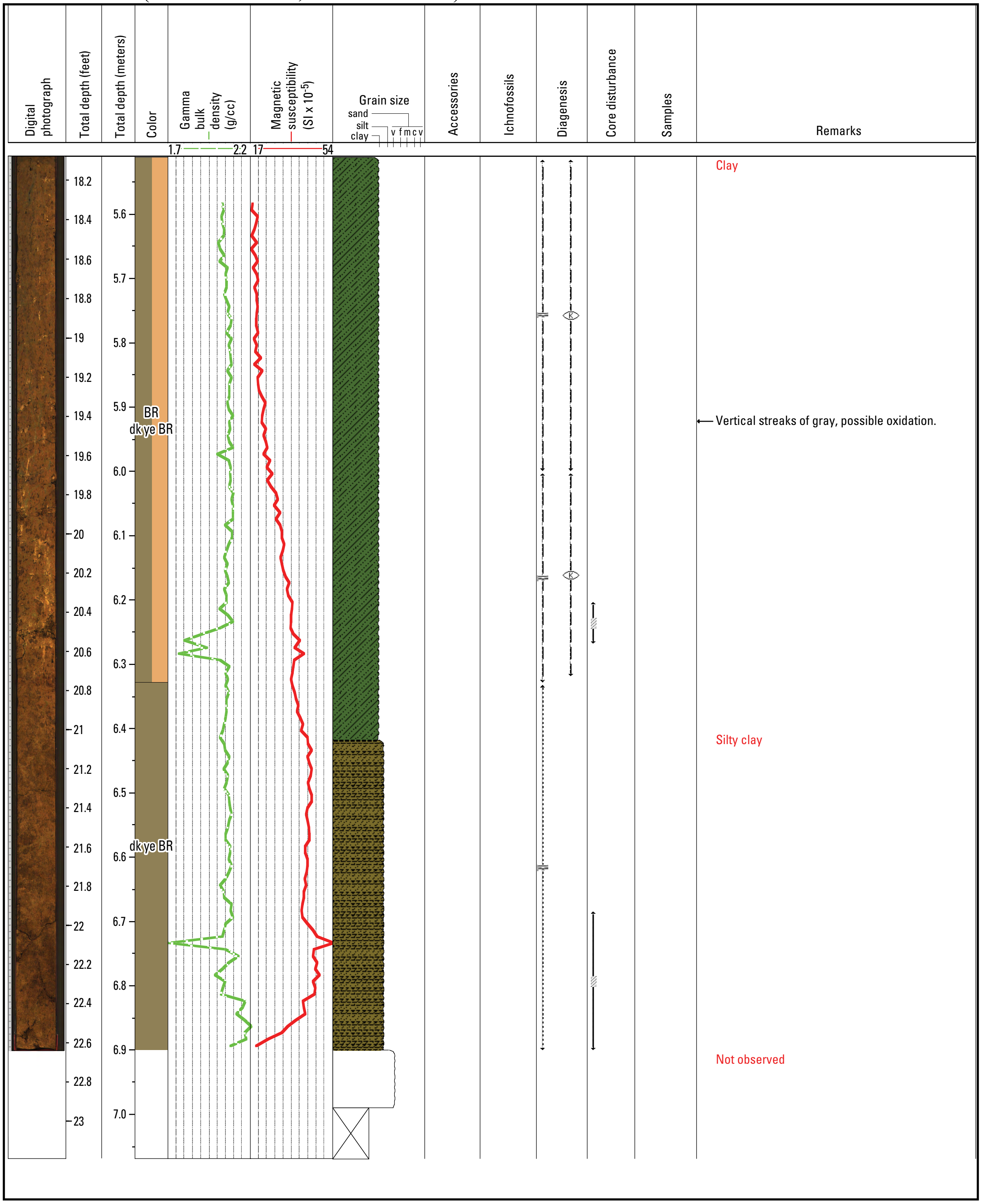


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-1b
Collected: Oct. 3, 2011
Land surface elevation: 9.98 m
USGS station number: 384048121402603

Core: 1b #5P
Section 5 of 6 (5.51–7.09 meters; 18.08–23.25 feet)

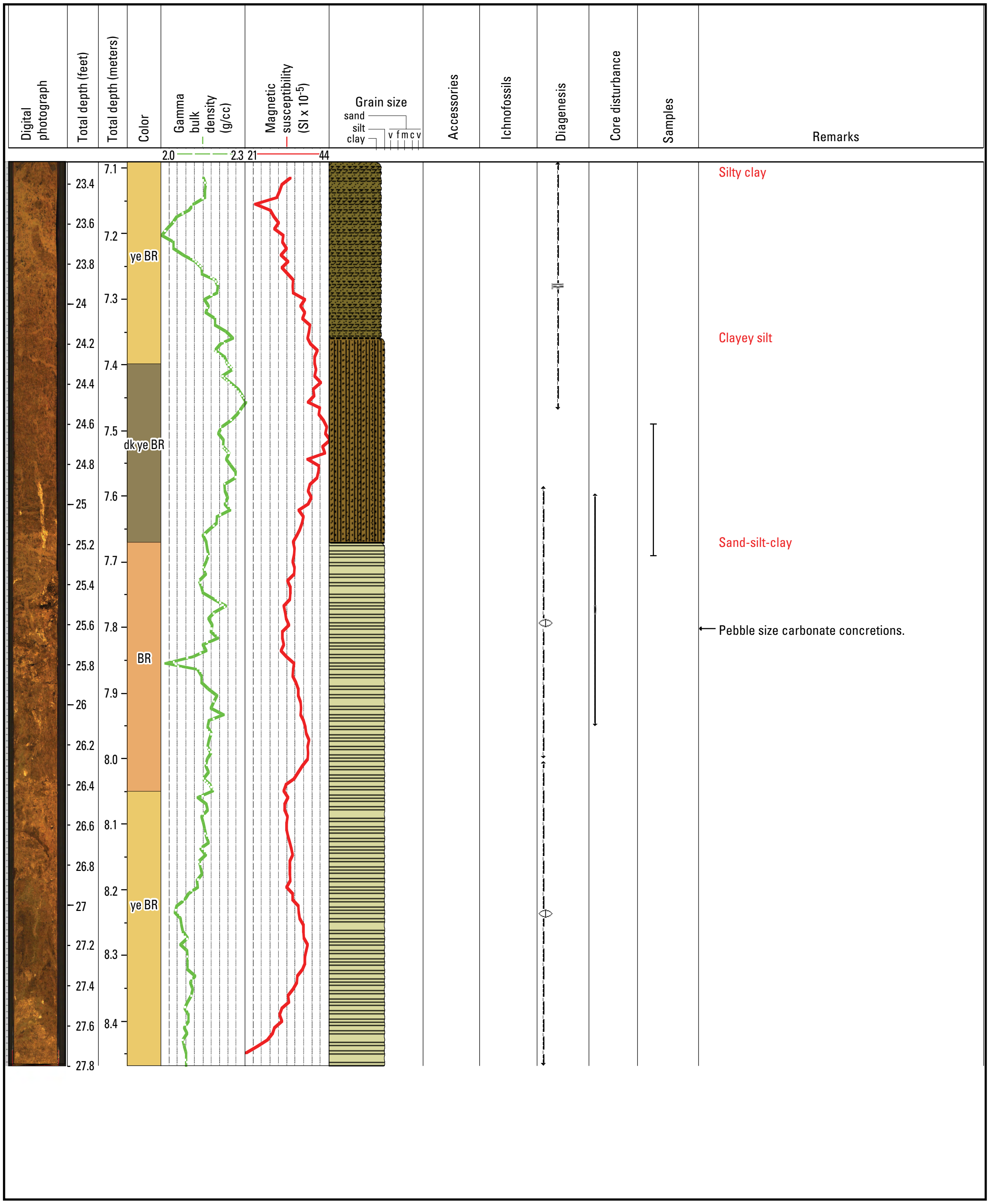


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-1b
Collected: Oct. 3, 2011
Land surface elevation: 9.98 m
USGS station number: 384048121402603

Core: 1b #6P
Section 6 of 6 (7.09–8.56 meters; 23.25–28.08 feet)

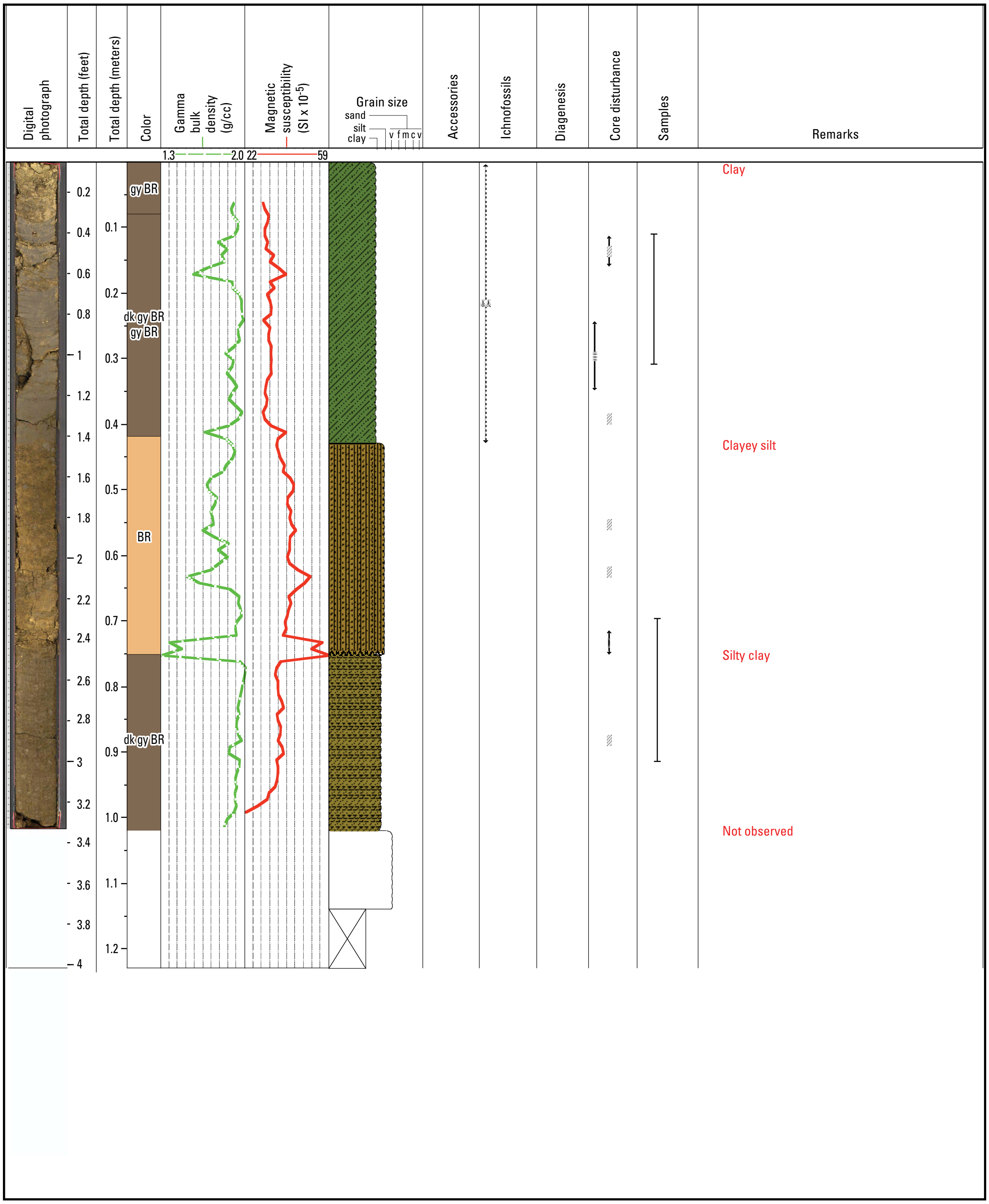


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-2c
Collected: Oct. 2, 2011
Land surface elevation: 9.12 m
USGS station number: 384117121403903

Core: 2c #1P
Section 1 of 6 (0–1.24 meters; 0–4.08 feet)

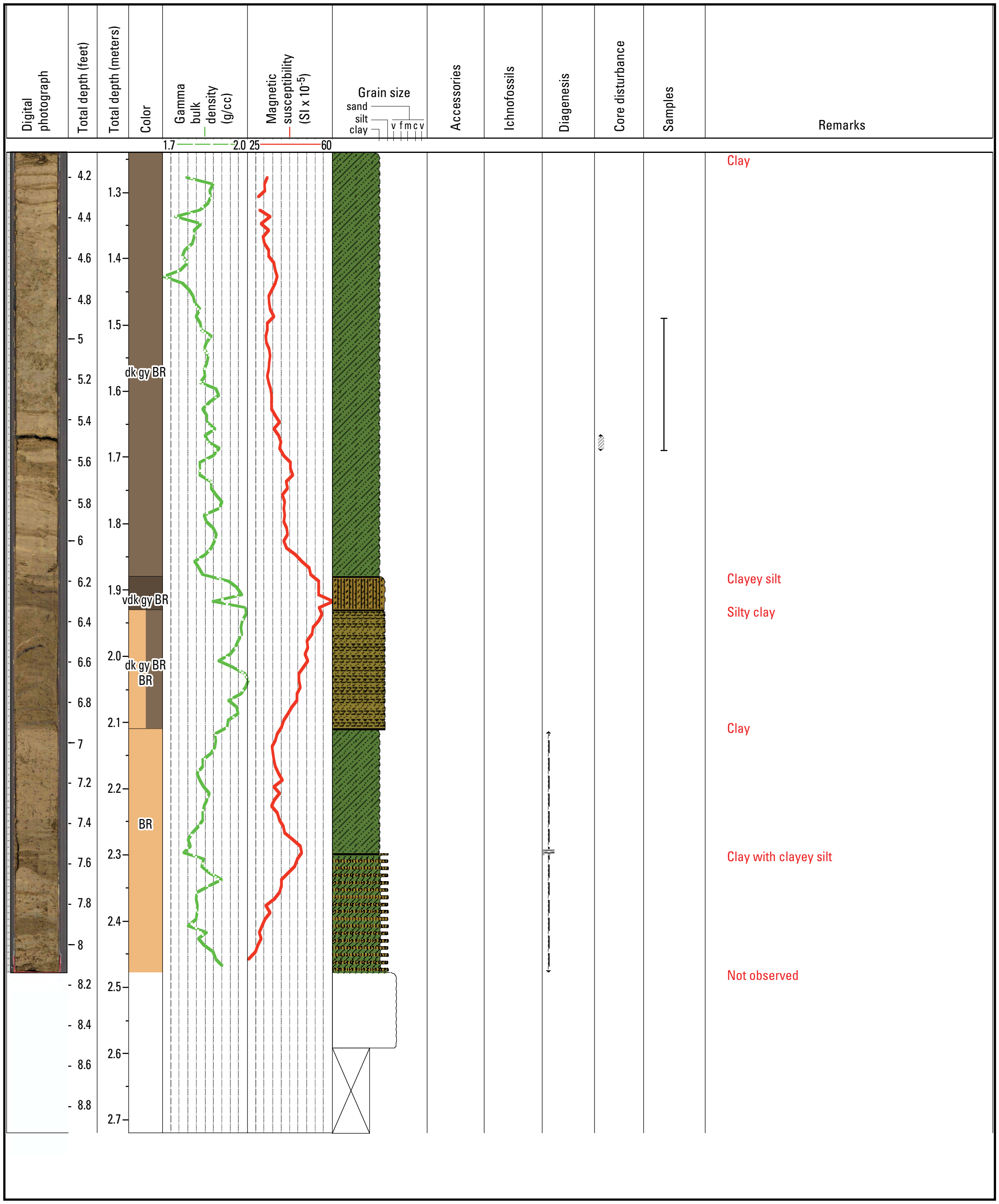


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-2c
Collected: Oct. 2, 2011
Land surface elevation: 9.12 m
USGS station number: 384117121403903

Core: 2c #2P
Section 2 of 6 (1.24–2.72 meters; 4.08–8.92 feet)

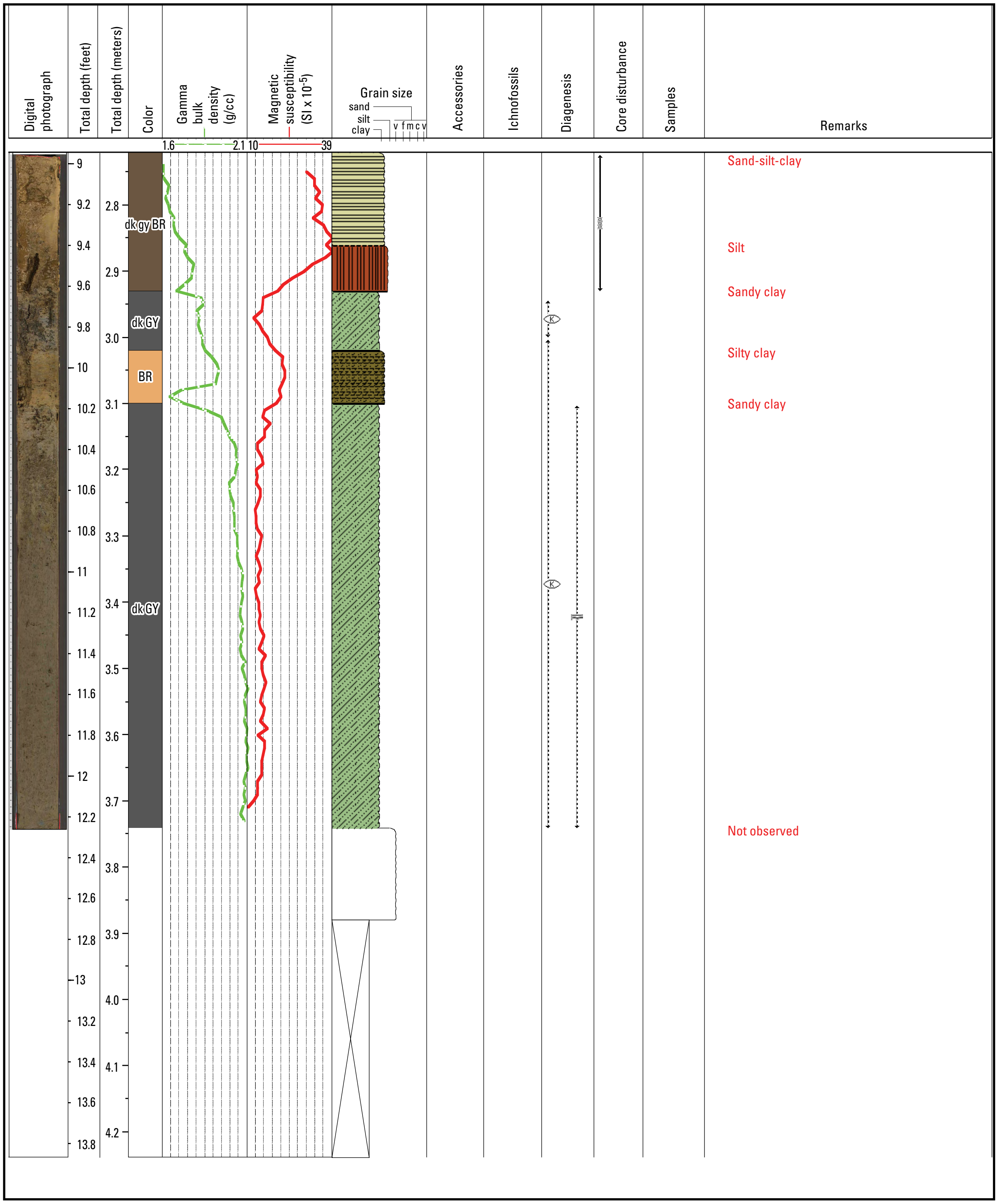


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-2c
Collected: Oct. 2, 2011
Land surface elevation: 9.12 m
USGS station number: 384117121403903

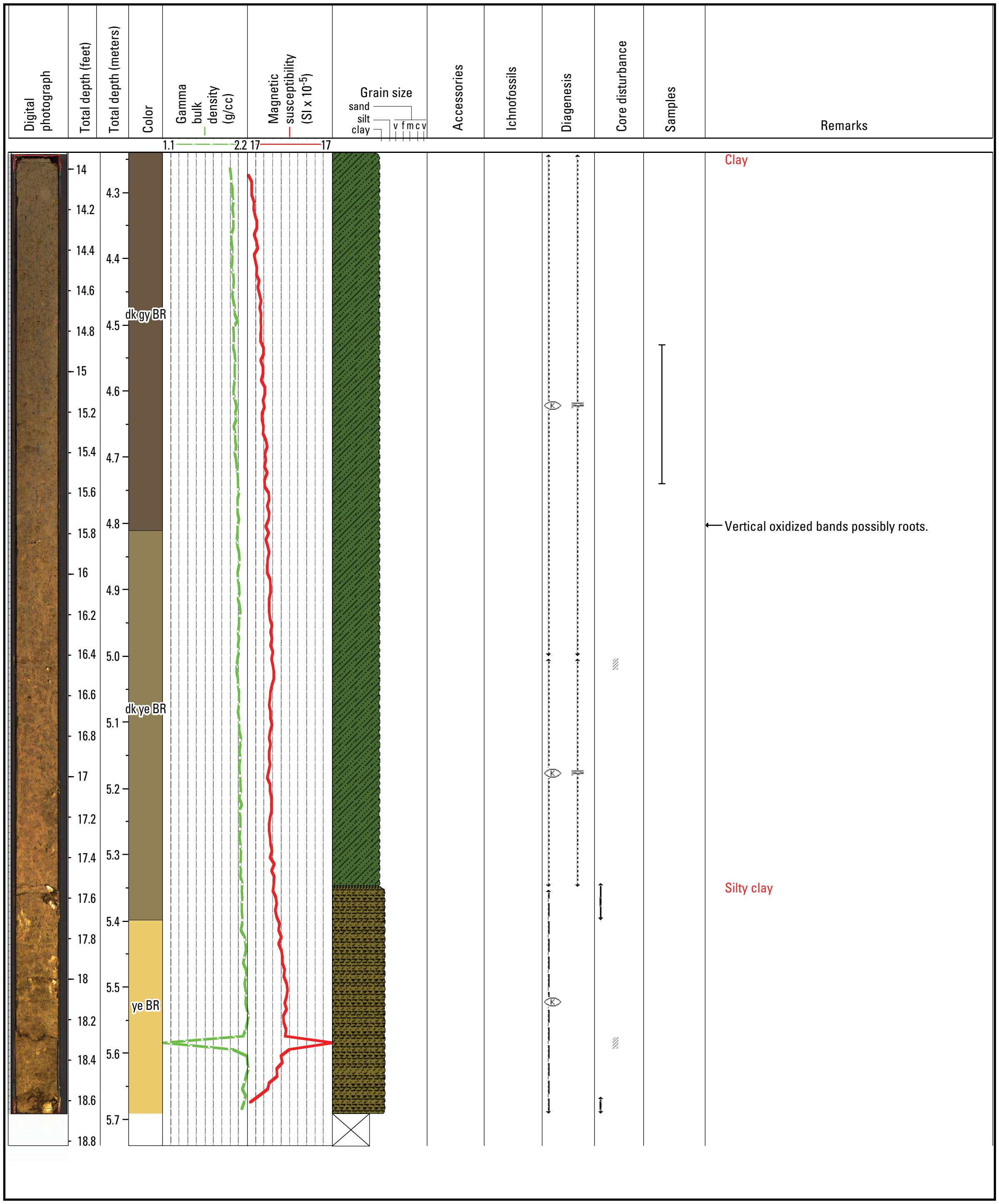
Core: 2c #3P
Section 3 of 6 (2.72–4.24 meters; 8.92–13.92 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-2c
Collected: Oct. 2, 2011
Land surface elevation: 9.12 m
USGS station number: 384117121403903

Core: 2c #4P
Section 4 of 6 (4.24–5.74 meters; 13.92–18.83 feet)

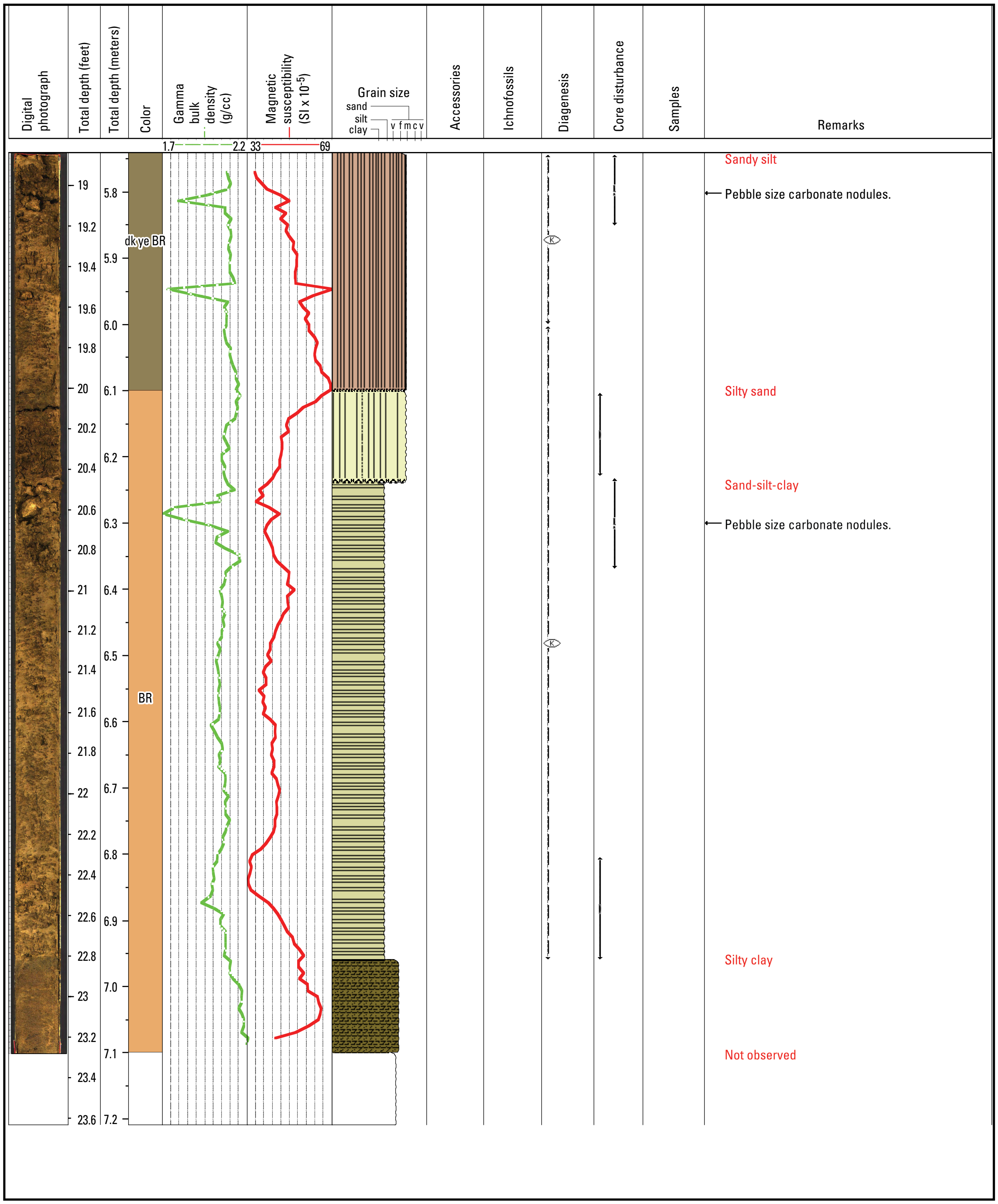


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-2c
Collected: Oct. 2, 2011
Land surface elevation: 9.12 m
USGS station number: 384117121403903

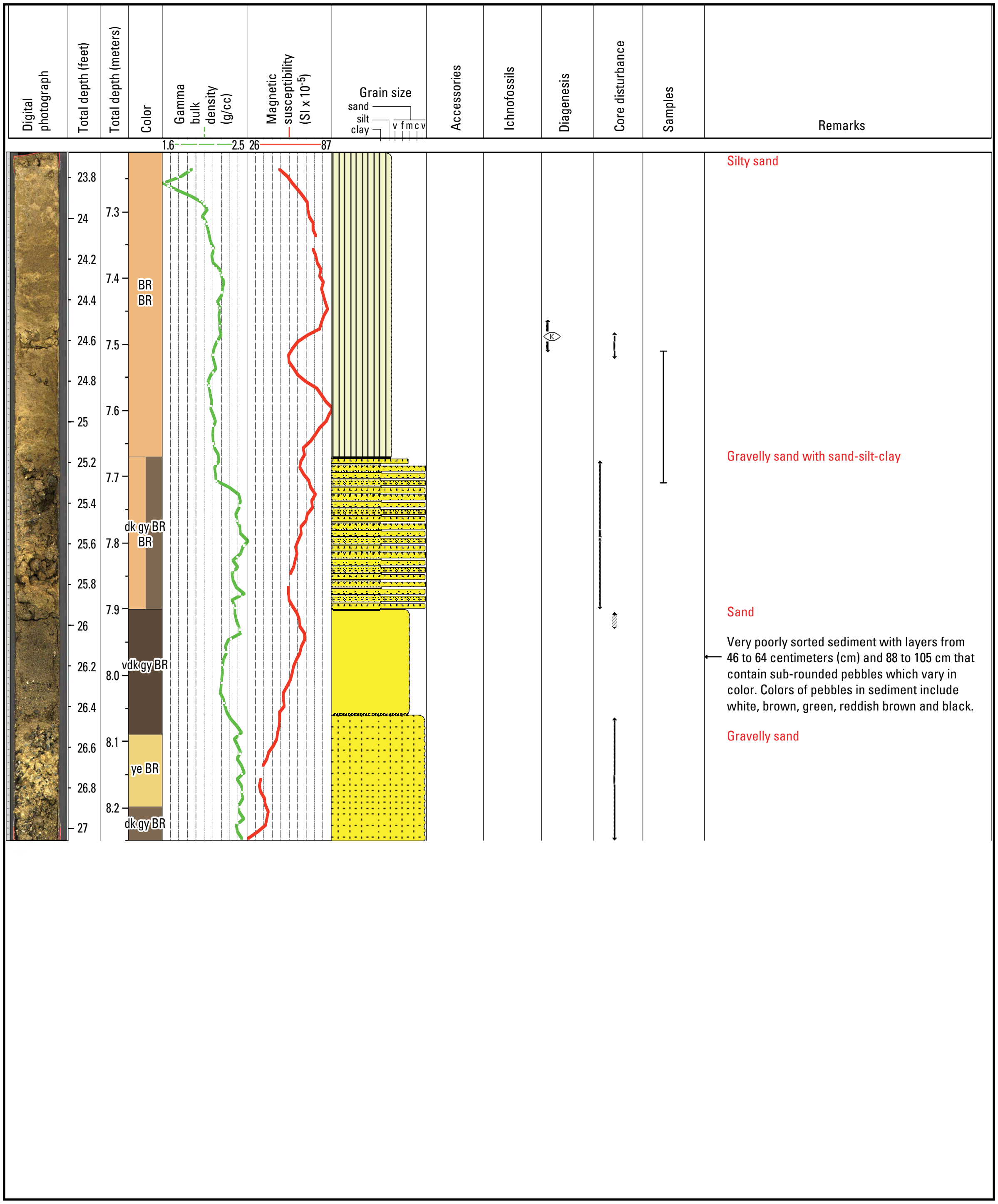
Core: 2c #5P
Section 5 of 6 (5.74–7.21 meters; 18.83–23.67 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-2c
Collected: Oct. 2, 2011
Land surface elevation: 9.12 m
USGS station number: 384117121403903

Core: 2c #6PH
Section 6 of 6 (7.21–8.26 meters; 23.67–27.08 feet)

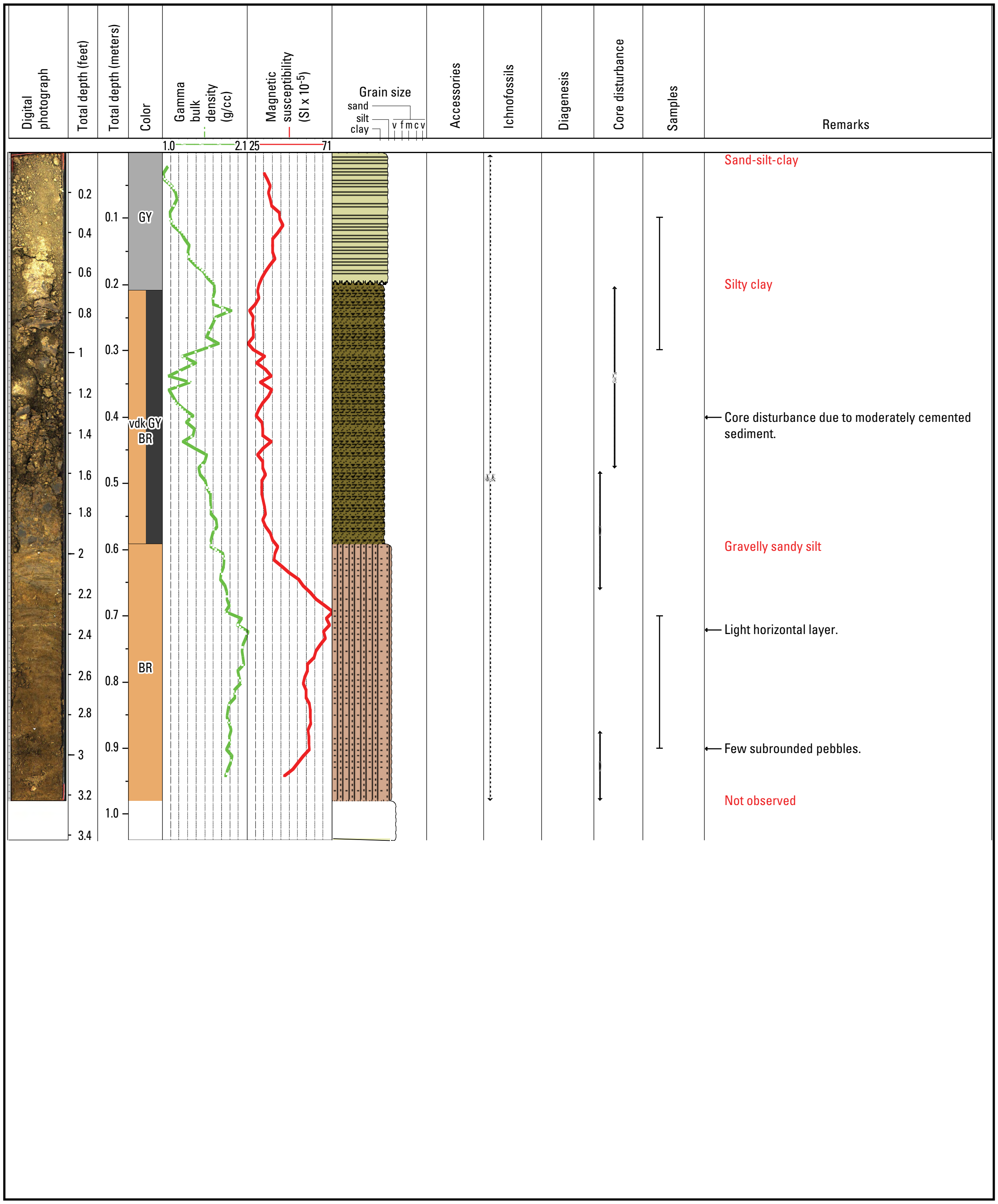


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-3b
Collected: Sept. 28, 2011
Land surface elevation: 10.01 m
USGS station number: 384129121415002

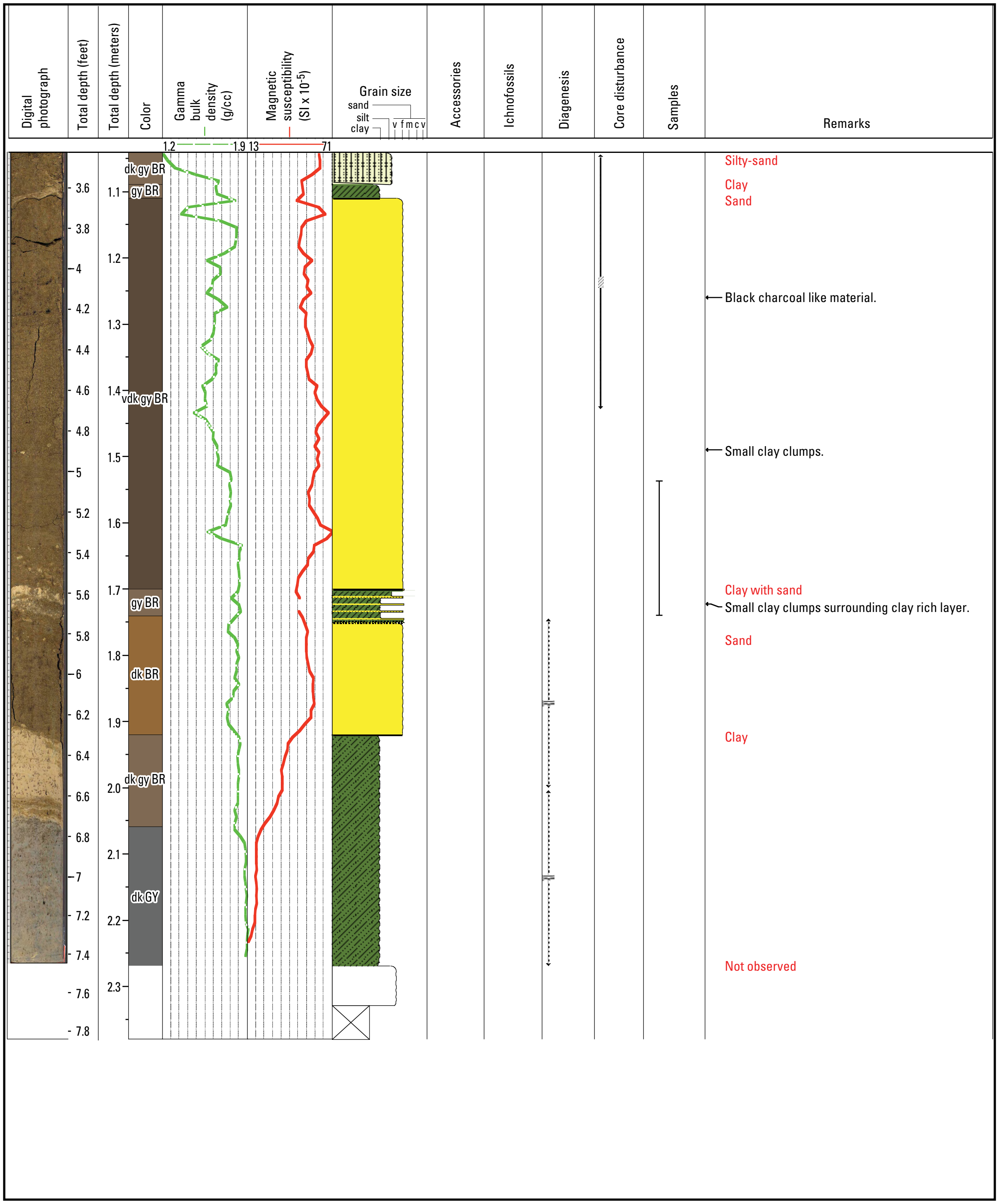
Core: 3b #1A
Section 1 of 6 (0–1.04 meters; 0–3.42 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-3b
Collected: Sept. 28, 2011
Core: 3b #2A
Land surface elevation: 10.01 m
Section 2 of 6 (1.04–2.39 meters; 3.42–7.83 feet)
USGS station number: 384129121415002

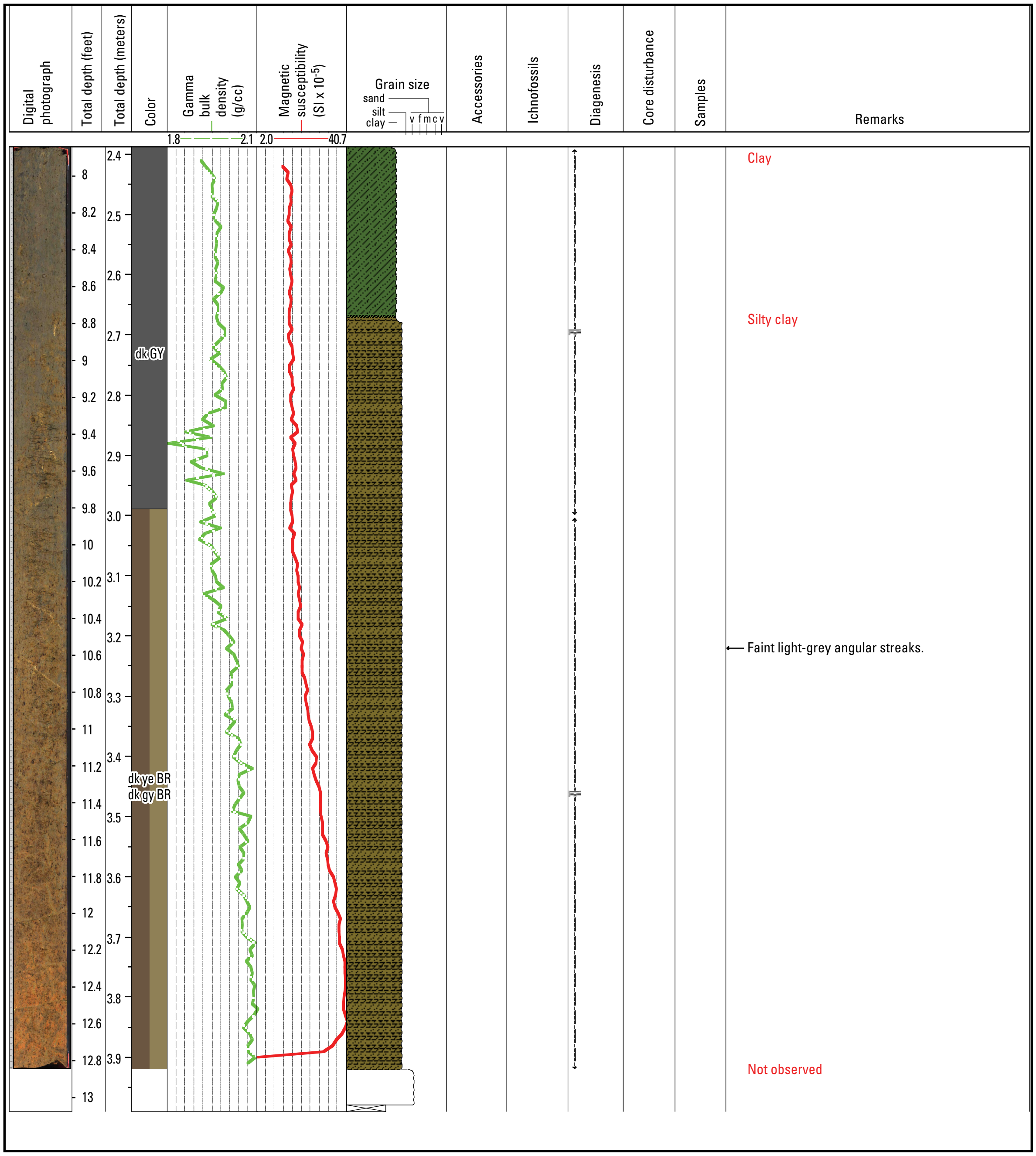


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-3b
Collected: Sept. 28, 2011
Land surface elevation: 10.01 m
USGS station number: 384129121415002

Core: 3b #3A
Section 3 of 6 (2.39–3.99 meters; 7.83–13.08 feet)

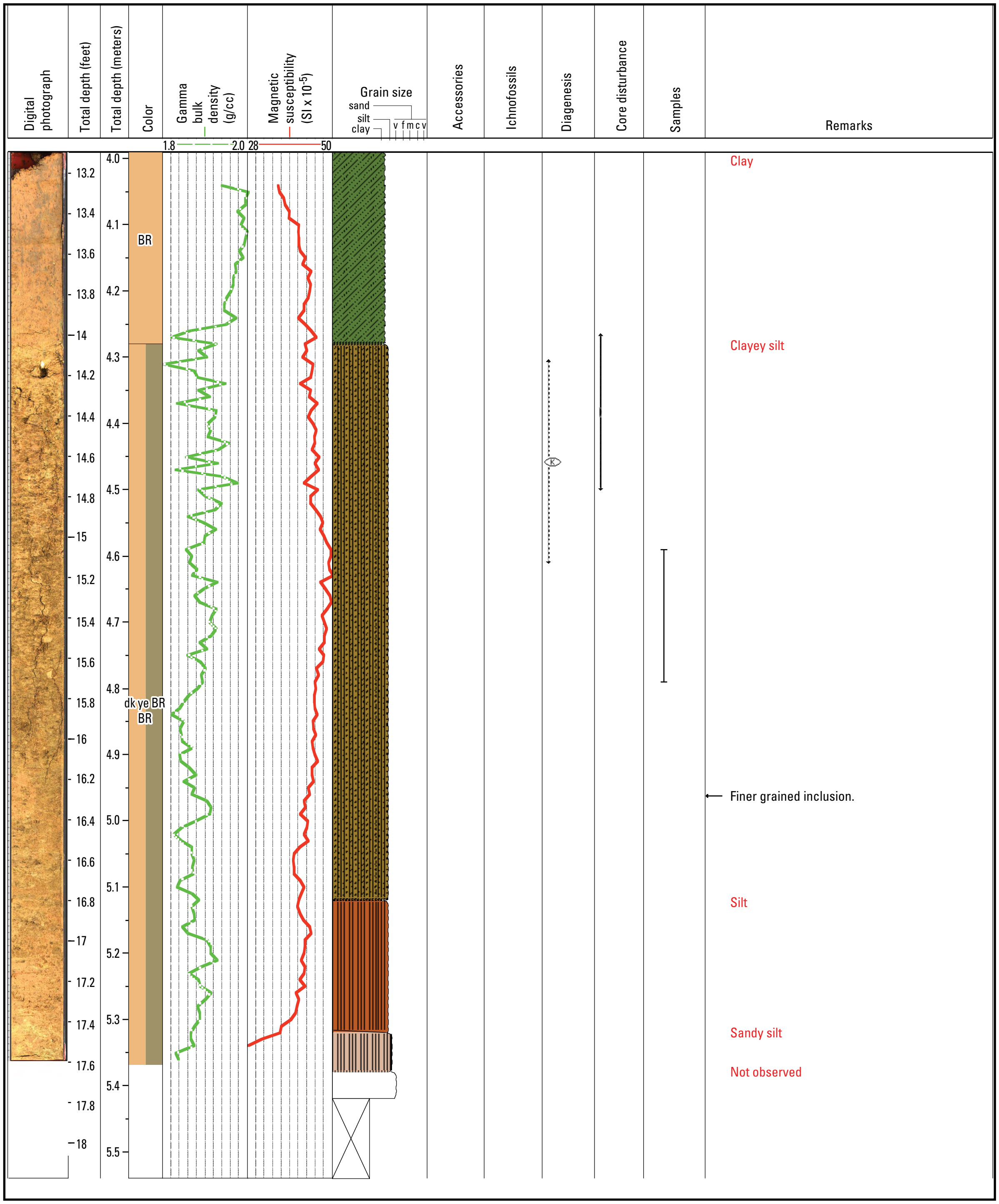


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-3b
Collected: Sept. 28, 2011
Land surface elevation: 10.01 m
USGS station number: 384129121415002

Core: 3b #4A
Section 4 of 6 (3.99–5.54 meters; 13.08–18.17 feet)

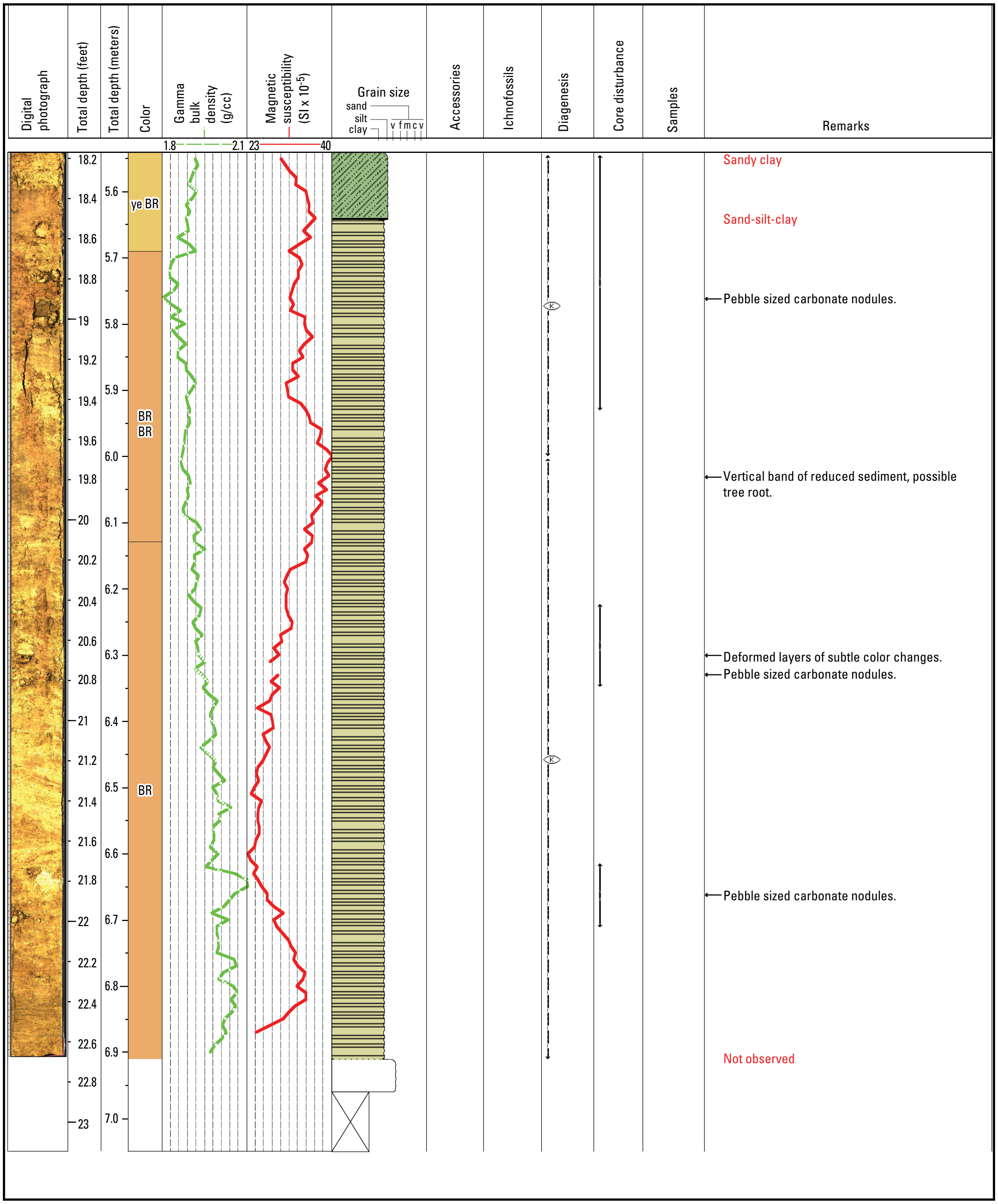


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-3b
Collected: Sept. 28, 2011
Land surface elevation: 10.01 m
USGS station number: 384129121415002

Core: 3b #5A
Section 5 of 6 (5.54–7.06 meters; 18.17–23.17 feet)

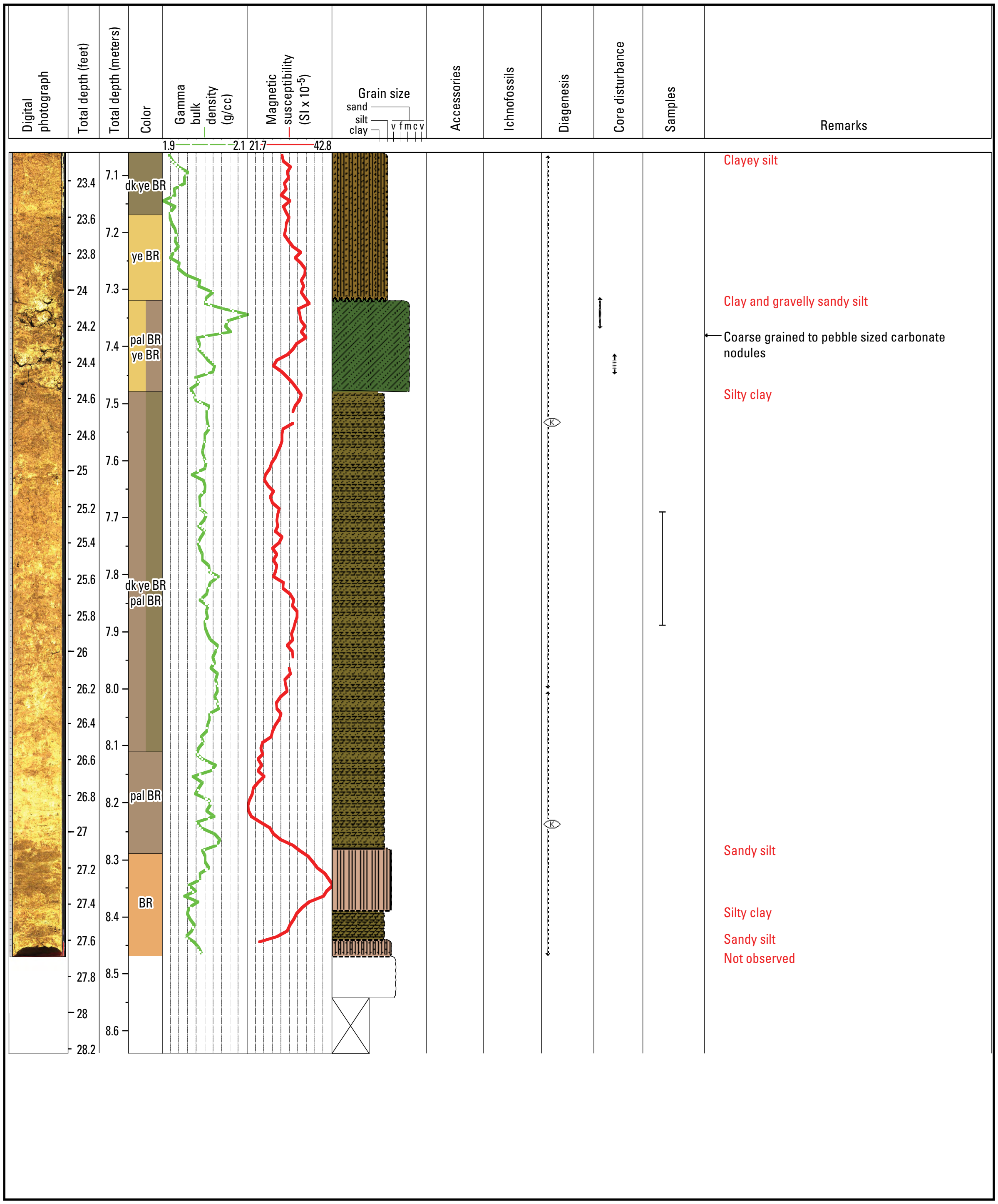


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-3b
Collected: Sept. 28, 2011
Land surface elevation: 10.01 m
USGS station number: 384129121415002

Core: 3b #6A
Section 6 of 6 (7.06–8.63 meters; 23.17–28.33 feet)

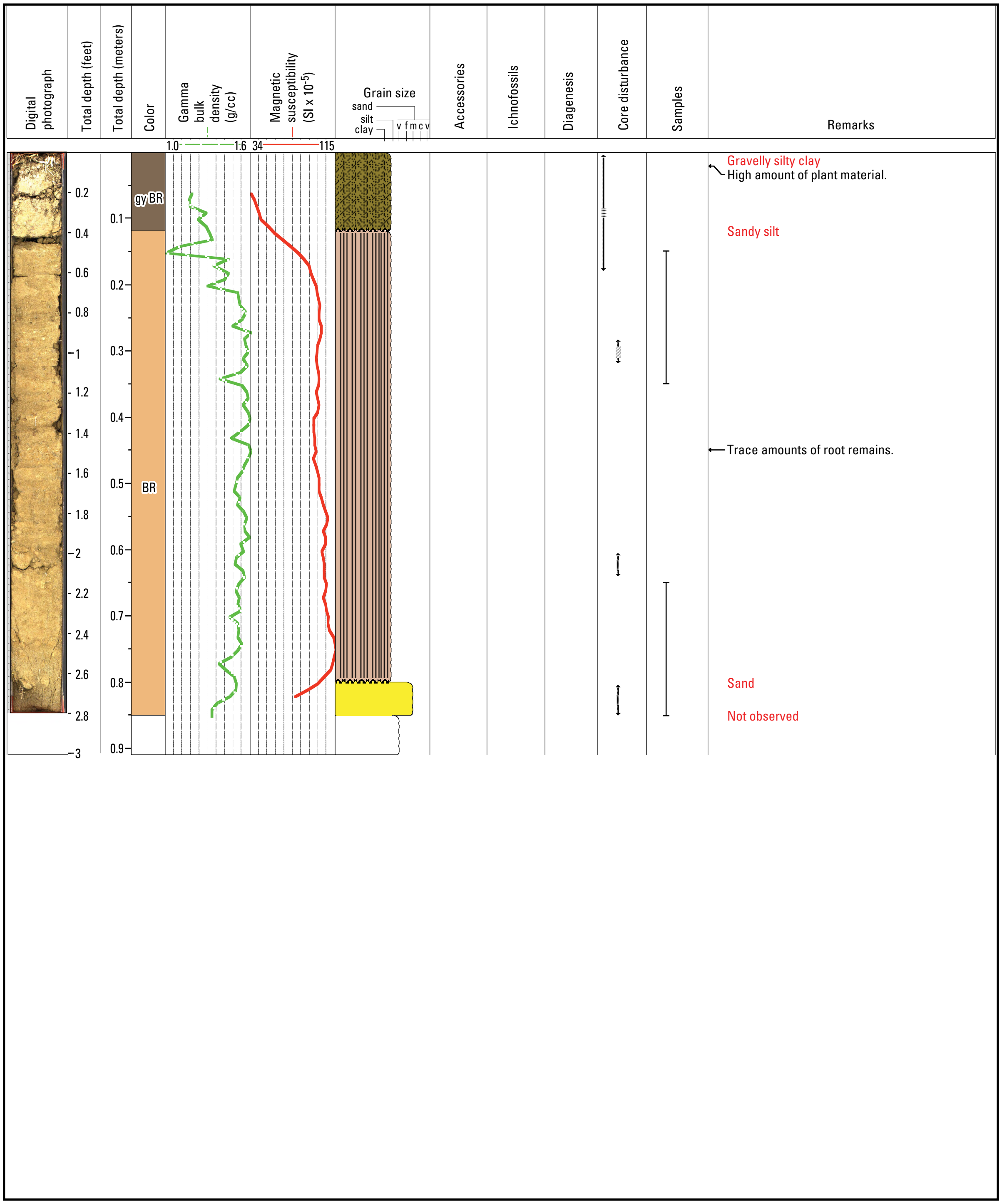


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-4b
Collected: Sept. 29, 2011
Land surface elevation: 9.84 m
USGS station number: 384143121415802

Core: 4b #1A
Section 1 of 6 (0–0.91 meters; 0–3.00 feet)

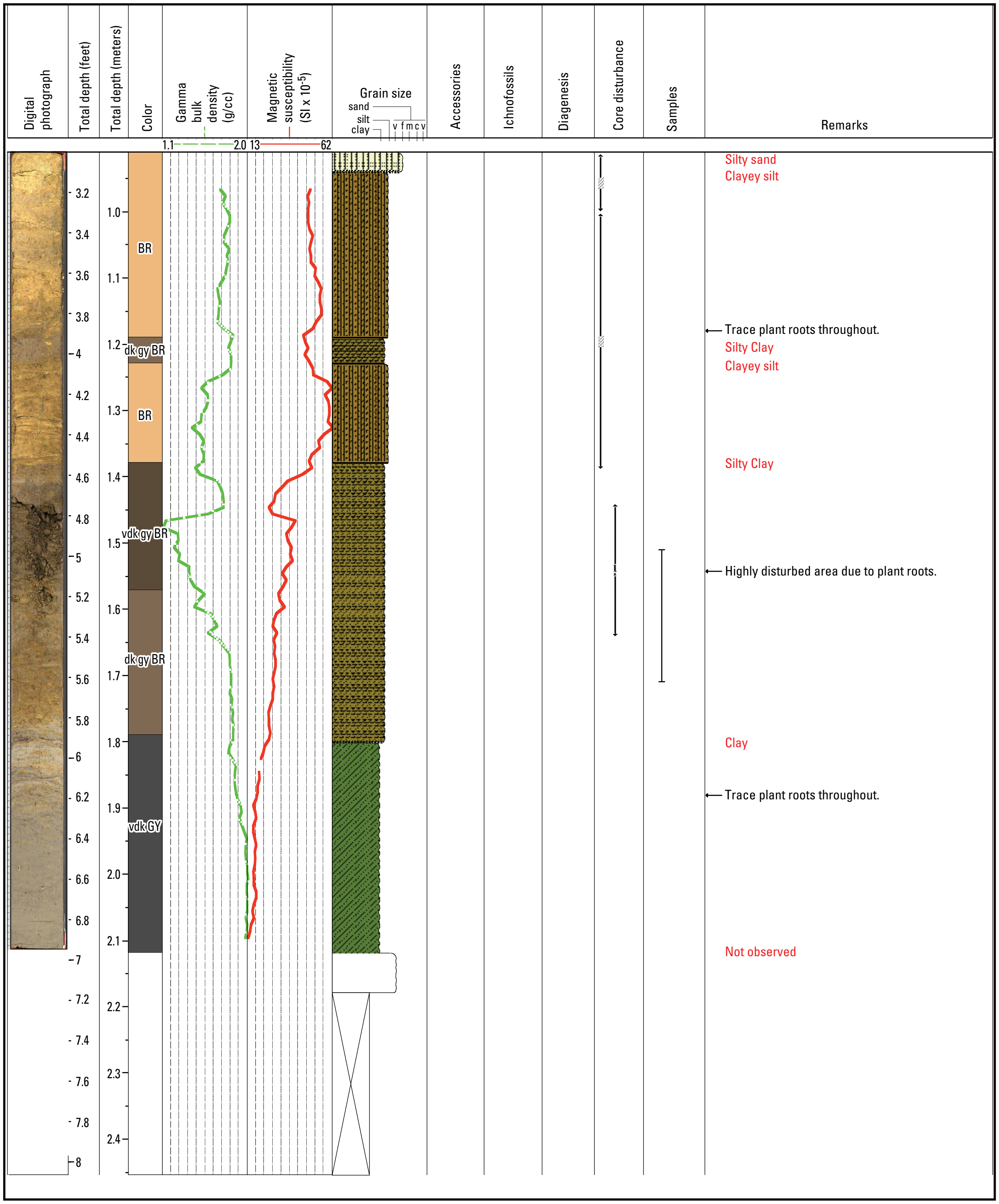


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-4b
Collected: Sept. 29, 2011
Land surface elevation: 9.84 m
USGS station number: 384143121415802

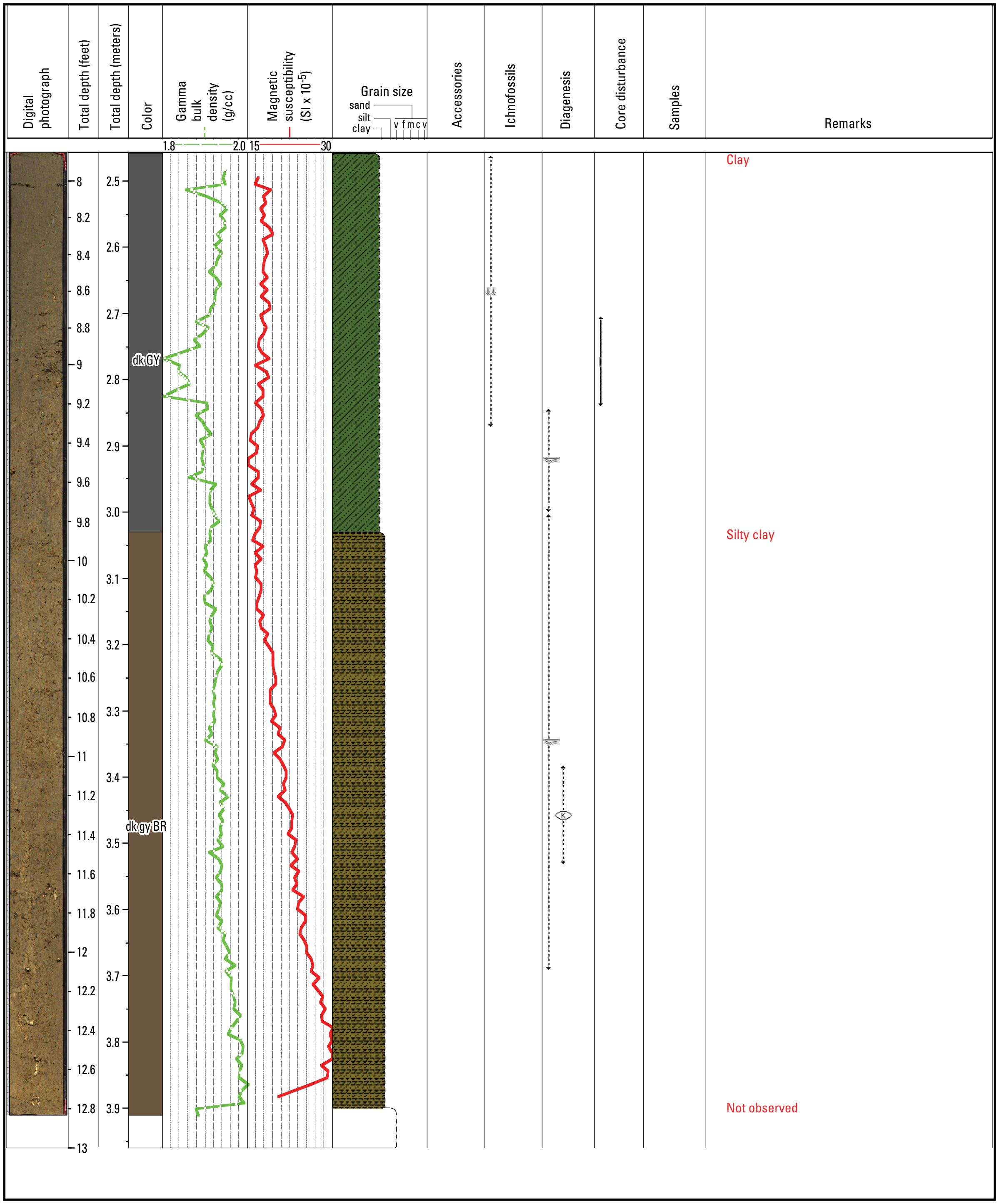
Core: 4b #2A
Section 2 of 6 (0.91–2.46 meters; 3.00–8.08 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-4b
Collected: Sept. 29, 2011
Core: 4b #3A
Land surface elevation: 9.84 m
Section 3 of 6 (2.46–3.96 meters; 8.08–13.00 feet)
USGS station number: 384143121415802

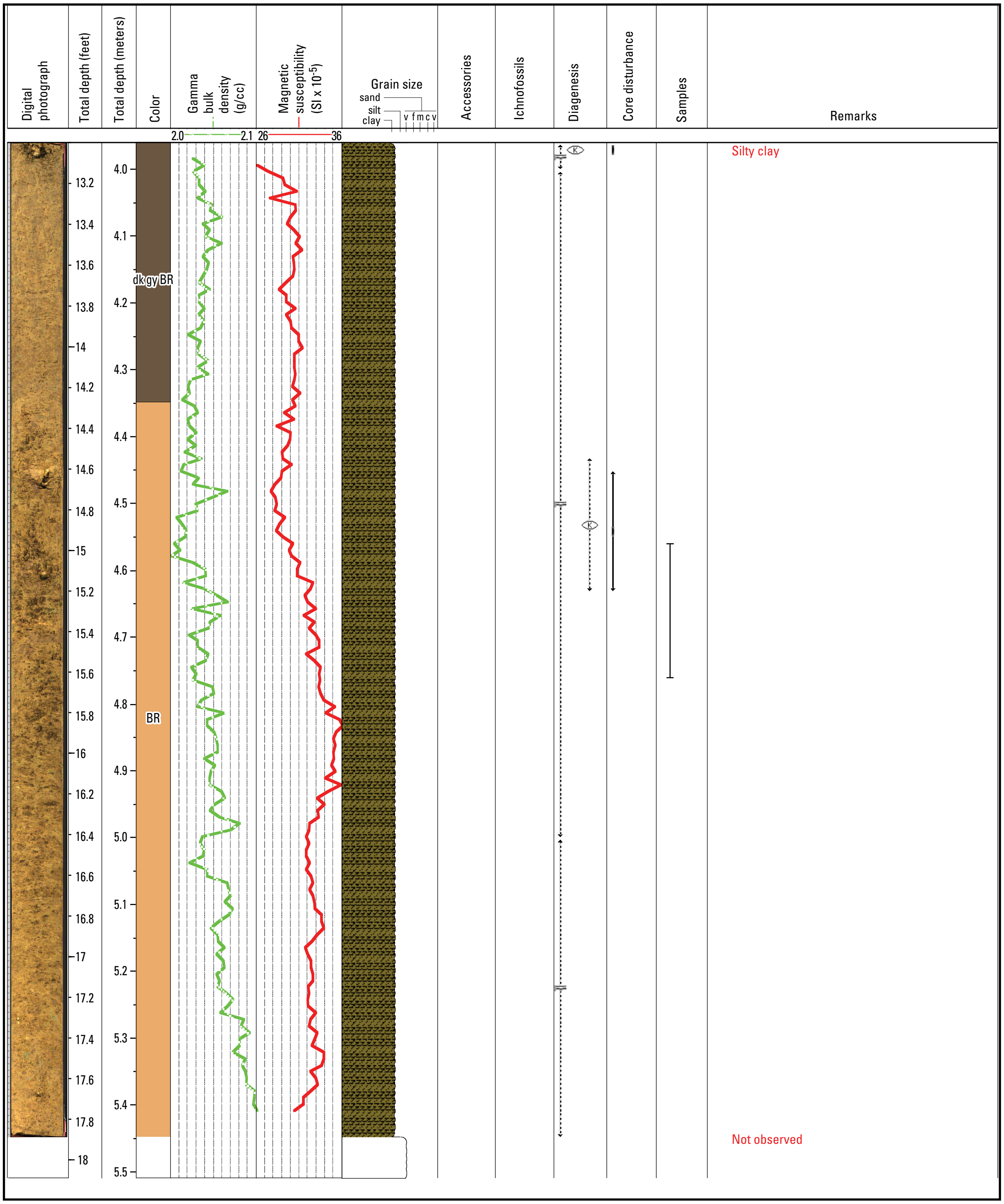


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-4b
Collected: Sept. 29, 2011
Land surface elevation: 9.84 m
USGS station number: 384143121415802

Core: 4b #4A
Section 4 of 6 (3.96–5.51 meters; 13.00–18.08 feet)

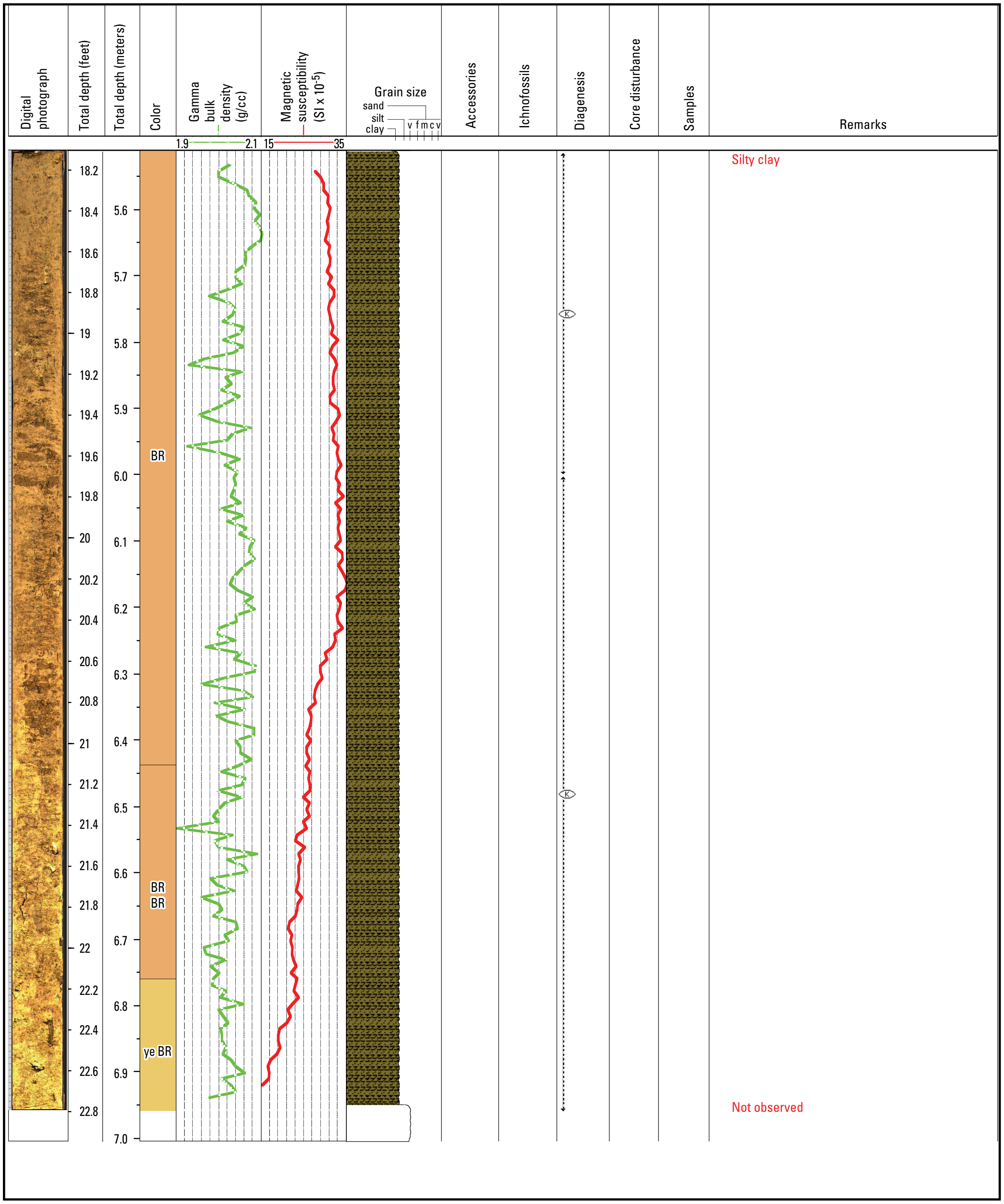


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-4b
Collected: Sept. 29, 2011
Land surface elevation: 9.84 m
USGS station number: 384143121415802

Core: 4b #5A
Section 5 of 6 (5.51–7.01 meters; 18.08–23.00 feet)

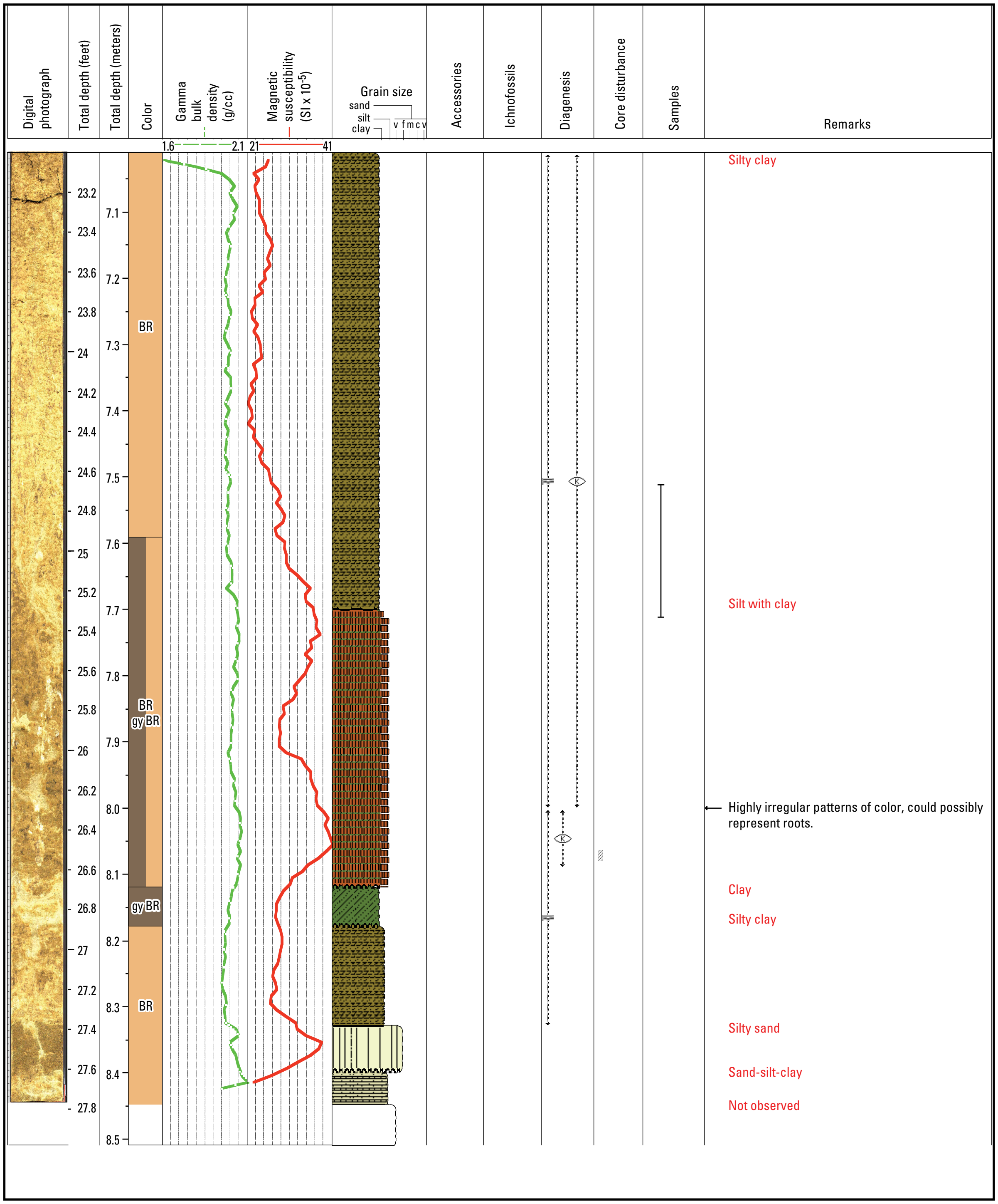


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-4b
Collected: Sept. 29, 2011
Land surface elevation: 9.84 m
USGS station number: 384143121415802

Core: 4b #6A
Section 6 of 6 (7.01–8.51 meters; 23.00–27.92 feet)

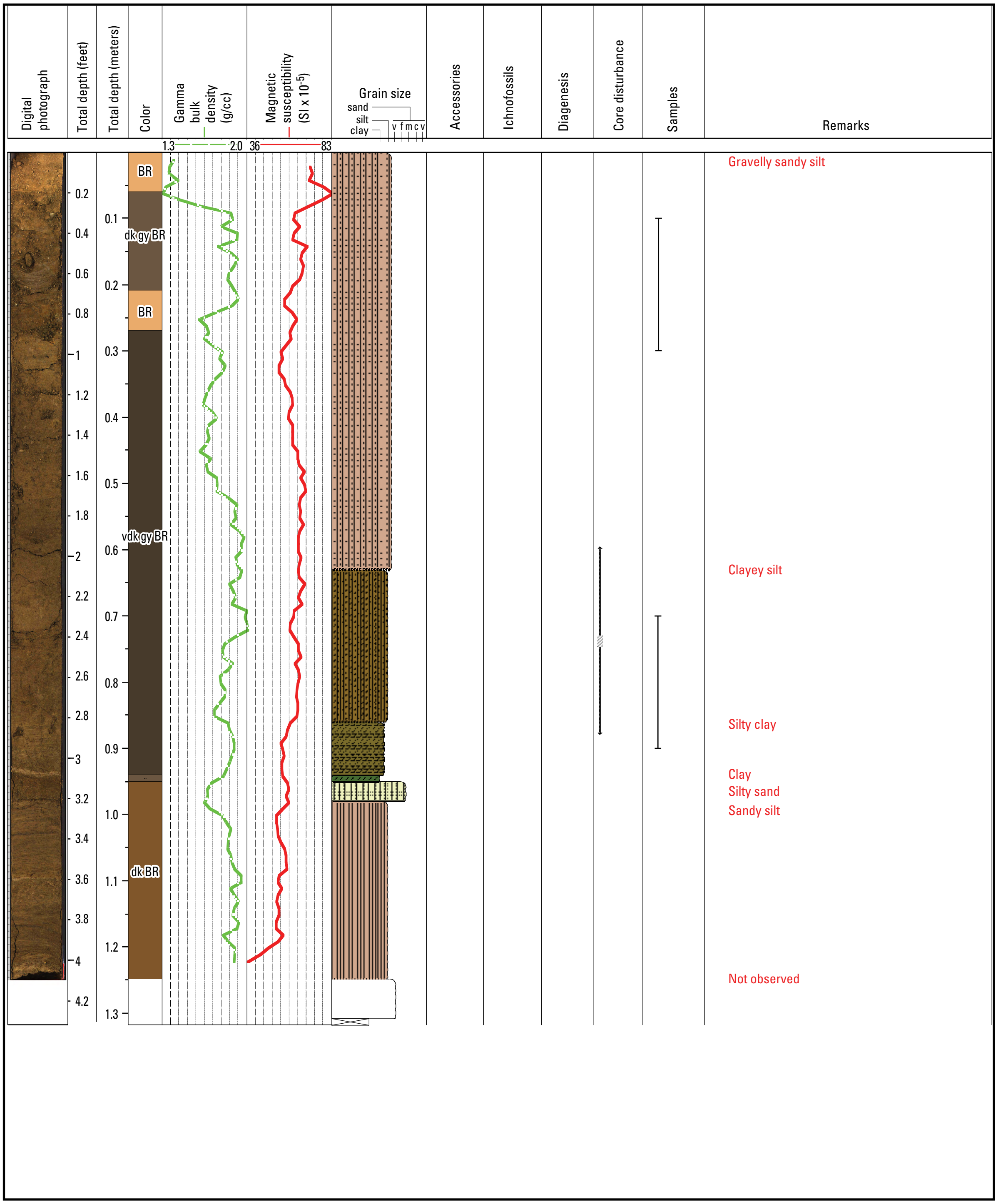


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-5a
Collected: Sept. 30, 2011
Land surface elevation: 10.17 m
USGS station number: 384225121420701

Core: 5a #1A
Section 1 of 6 (0–1.32 meters; 0–4.33 feet)

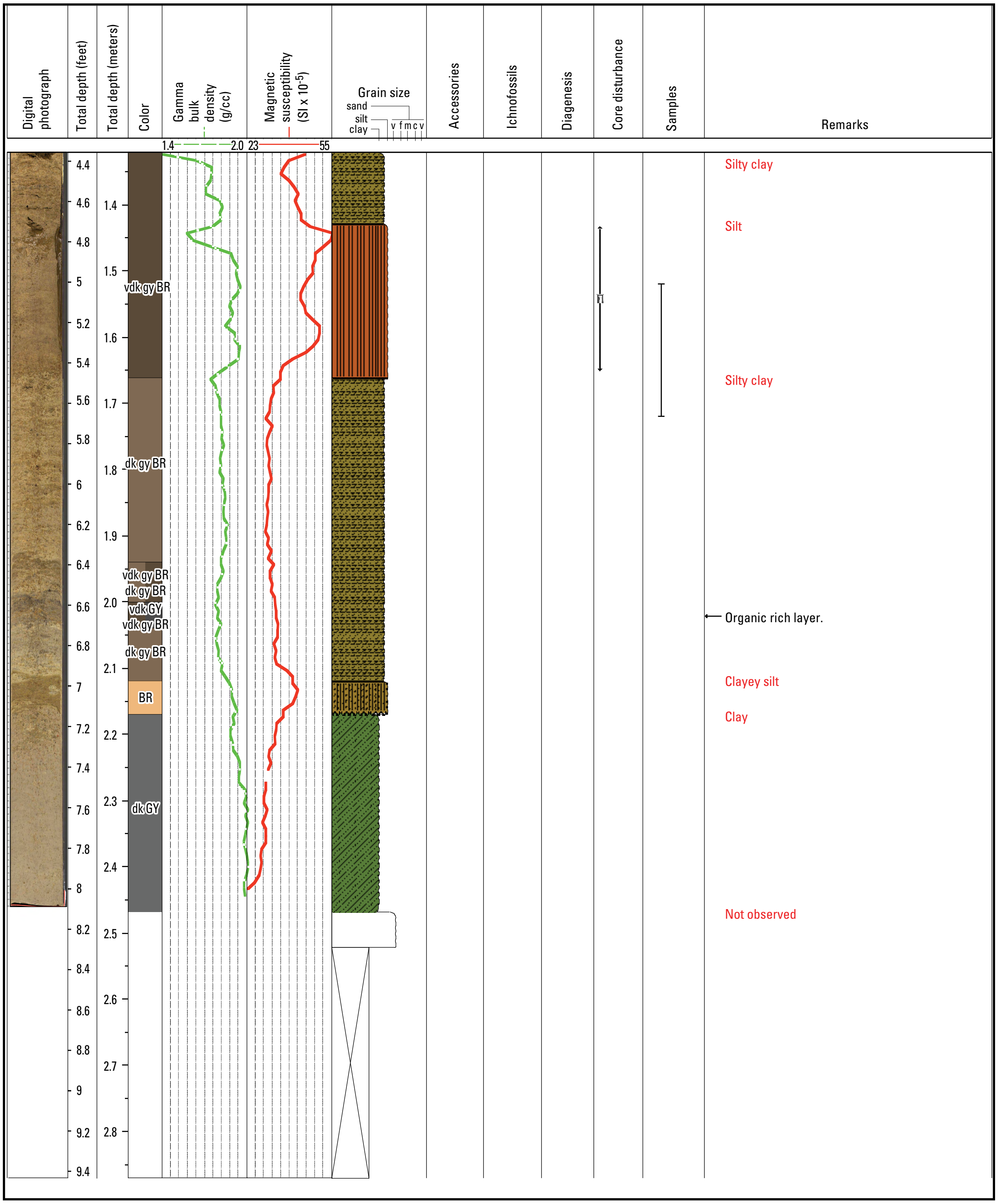


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-5a
Collected: Sept. 30, 2011
Land surface elevation: 10.17 m
USGS station number: 384225121420701

Core: 5a #2A
Section 2 of 6 (1.32–2.87 meters; 4.33–9.42 feet)

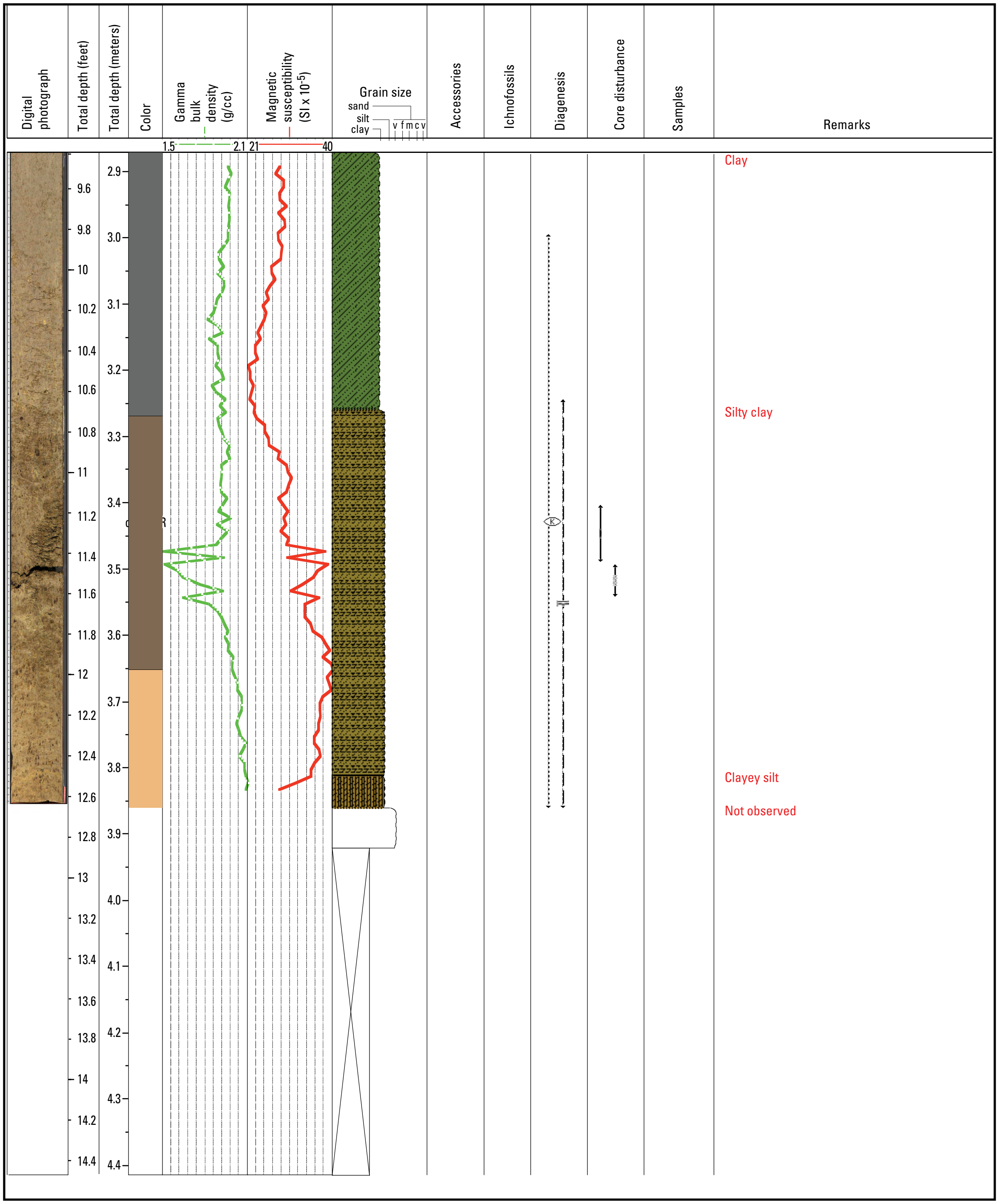


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-5a
Collected: Sept. 30, 2011
Land surface elevation: 10.17 m
USGS station number: 384225121420701

Core: 5a #3A
Section 3 of 6 (2.87–4.42 meters; 9.42–14.5 feet)

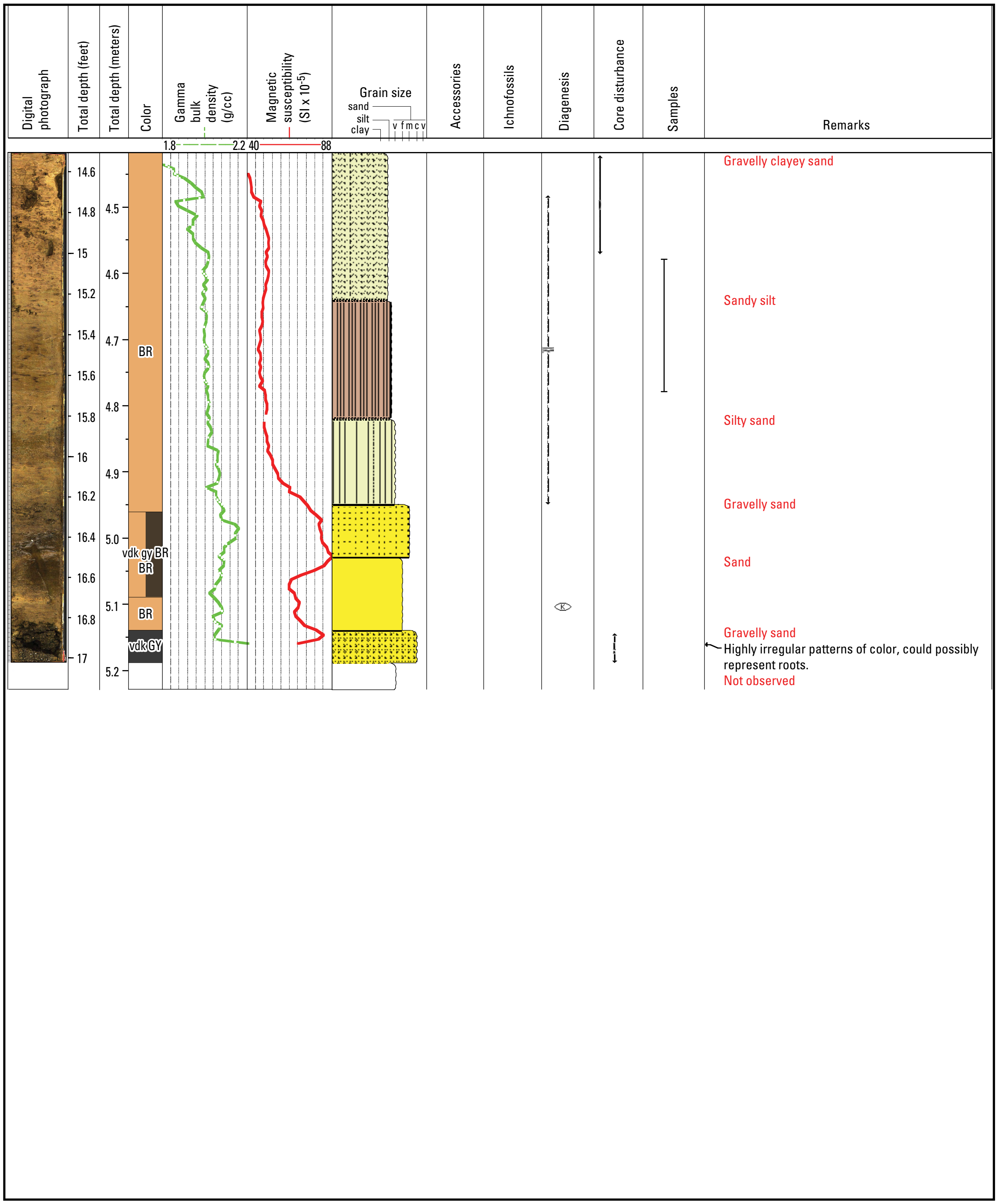


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-5a
Collected: Sept. 30, 2011
Land surface elevation: 10.17 m
USGS station number: 384225121420701

Core: 5a #4A
Section 4 of 6 (4.42–5.23 meters; 14.5–17.17 feet)

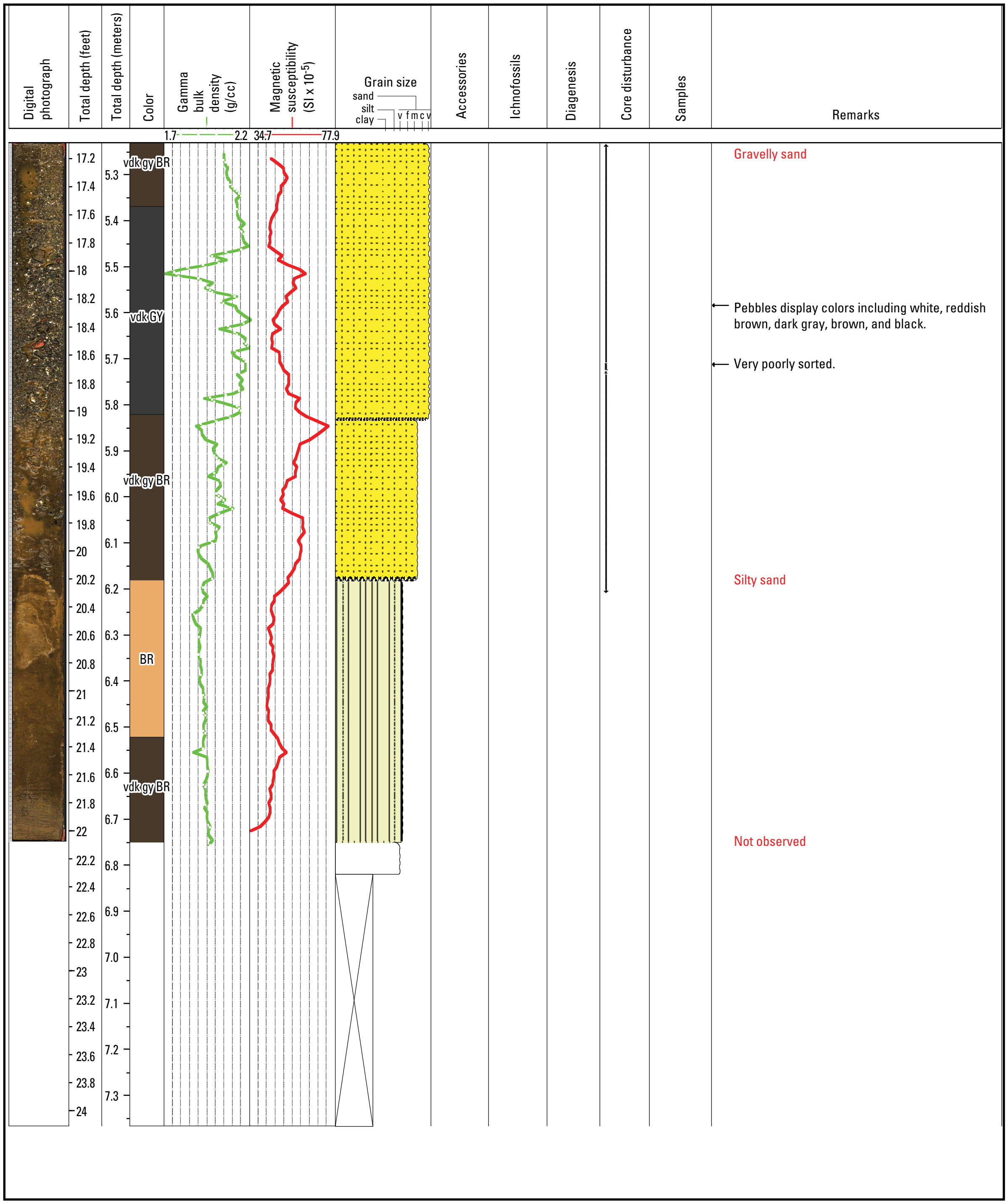


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-5a
Collected: Sept. 30, 2011
Land surface elevation: 10.17 m
USGS station number: 384225121420701

Core: 5a #5A
Section 5 of 6 (5.23–7.37 meters; 17.17–24.17 feet)

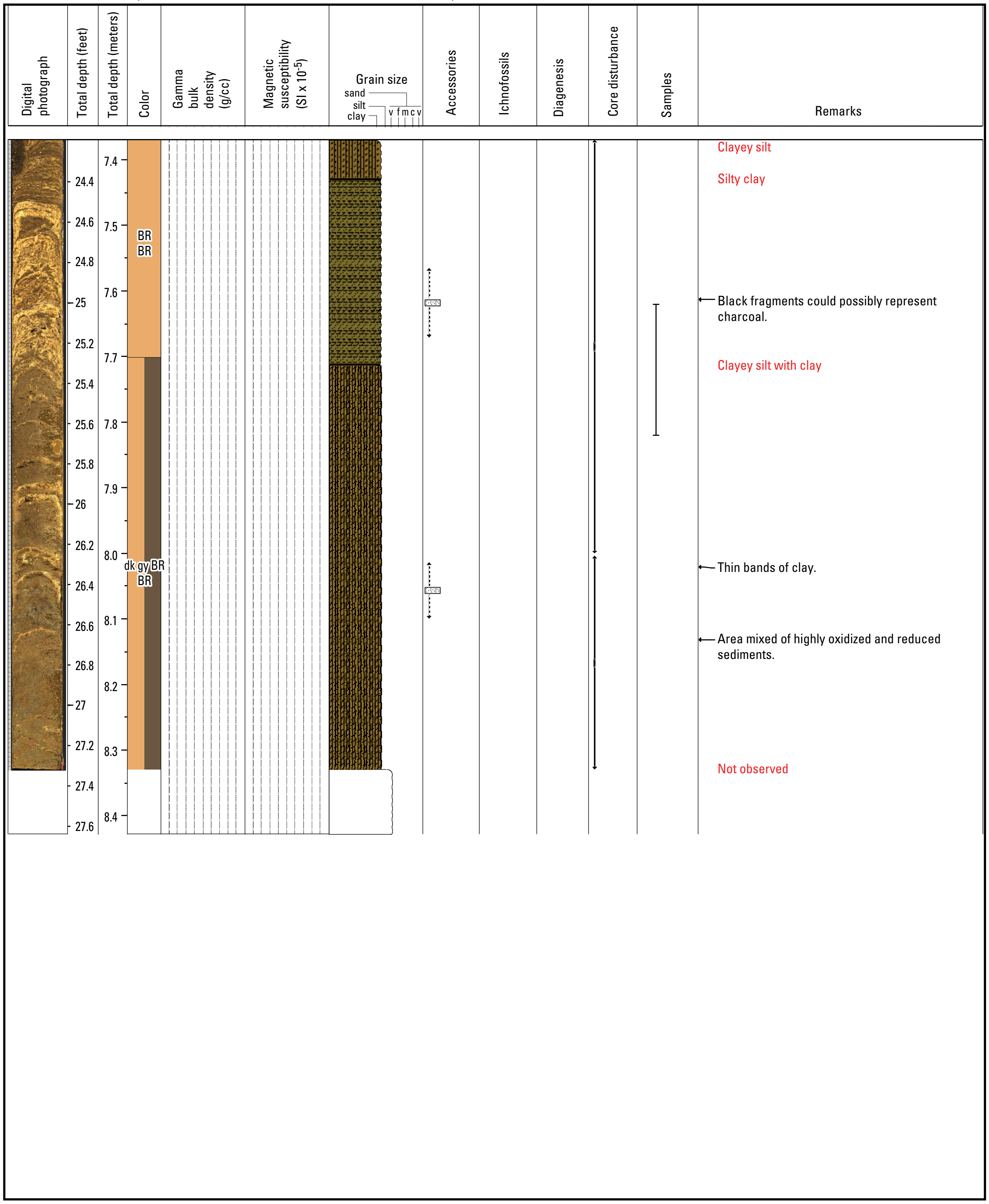


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-5a
Collected: Sept. 30, 2011
Land surface elevation: 10.17 m
USGS station number: 384225121420701

Core: 5a #6A
Section 6 of 6 (7.37–8.46 meters; 24.17–27.75 feet)

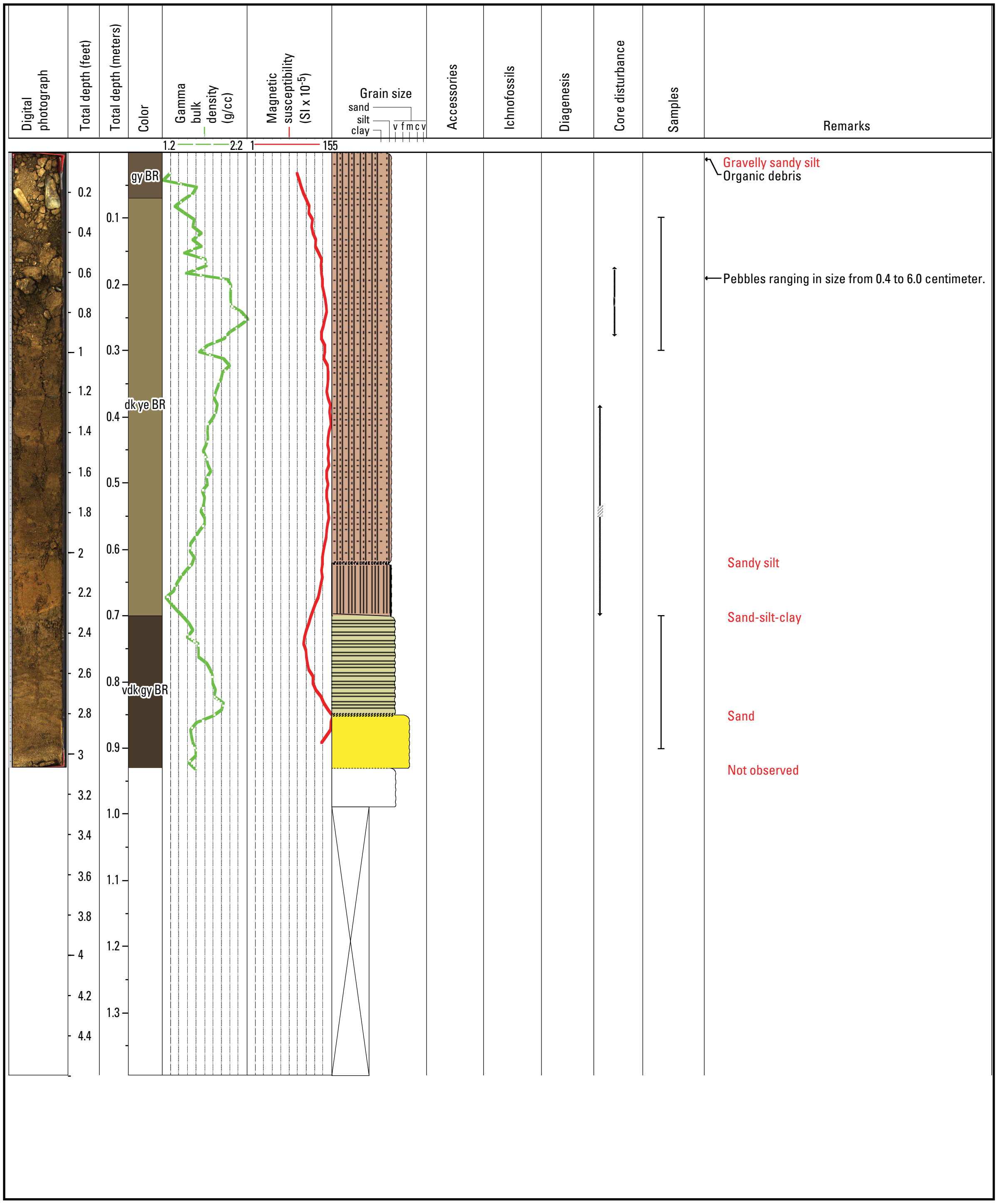


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-6a
Collected: Sept. 30, 2011
Land surface elevation: 10.43 m
USGS station number: 384312121421401

Core: 6a #1A
Section 1 of 6 (0–1.40 meters; 0–4.58 feet)

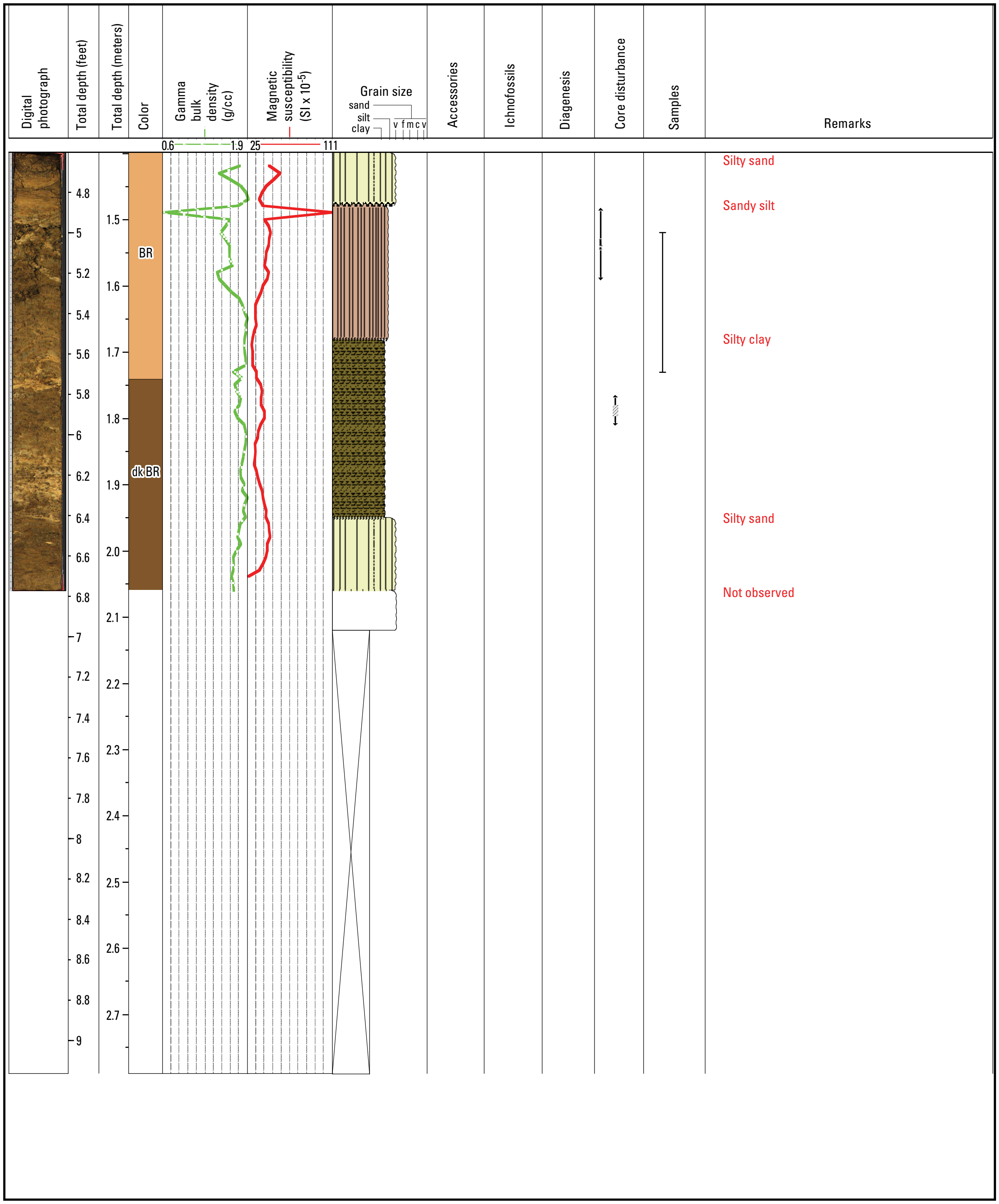


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-6a
Collected: Sept. 30, 2011
Land surface elevation: 10.43 m
USGS station number: 384312121421401

Core: 6a #2A
Section 2 of 6 (1.40–2.79 meters; 4.58–9.17 feet)

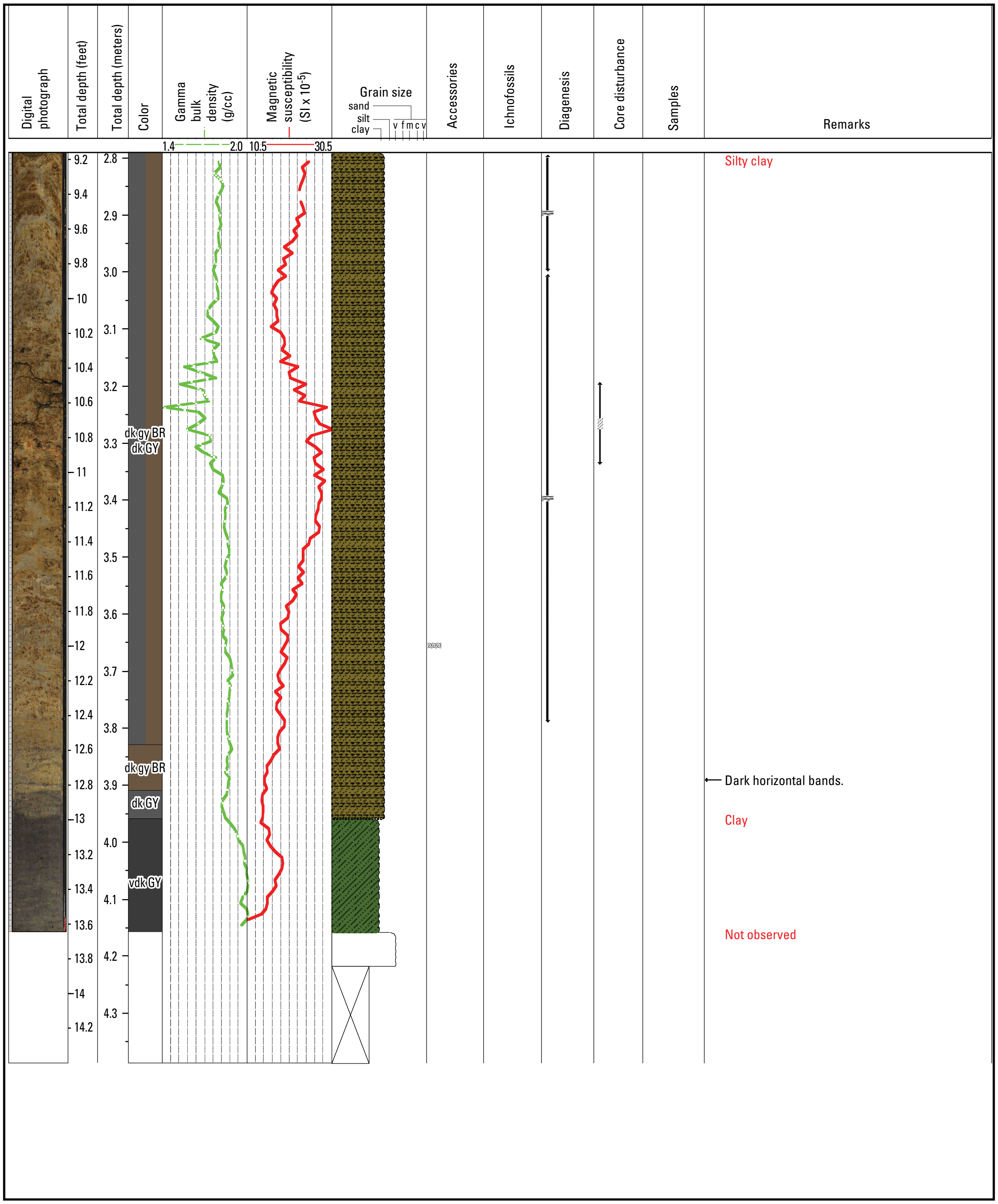


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-6a
Collected: Sept. 30, 2011
Land surface elevation: 10.43 m
USGS station number: 384312121421401

Core: 6a #3A
Section 3 of 6 (2.79–4.39 meters; 9.17–14.42 feet)

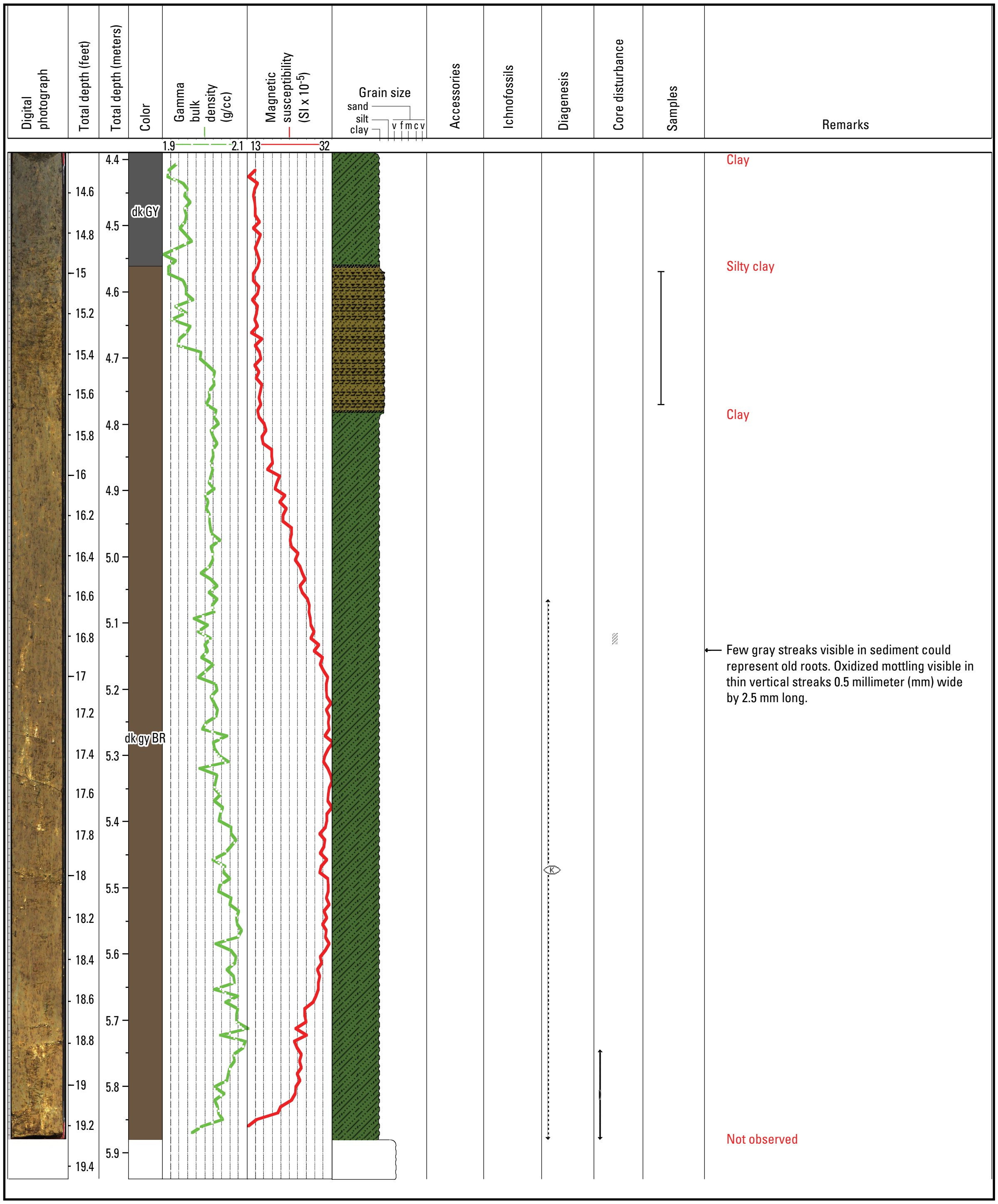


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-6a
Collected: Sept. 30, 2011
Land surface elevation: 10.43 m
USGS station number: 384312121421401

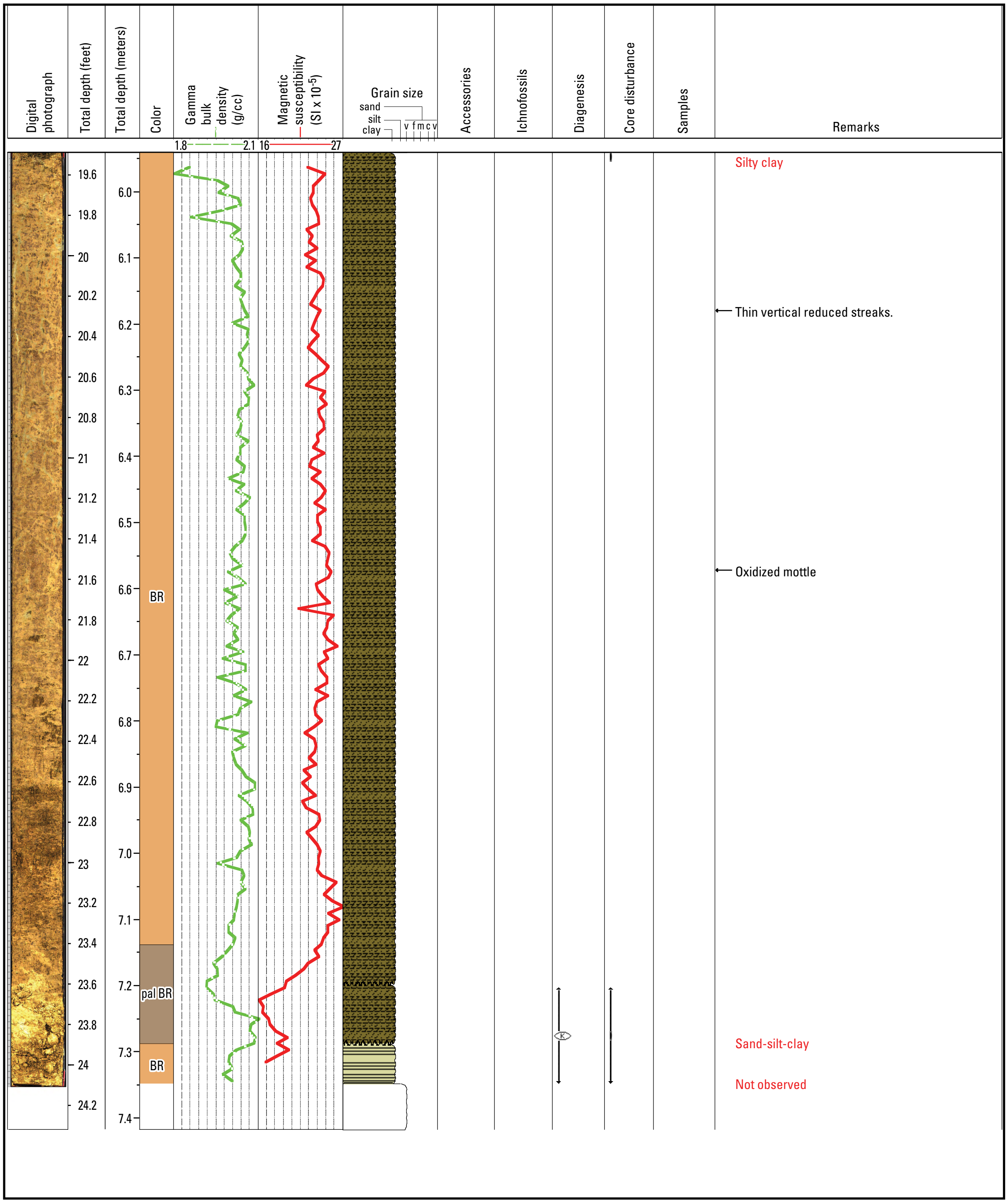
Core: 6a #4A
Section 4 of 6 (4.39–5.94 meters; 14.42–19.5 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-6a
Collected: Sept. 30, 2011
Land surface elevation: 10.43 m
USGS station number: 384312121421401

Core: 6a #5A
Section 5 of 6 (5.94–7.42 meters; 19.5–24.33 feet)

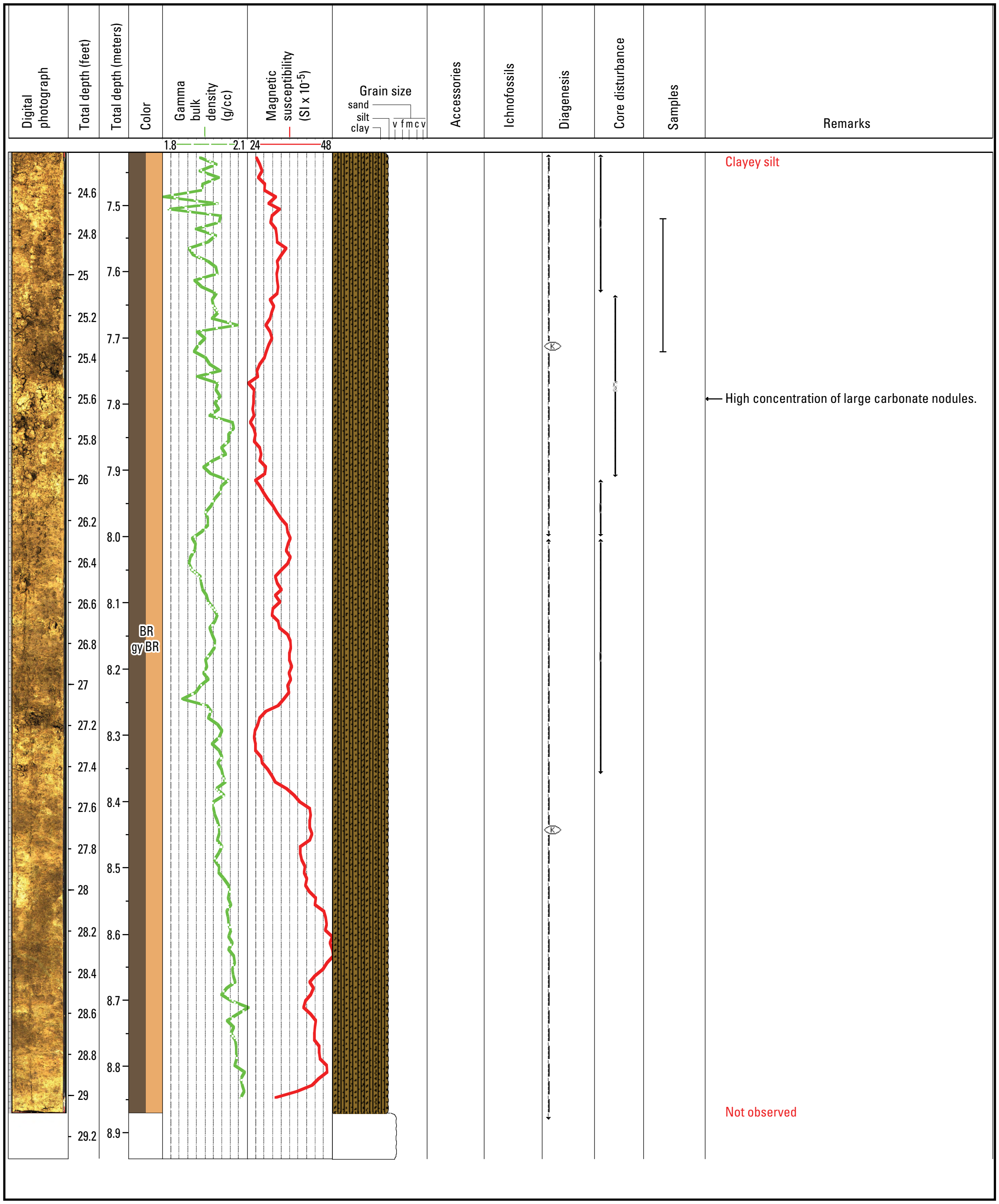


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-6a
Collected: Sept. 30, 2011
Land surface elevation: 10.43 m
USGS station number: 384312121421401

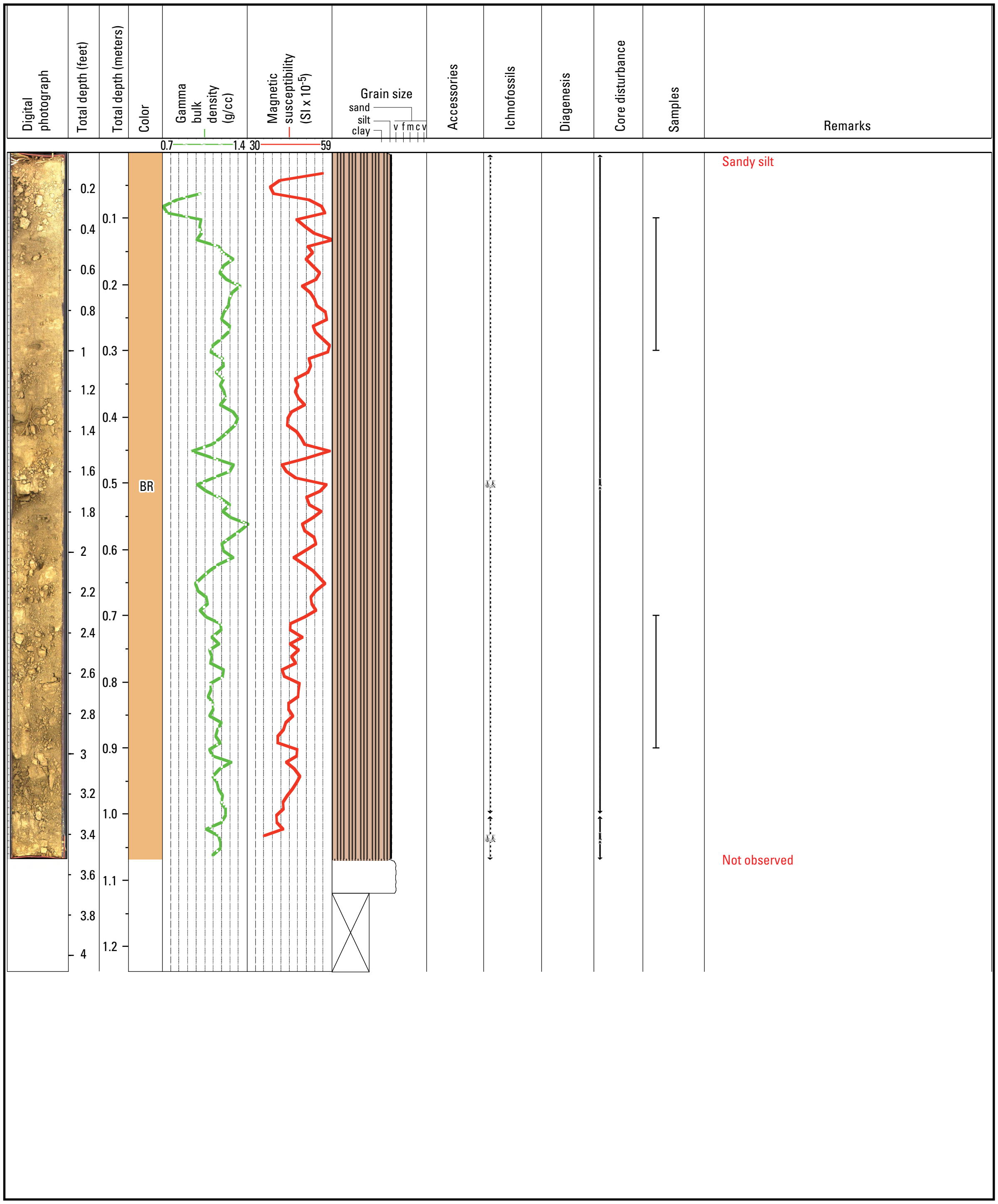
Core: 6a #6A
Section 6 of 6 (7.42–8.94 meters; 24.33–29.33 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-7a
Collected: Oct. 4, 2011
Land surface elevation: 10.93 m
USGS station number: 384145121425601

Core: 7a #1A
Section 1 of 6 (0–1.24 meters; 0–4.08 feet)

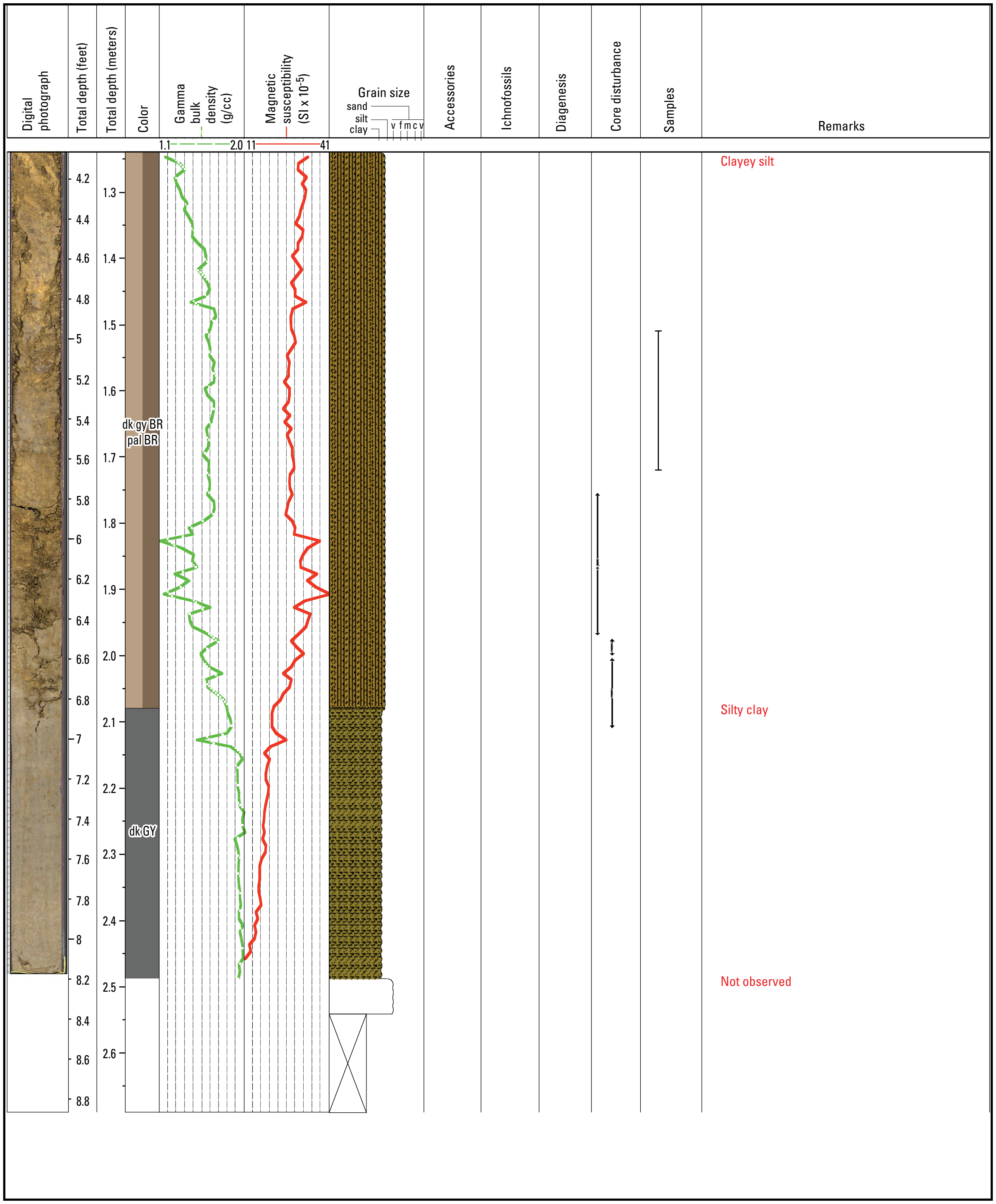


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-7a
Collected: Oct. 4, 2011
Land surface elevation: 10.93 m
USGS station number: 384145121425601

Core: 7a #2A
Section 2 of 6 (1.24–2.69 meters; 4.08–8.83 feet)

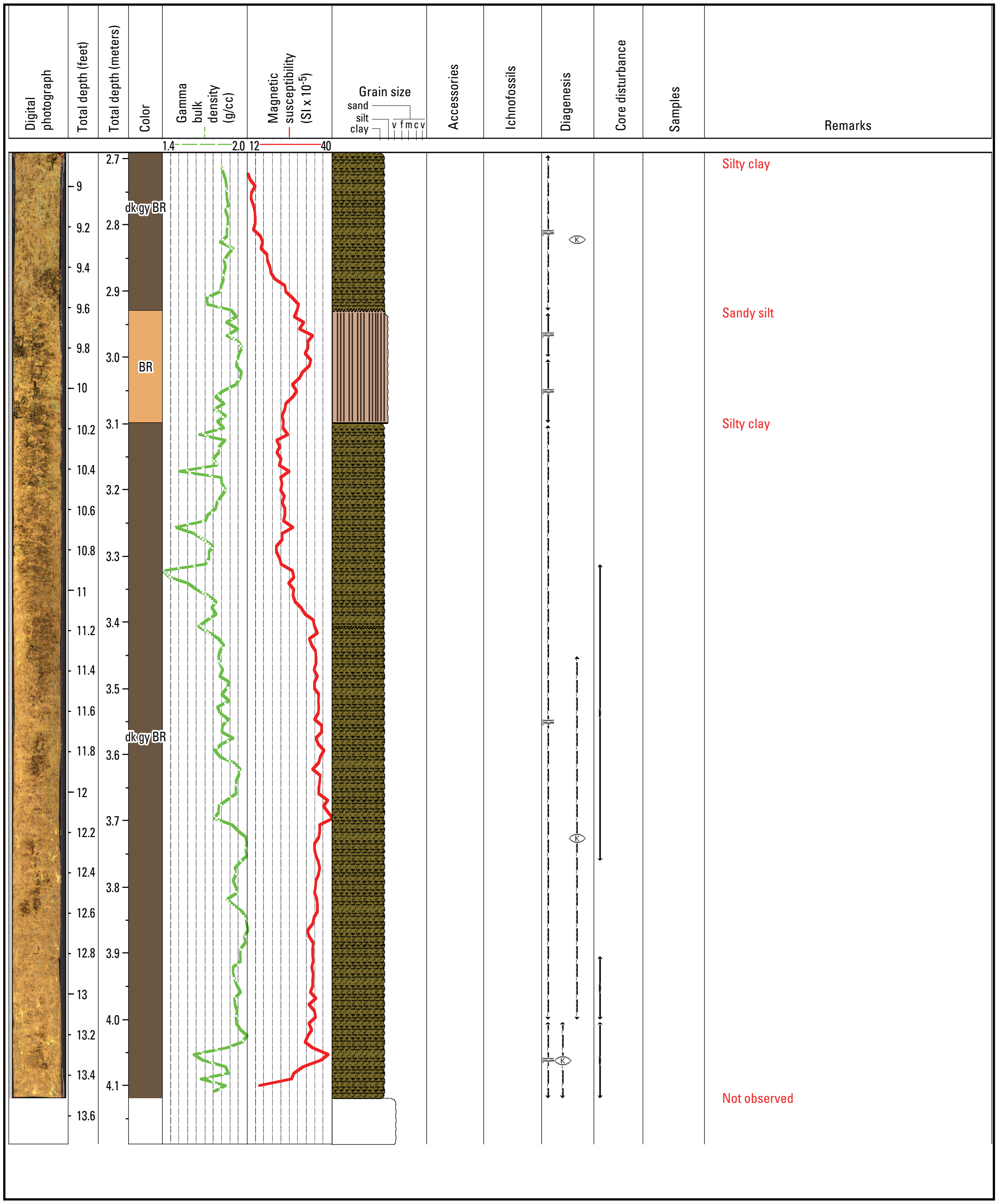


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-7a
Collected: Oct. 4, 2011
Land surface elevation: 10.93 m
USGS station number: 384145121425601

Core: 7a #3A
Section 3 of 6 (2.69–4.19 meters; 8.83–13.75 feet)

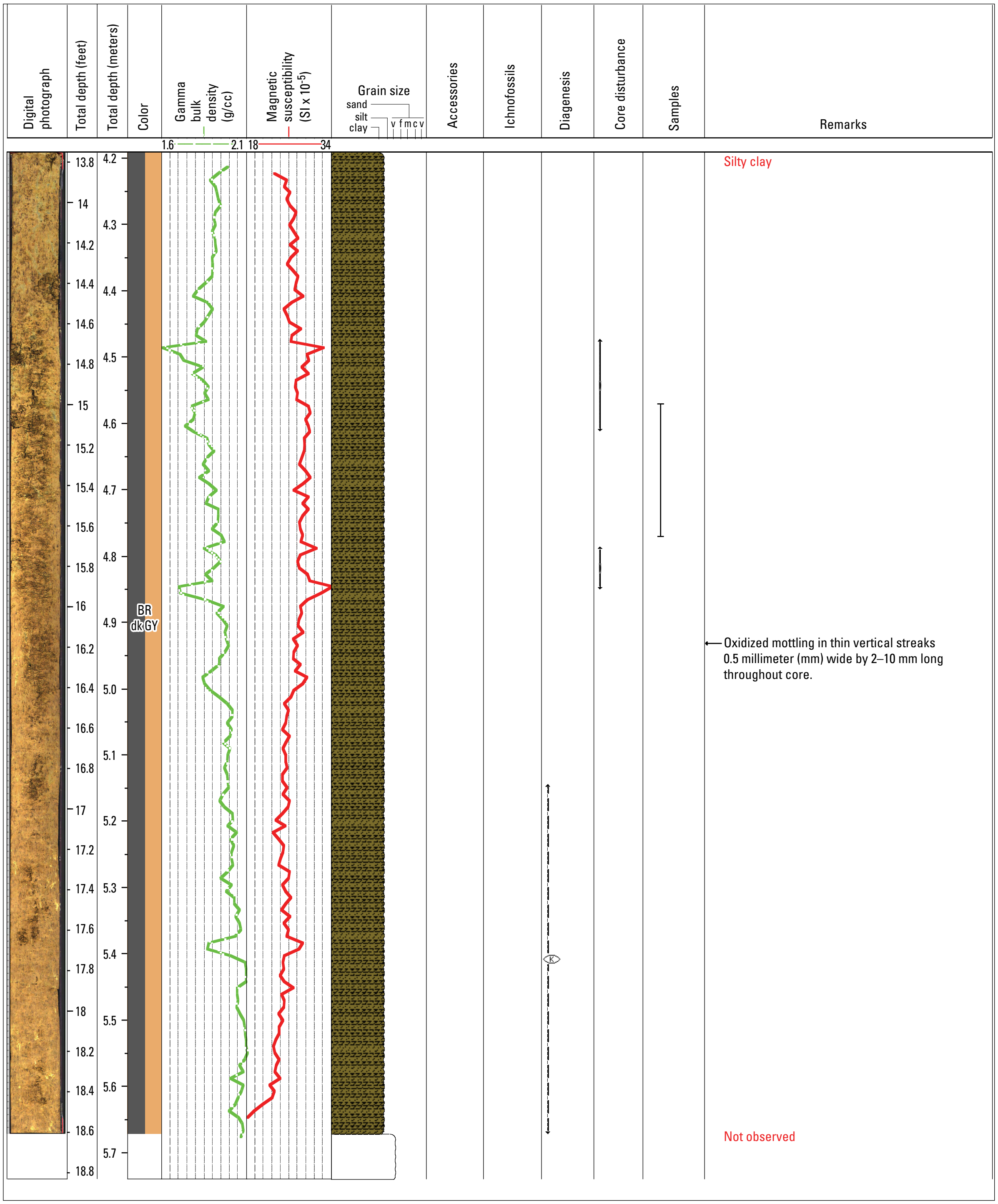


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-7a
Collected: Oct. 4, 2011
Land surface elevation: 10.93 m
USGS station number: 384145121425601

Core: 7a #4A
Section 4 of 6 (4.19–5.74 meters; 13.75–18.83 feet)

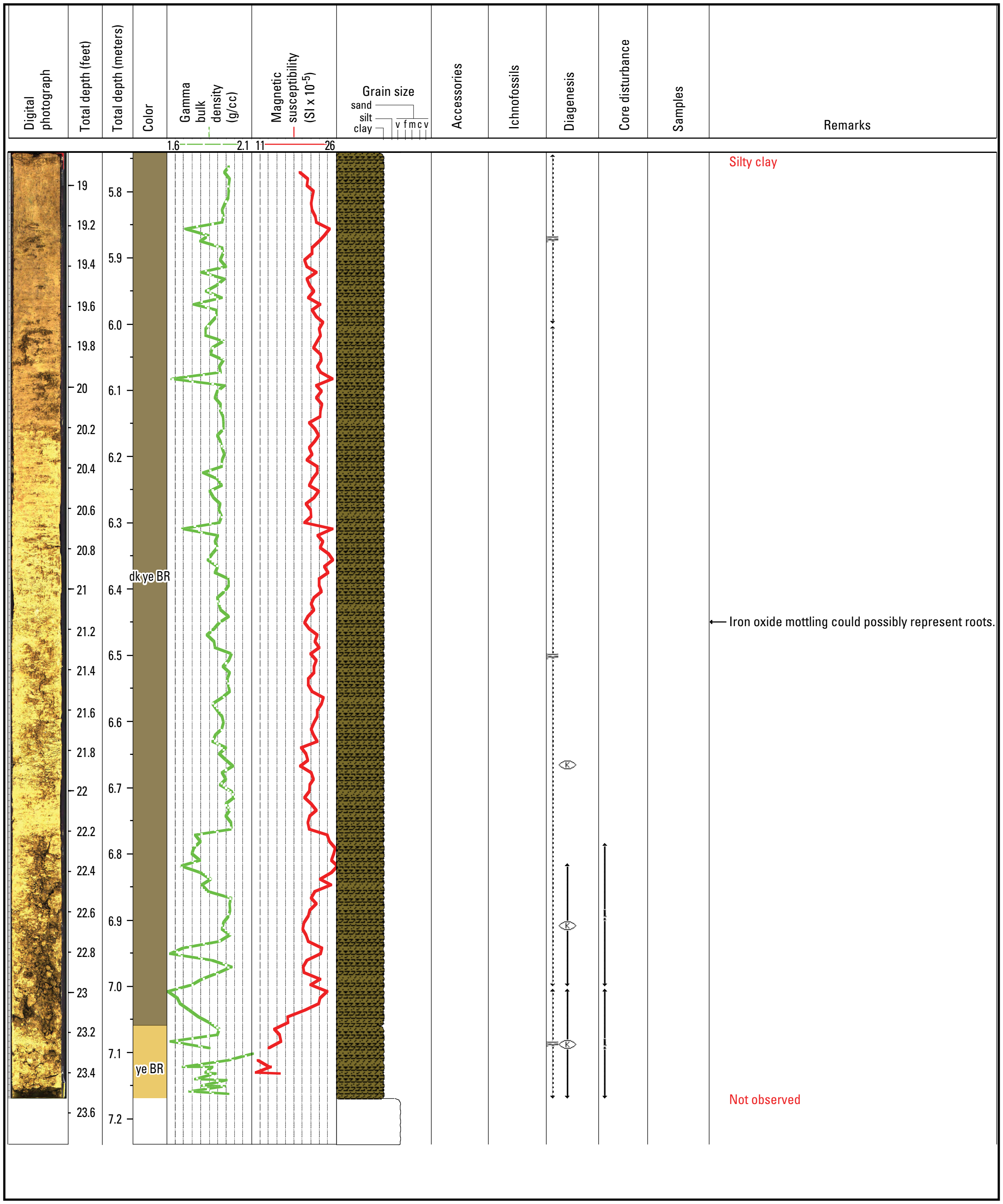


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-7a
Collected: Oct. 4, 2011
Land surface elevation: 10.93 m
USGS station number: 384145121425601

Core: 7a #5A
Section 5 of 6 (5.74–7.24 meters; 18.83–23.75 feet)

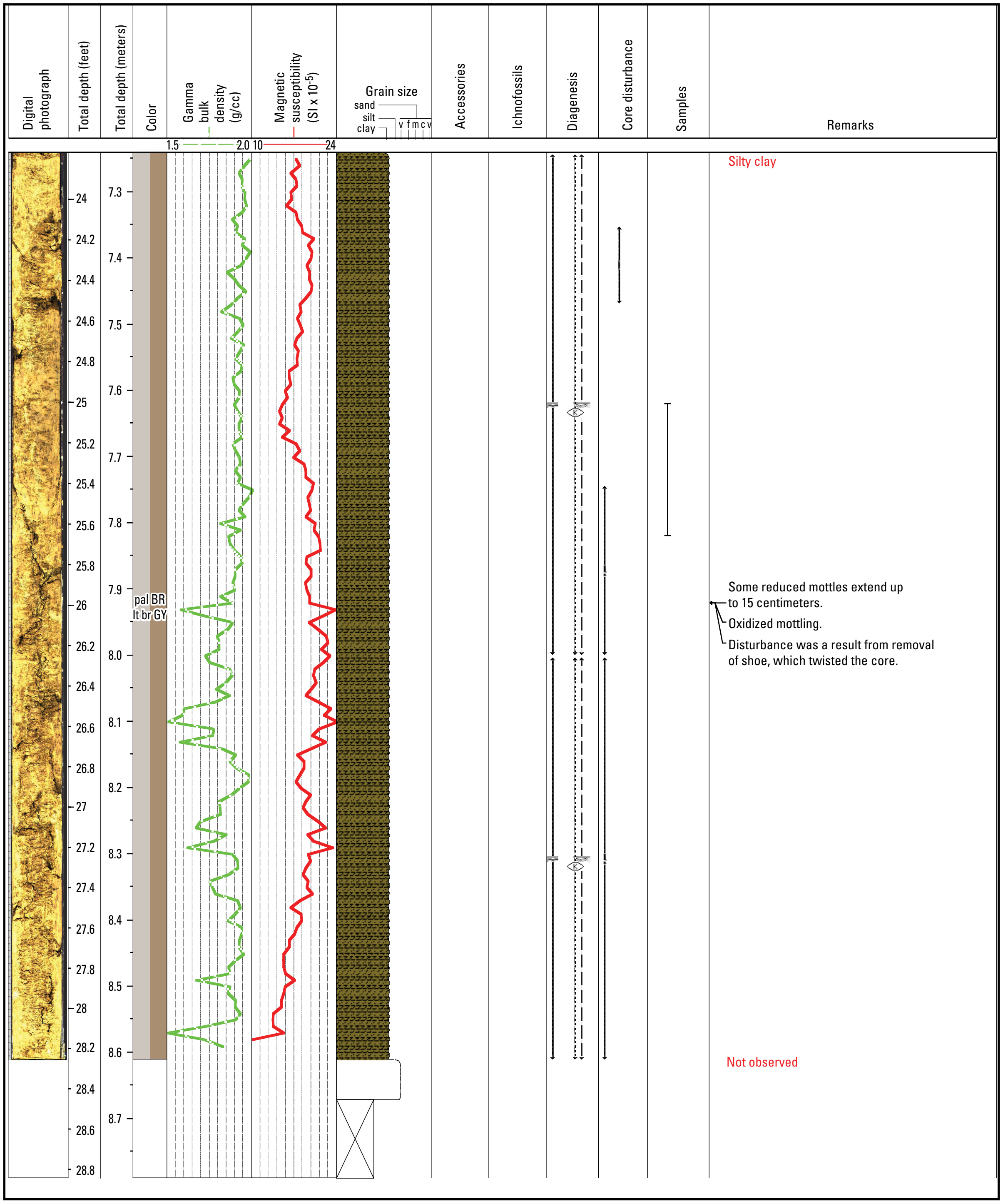


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-7a
Collected: Oct. 4, 2011
Land surface elevation: 10.93 m
USGS station number: 384145121425601

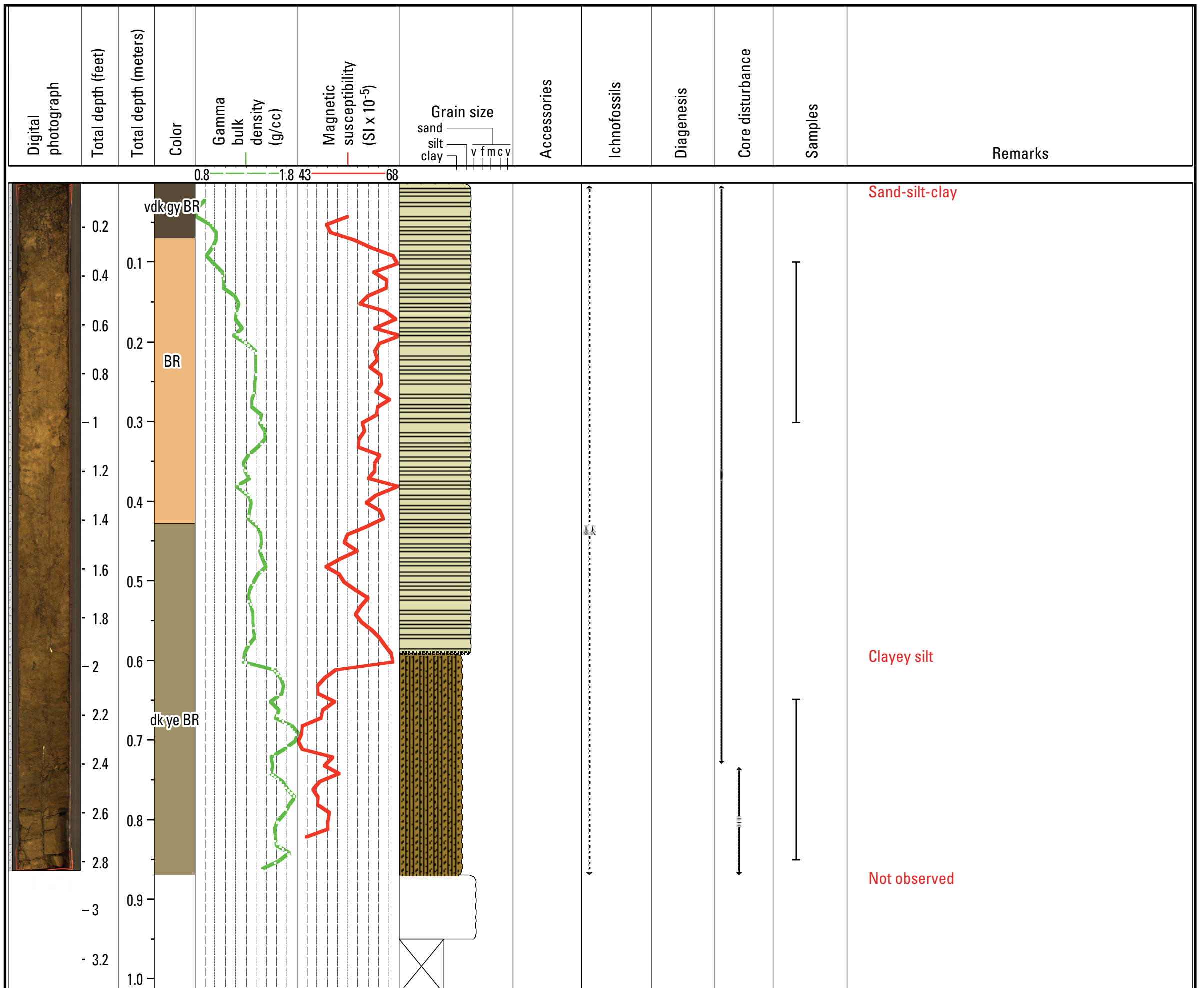
Core: 7a #6A
Section 6 of 6 (7.24–8.79 meters; 23.75–28.83 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-8b
Collected: Oct. 5, 2011
Core: 8b #1P
Land surface elevation: 10.45 m
Section 1 of 4 (0–1.02 meters; 0–3.33 feet)
USGS station number: 384225121425402

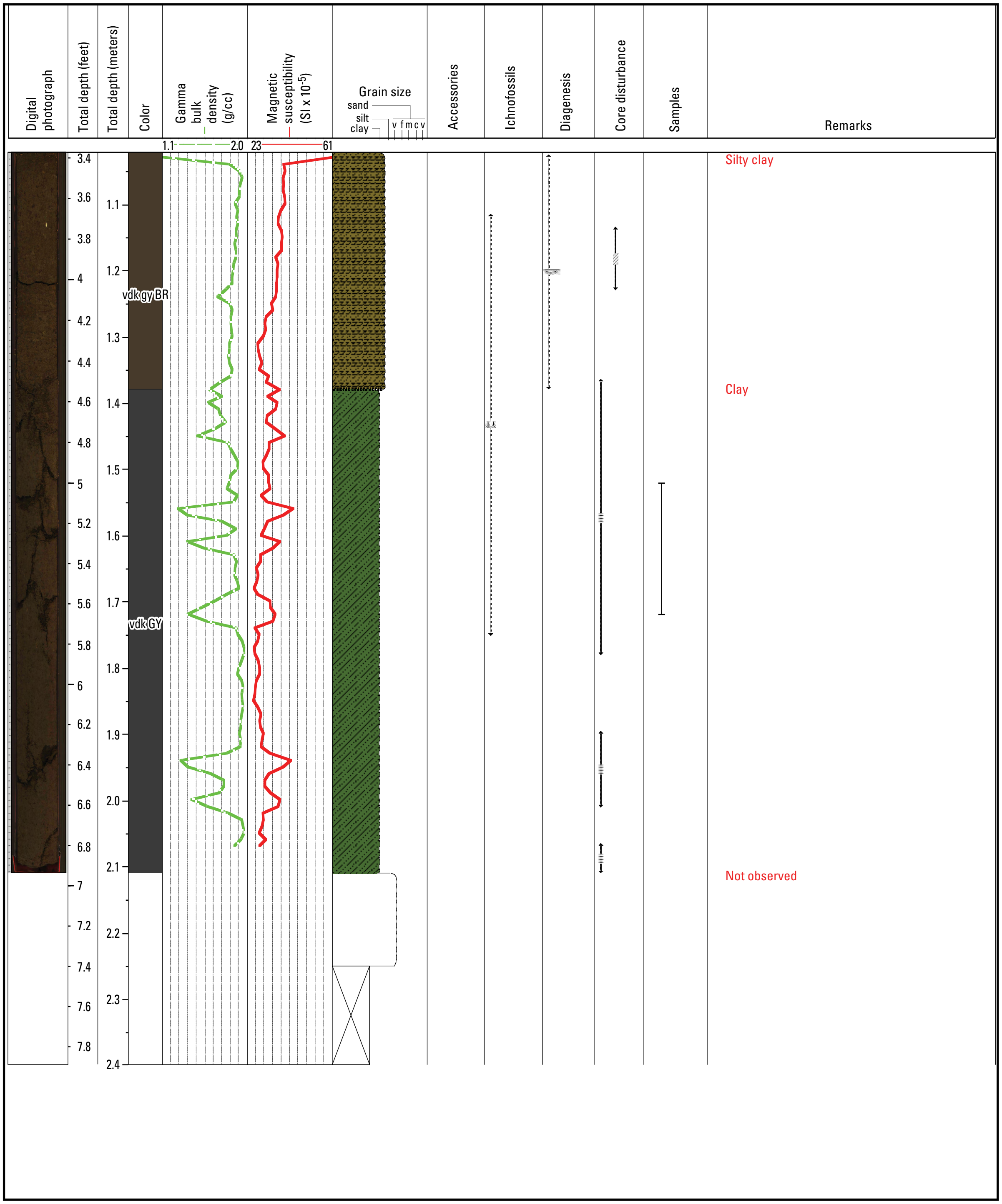


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-8b
Collected: Oct. 5, 2011
Land surface elevation: 10.45 m
USGS station number: 384225121425402

Core: 8b #2P
Section 2 of 4 (1.02–2.40 meters; 3.33–7.88 feet)

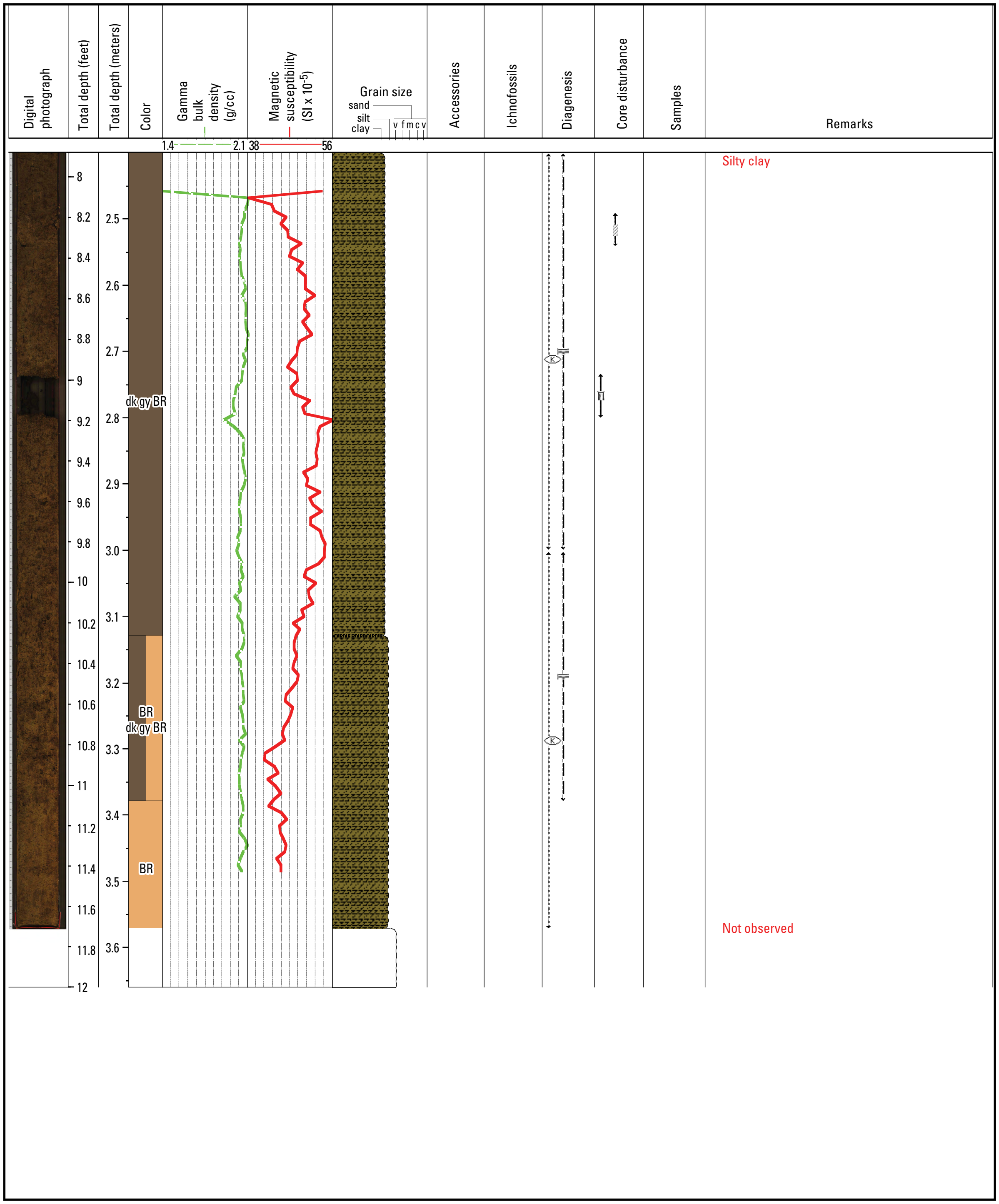


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-8b
Collected: Oct. 5, 2011
Land surface elevation: 10.45 m
USGS station number: 384225121425402

Core: 8b #3P
Section 3 of 4 (2.40–3.66 meters; 7.88–12.00 feet)

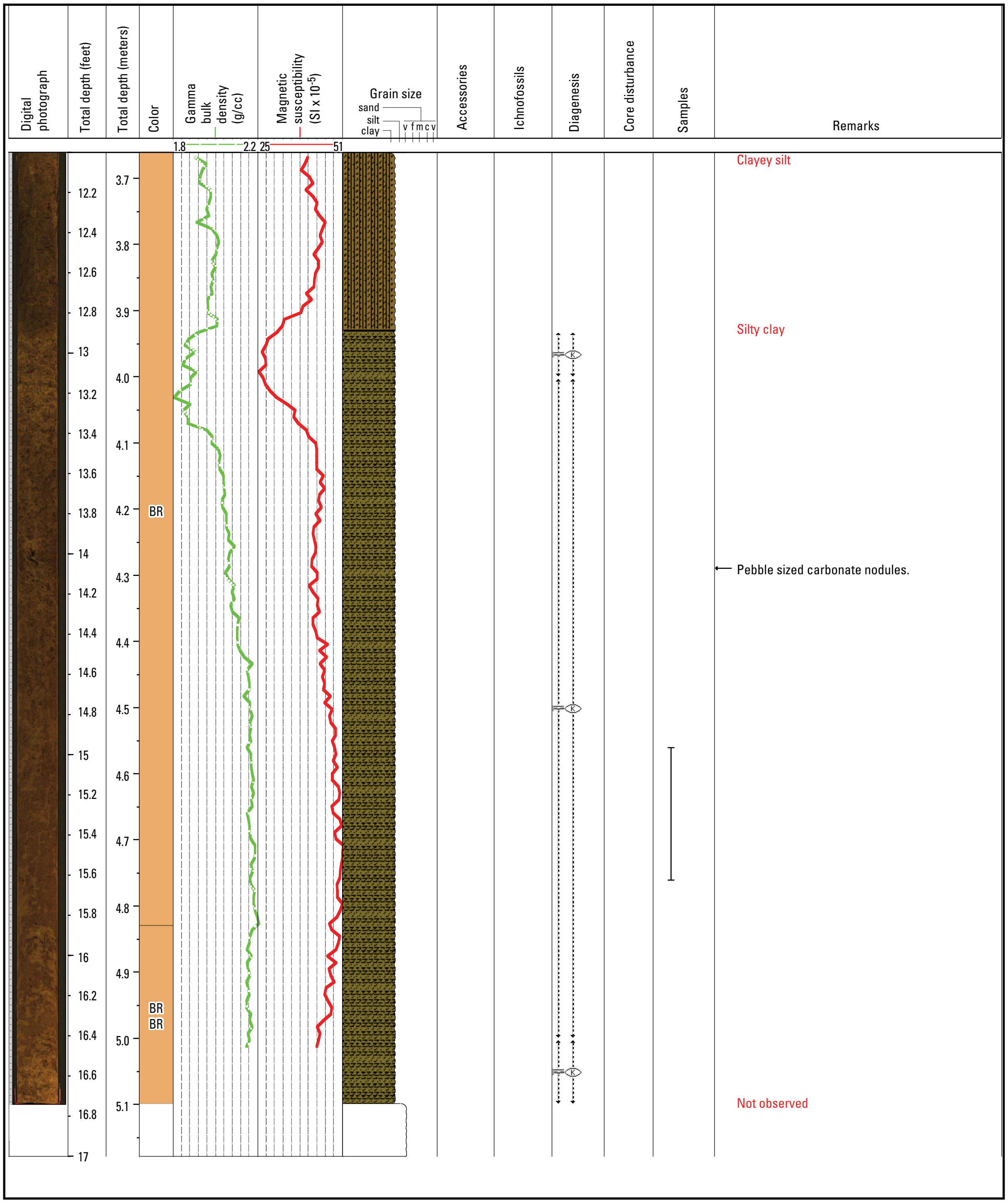


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-8b
Collected: Oct. 5, 2011
Land surface elevation: 10.45 m
USGS station number: 384225121425402

Core: 8b #4P
Section 4 of 4 (3.66–5.18 meters; 12.00–17.00 feet)

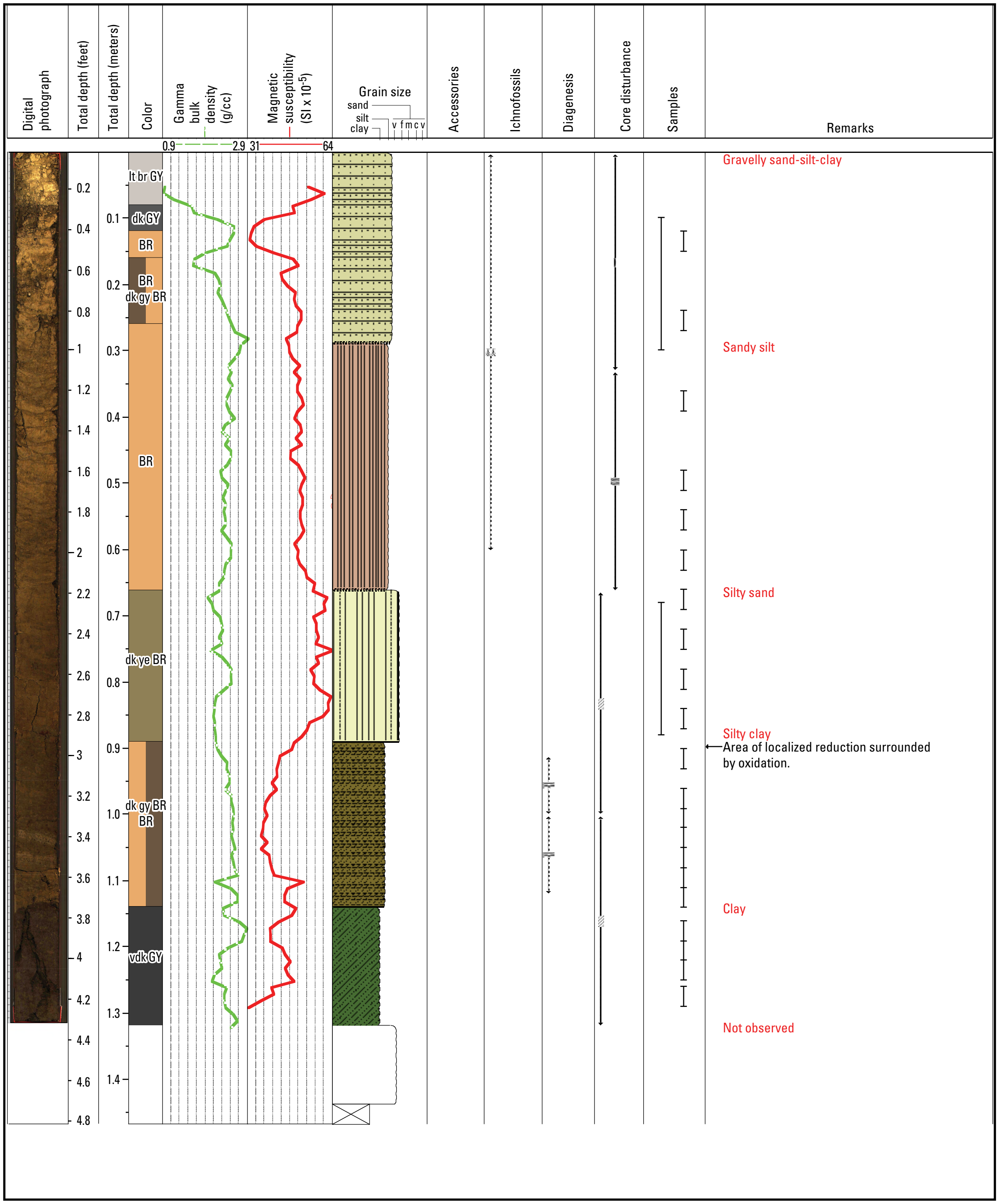


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-9a
Collected: Oct. 3, 2011
Land surface elevation: 10.02 m
USGS station number: 384105121423701

Core: 9a #1PHP
Section 1 of 6 (0–1.47 meters; 0–4.83 feet)

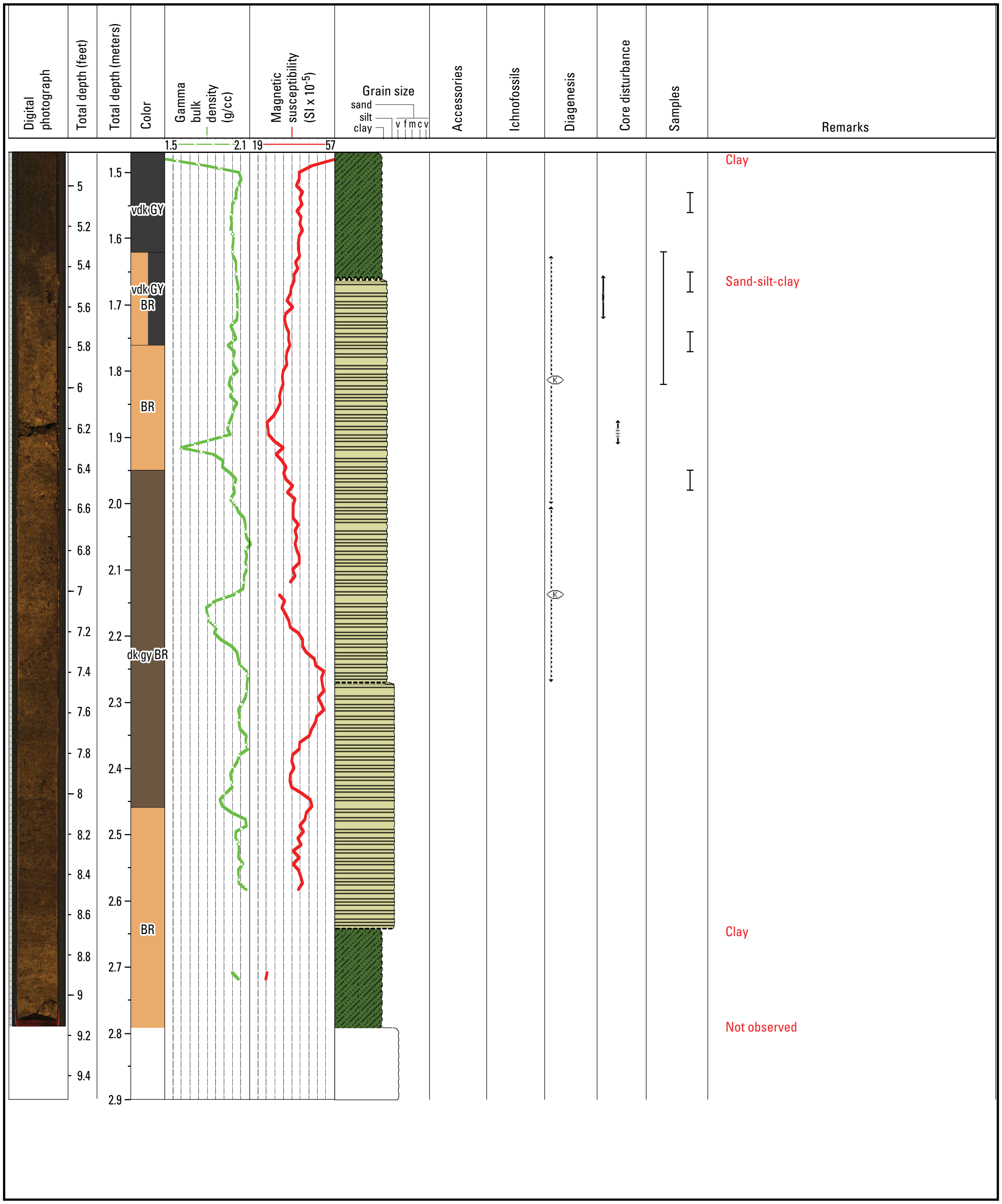


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-9a
Collected: Oct. 3, 2011
Land surface elevation: 10.02 m
USGS station number: 384105121423701

Core: 9a #2P
Section 2 of 6 (1.47–2.90 meters; 4.83–9.50 feet)

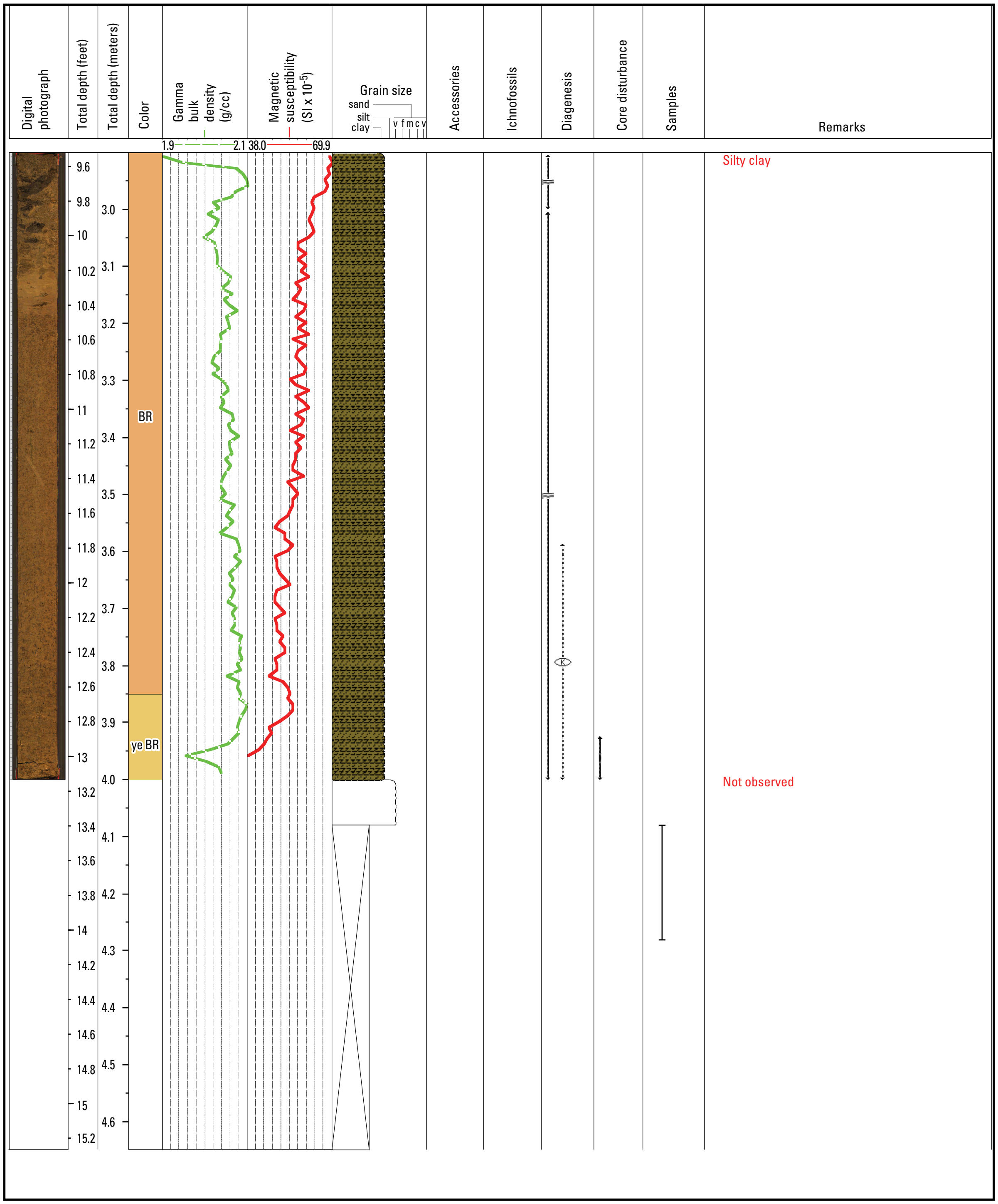


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-9a
Collected: Oct. 3, 2011
Land surface elevation: 10.02 m
USGS station number: 384105121423701

Core: 9a #3P
Section 3 of 6 (2.90–4.65 meters; 9.50–15.25 feet)

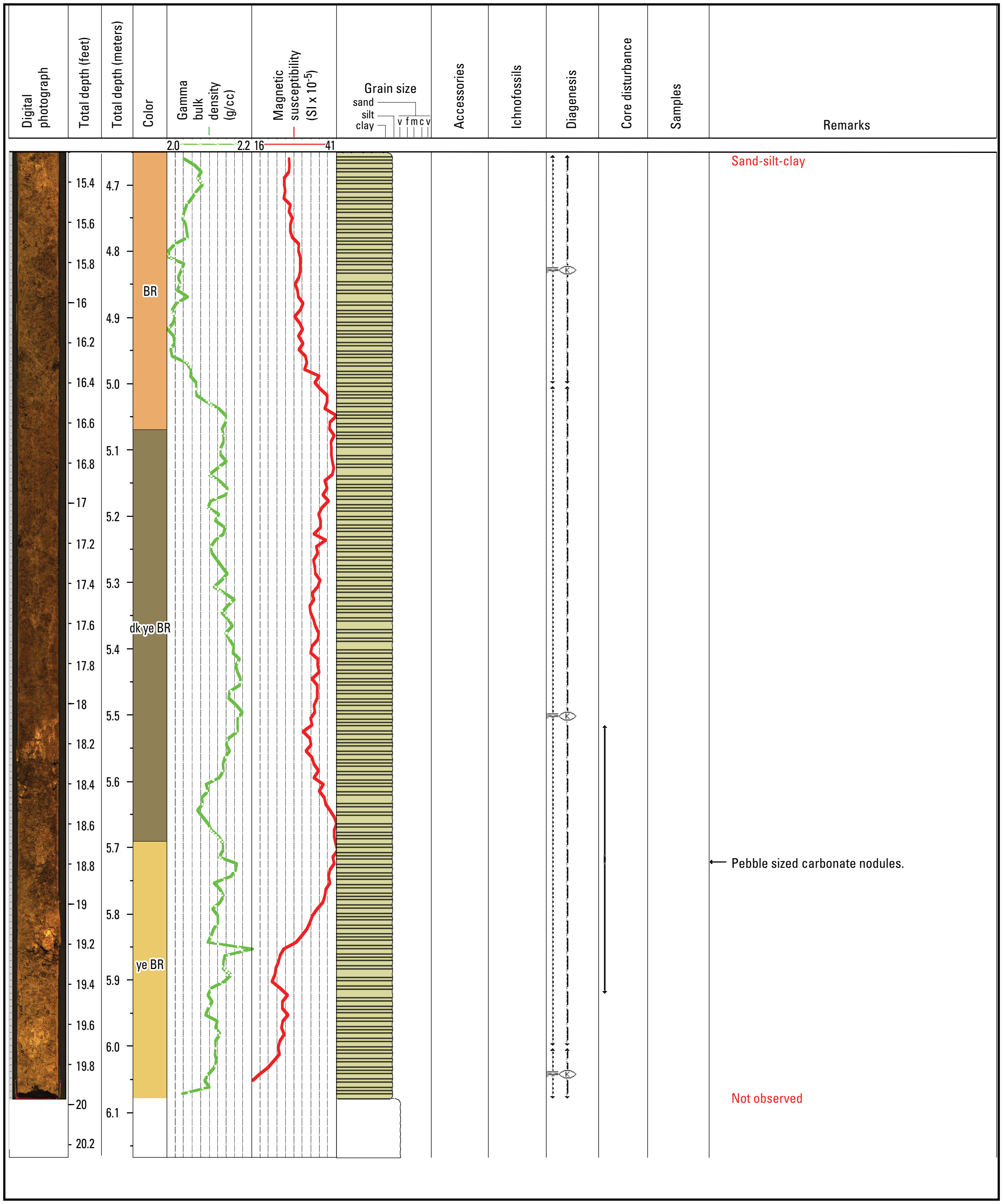


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-9a
Collected: Oct. 3, 2011
Land surface elevation: 10.02 m
USGS station number: 384105121423701

Core: 9a #4P
Section 4 of 6 (4.65–6.17 meters; 15.25–20.25 feet)

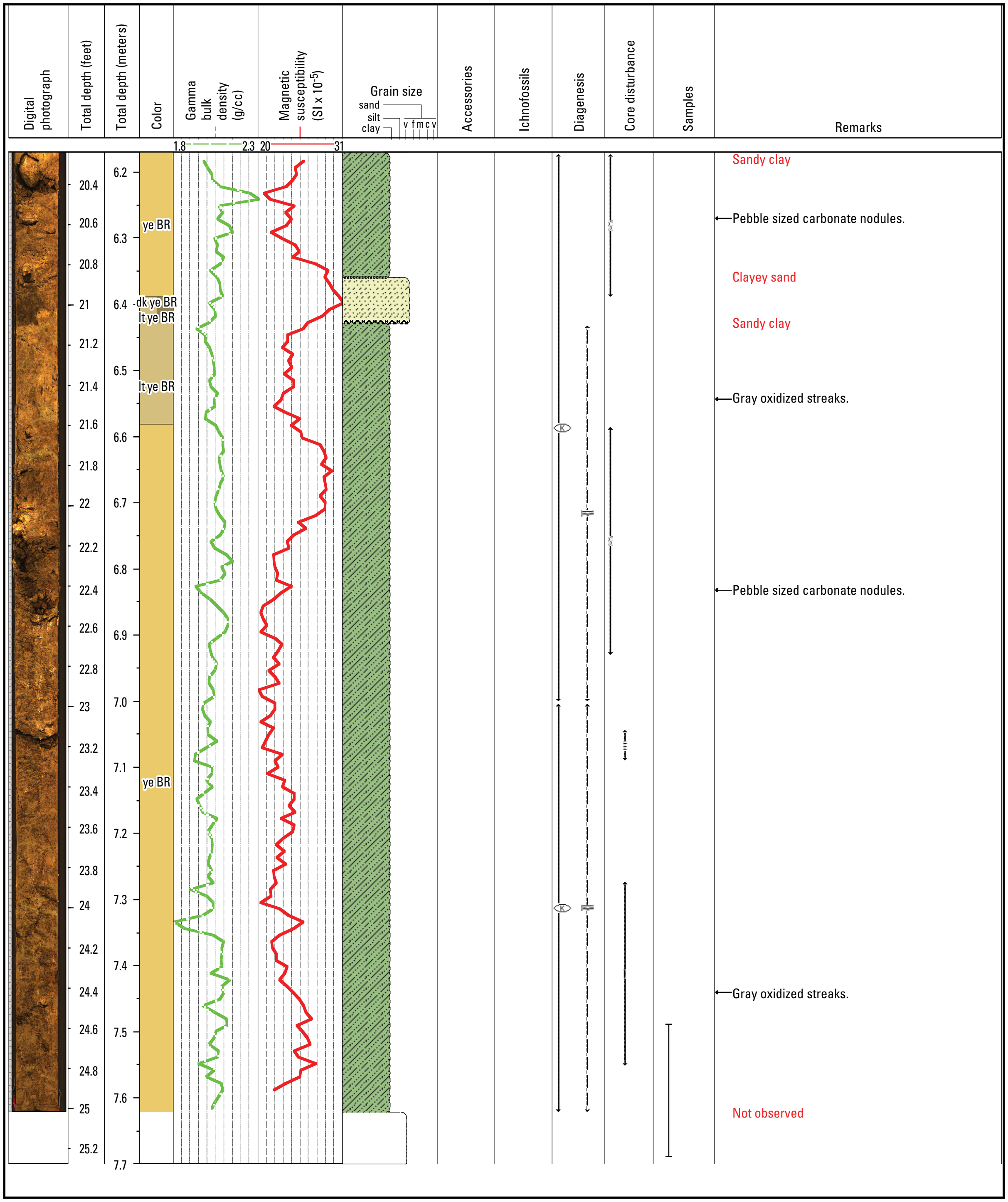


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-9a
Collected: Oct. 3, 2011
Land surface elevation: 10.02 m
USGS station number: 384105121423701

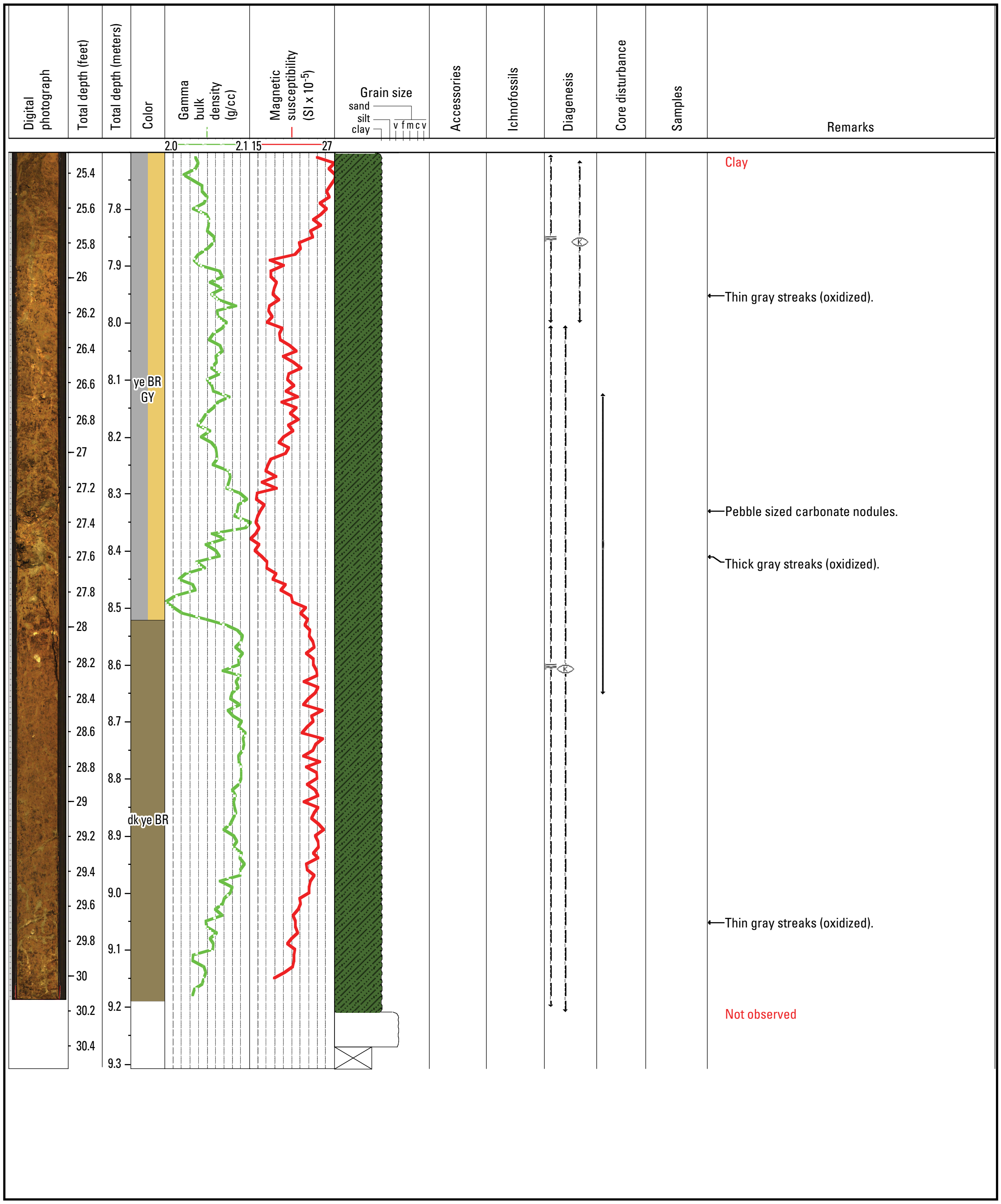
Core: 9a #5P
Section 5 of 6 (6.17–7.70 meters; 20.25–25.25 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

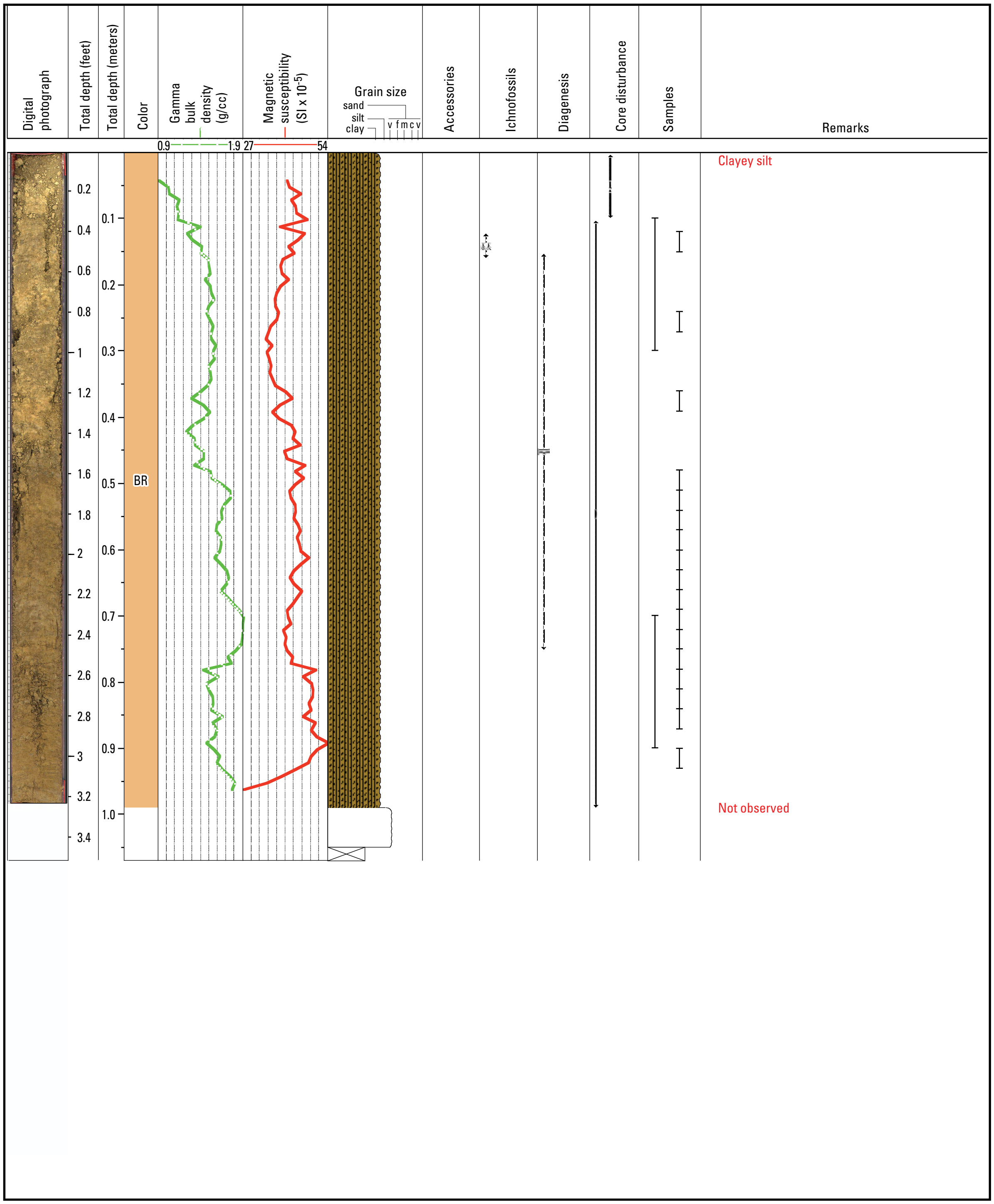
Site: Testhole-9a
Collected: Oct. 3, 2011
Core: 9a #6P
Land surface elevation: 10.02 m
Section 6 of 6 (7.70–9.31 meters; 25.25–30.54 feet)
USGS station number: 384105121423701



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-10b
Collected: Oct. 4, 2011
Land surface elevation: 10.11 m
USGS station number: 384102121415502

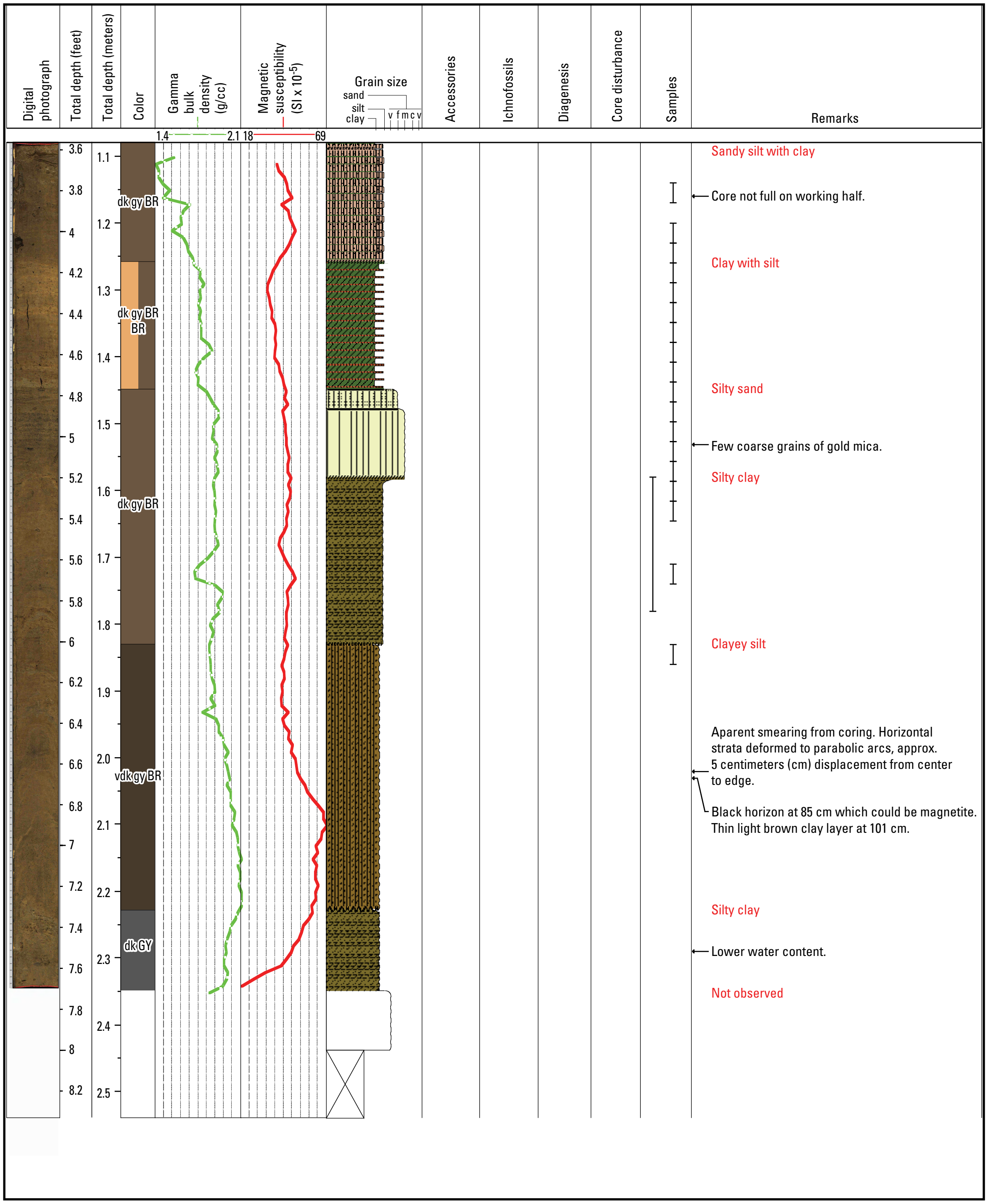
Core: 10b #1A
Section 1 of 6 (0–1.08 meters; 0–3.54 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-10b
Collected: Oct. 4, 2011
Core: 10b #2A
Land surface elevation: 10.11 m
Section 2 of 6 (1.08–2.54 meters; 3.54–8.33 feet)
USGS station number: 384102121415502

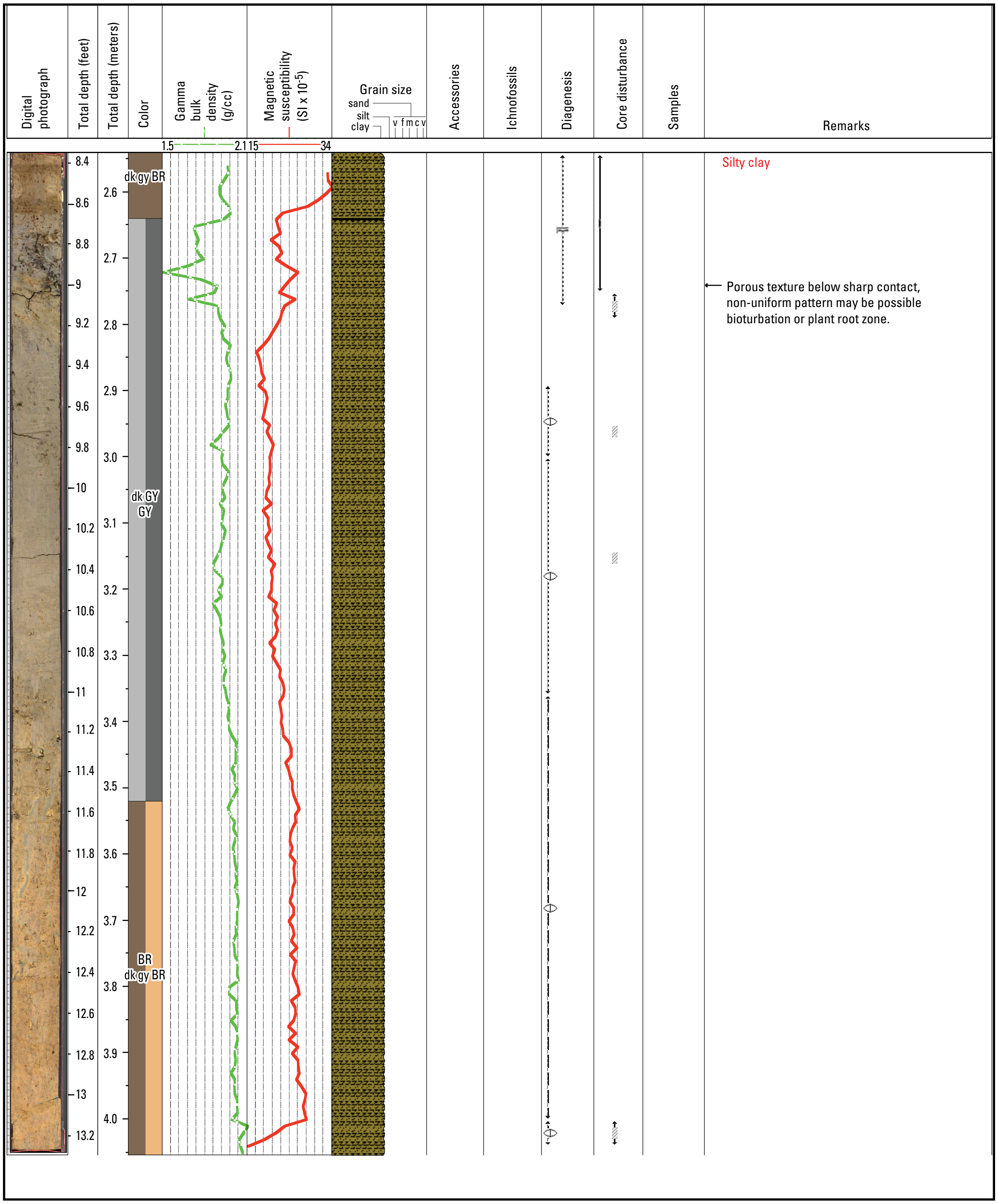


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-10b
Collected: Oct. 4, 2011
Land surface elevation: 10.11 m
USGS station number: 384102121415502

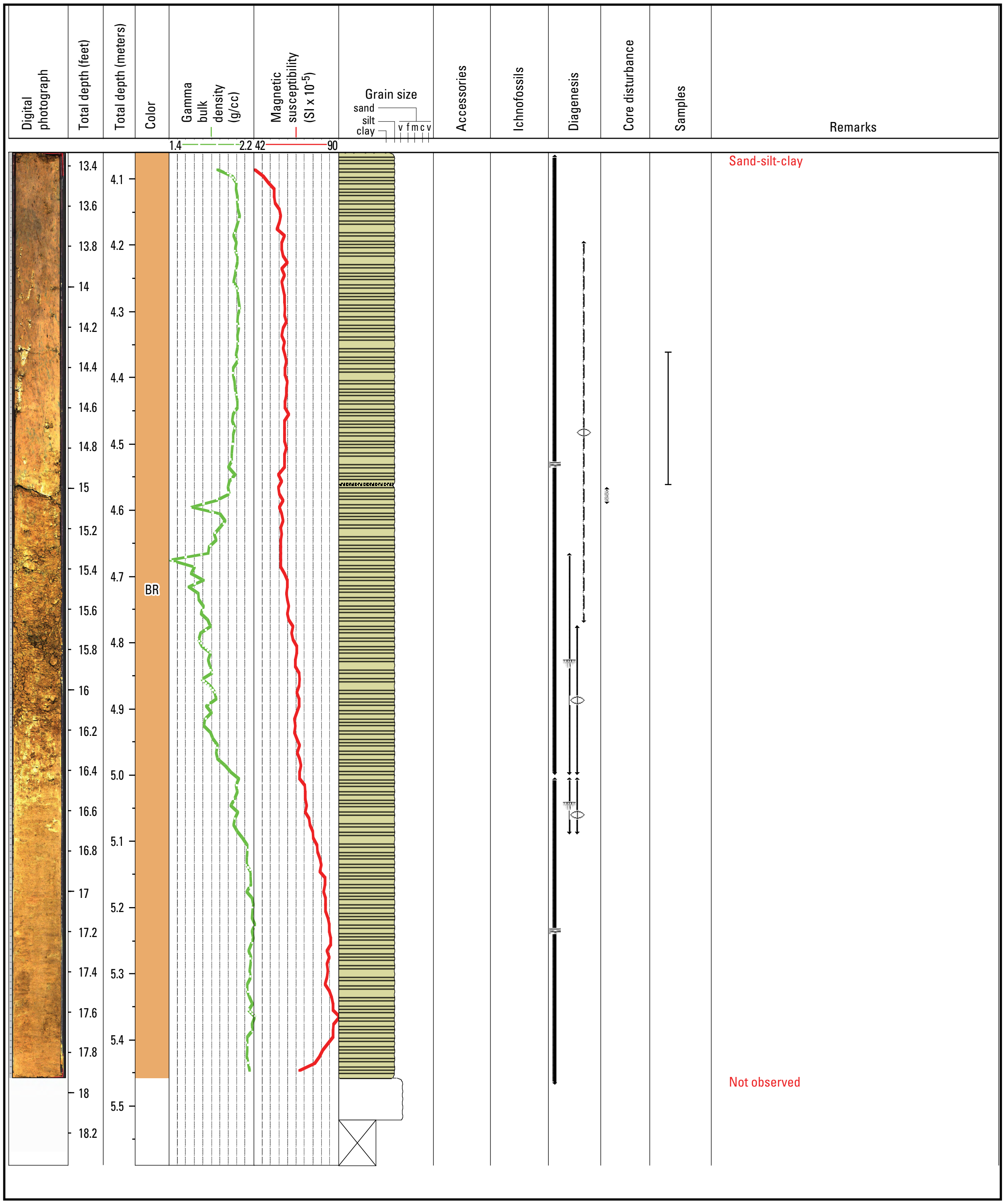
Core: 10b #3A
Section 3 of 6 (2.54–4.06 meters; 8.33–13.33 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-10b
Collected: Oct. 4, 2011
Core: 10b #4A
Land surface elevation: 10.11 m
Section 4 of 6 (4.06–5.59 meters; 13.33–18.33 feet)
USGS station number: 384102121415502

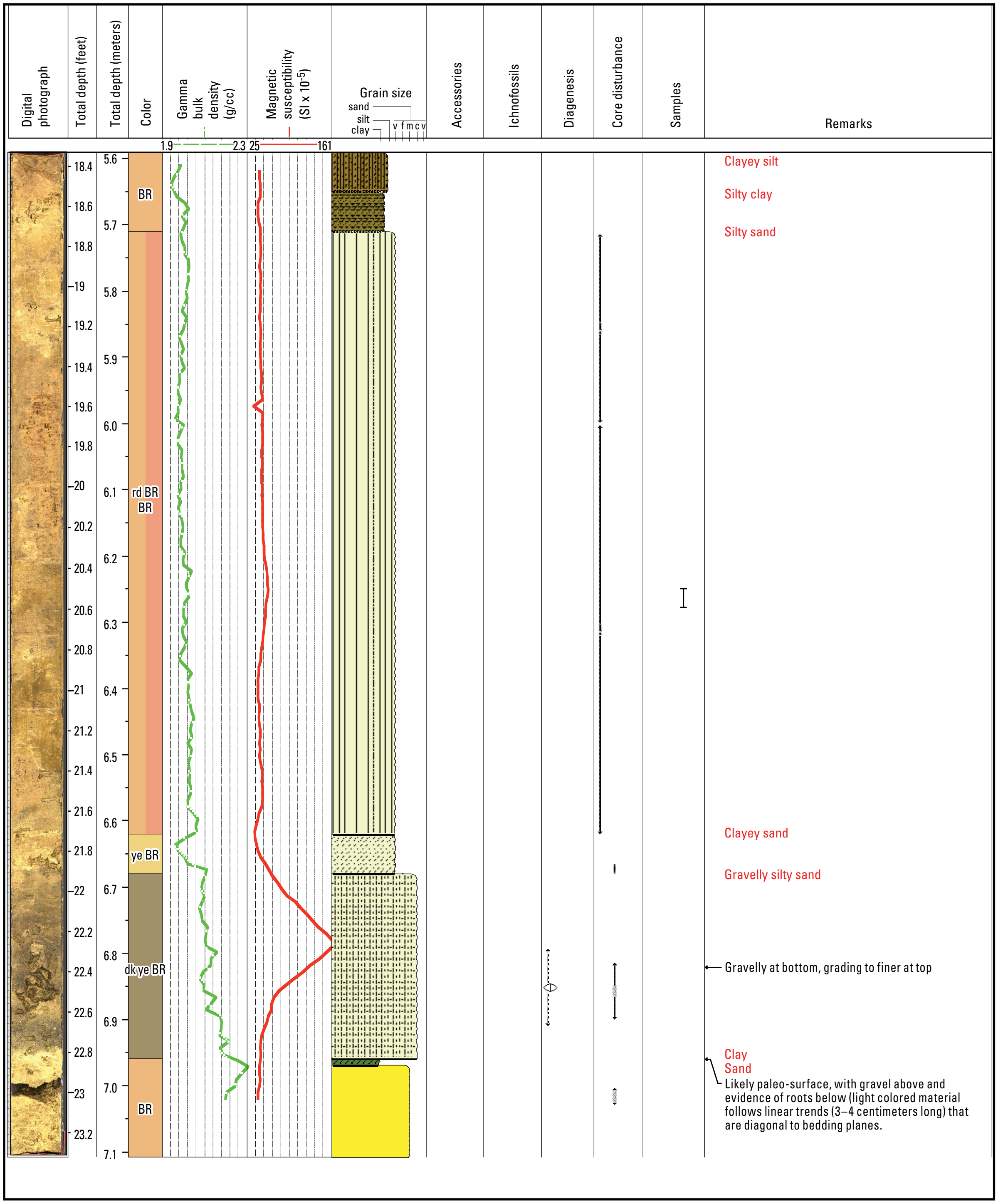


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-10b
Collected: Oct. 4, 2011
Land surface elevation: 10.11 m
USGS station number: 384102121415502

Core: 10b #5A
Section 5 of 6 (5.59–7.11 meters; 18.33–23.33 feet)

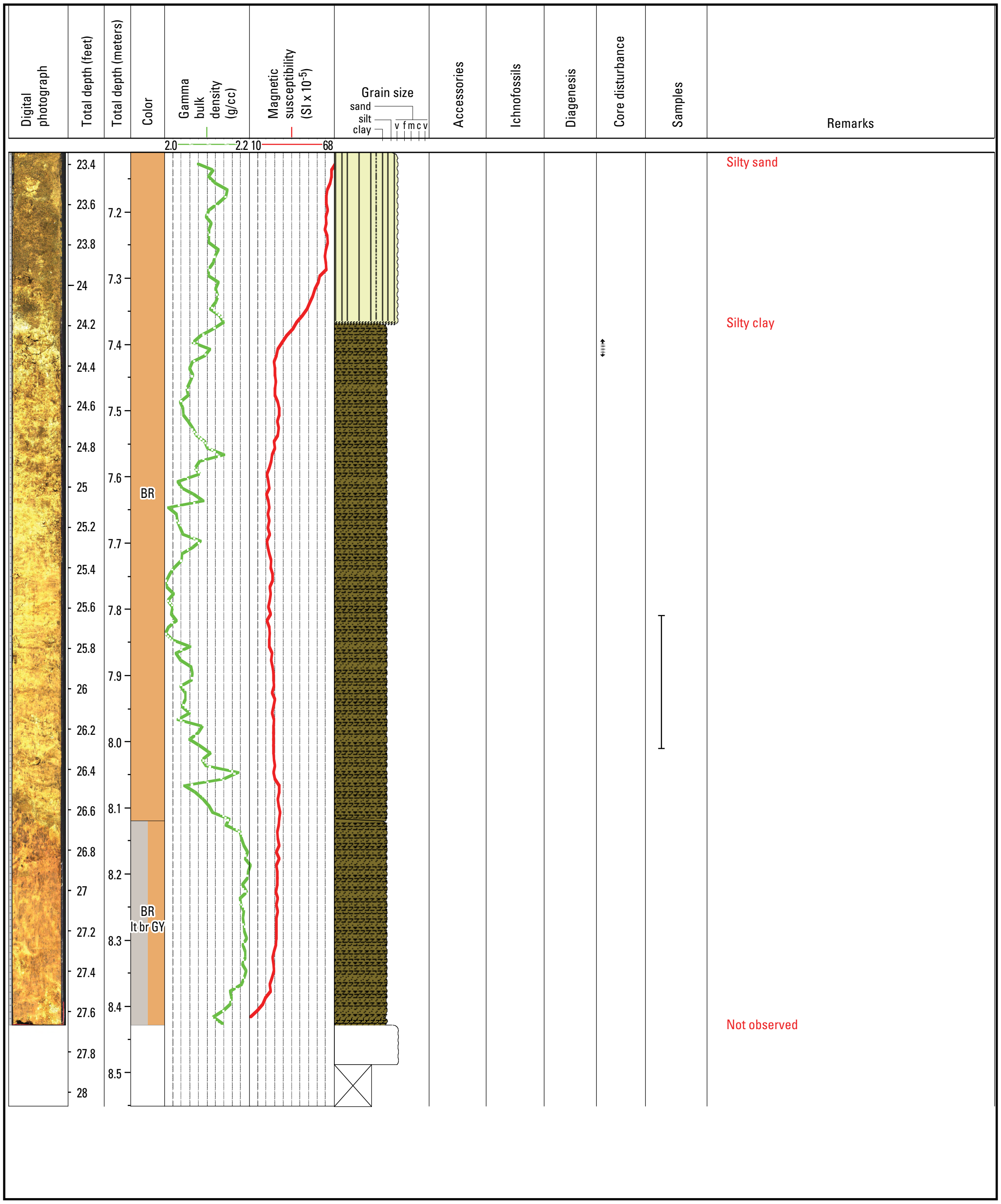


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-10b
Collected: Oct. 4, 2011
Land surface elevation: 10.11 m
USGS station number: 384102121415502

Core: 10b #6A
Section 6 of 6 (7.11–8.64 meters; 23.33–28.33 feet)

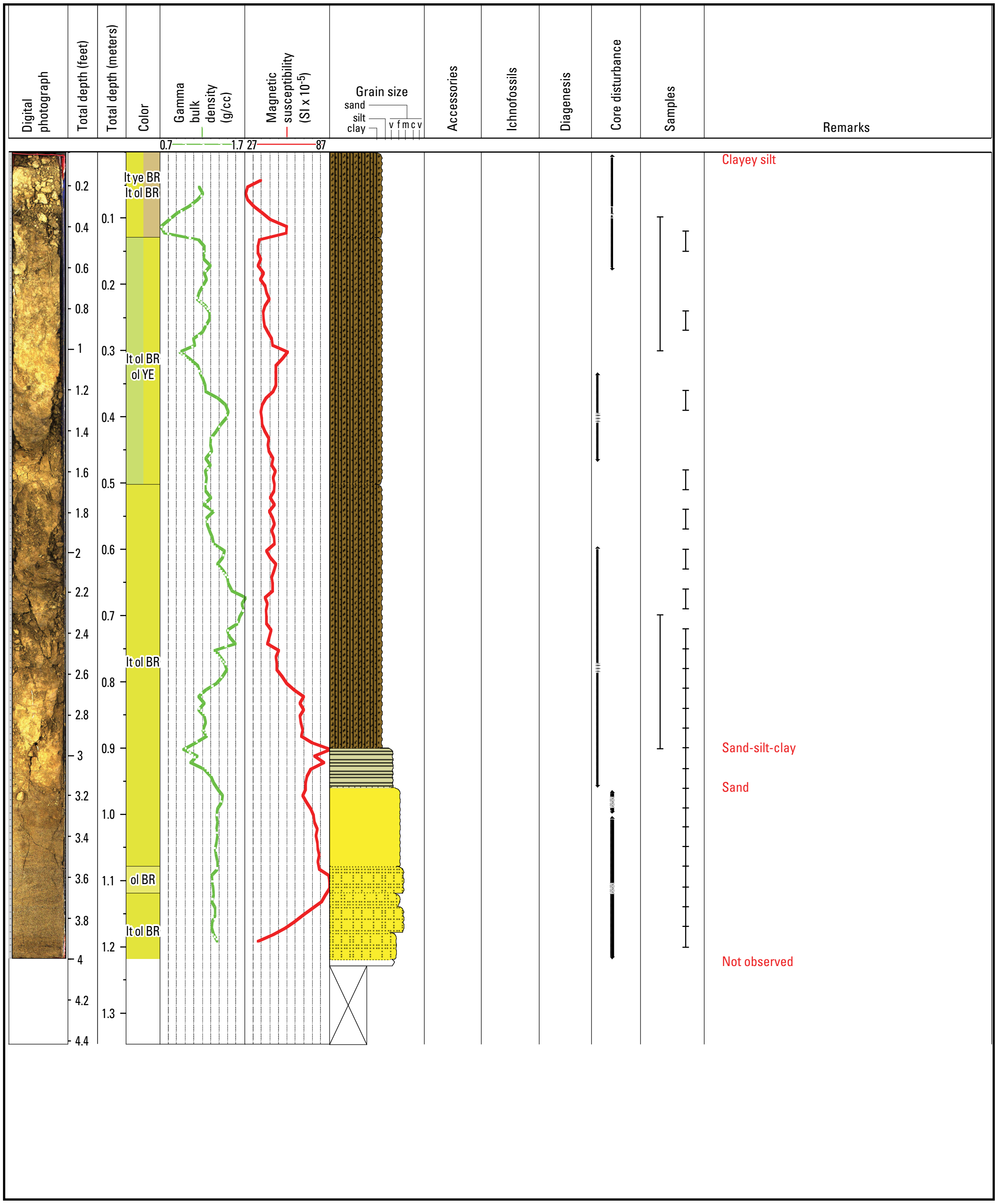


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11c
Collected: Aug. 23, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421403

Core: 11c #1A
Section 1 of 10 (0–1.35 meters; 0–4.42 feet)

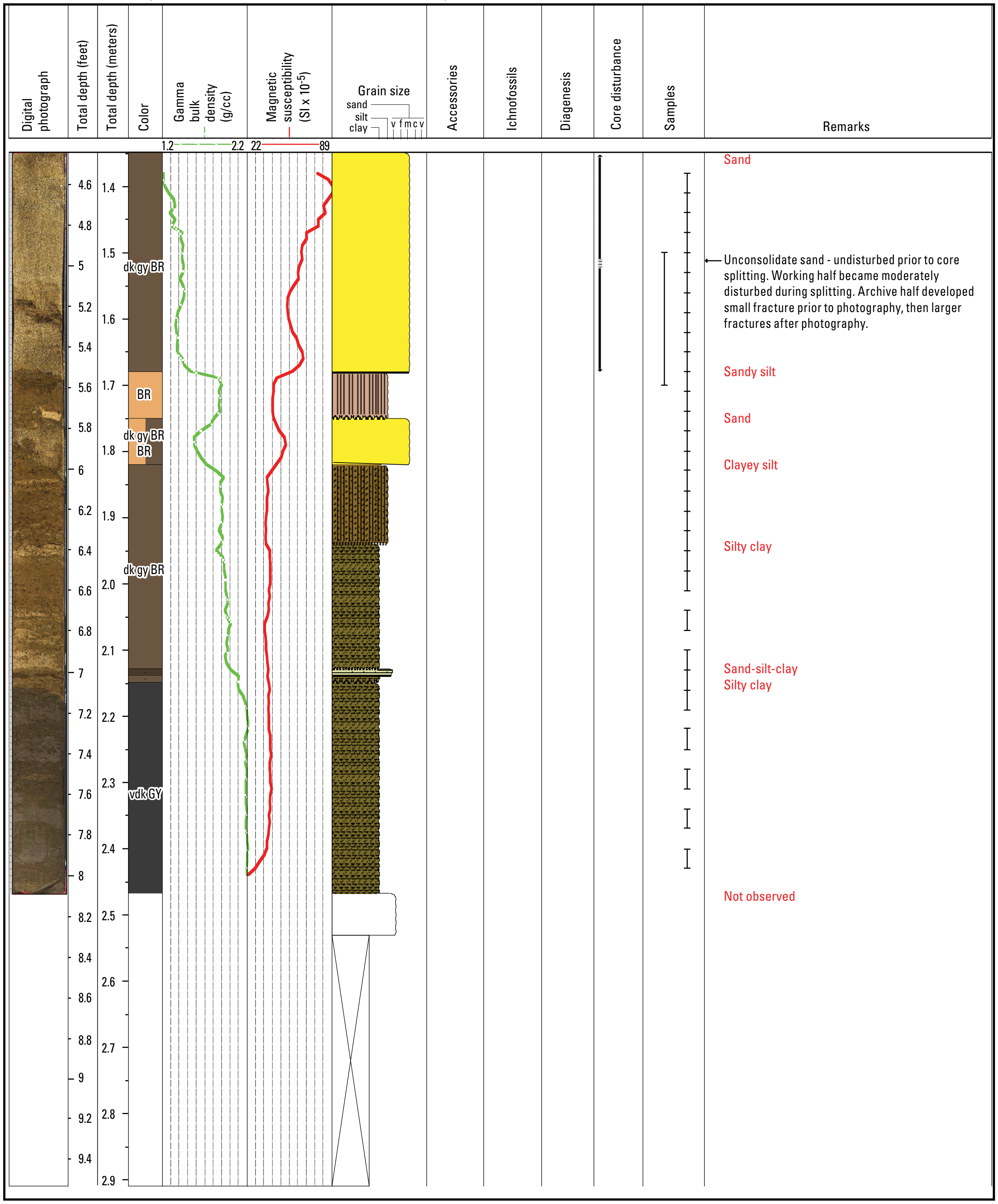


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11c
Collected: Aug. 23, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421403

Core: 11c #2A
Section 2 of 10 (1.35–2.91 meters; 4.42–9.54 feet)

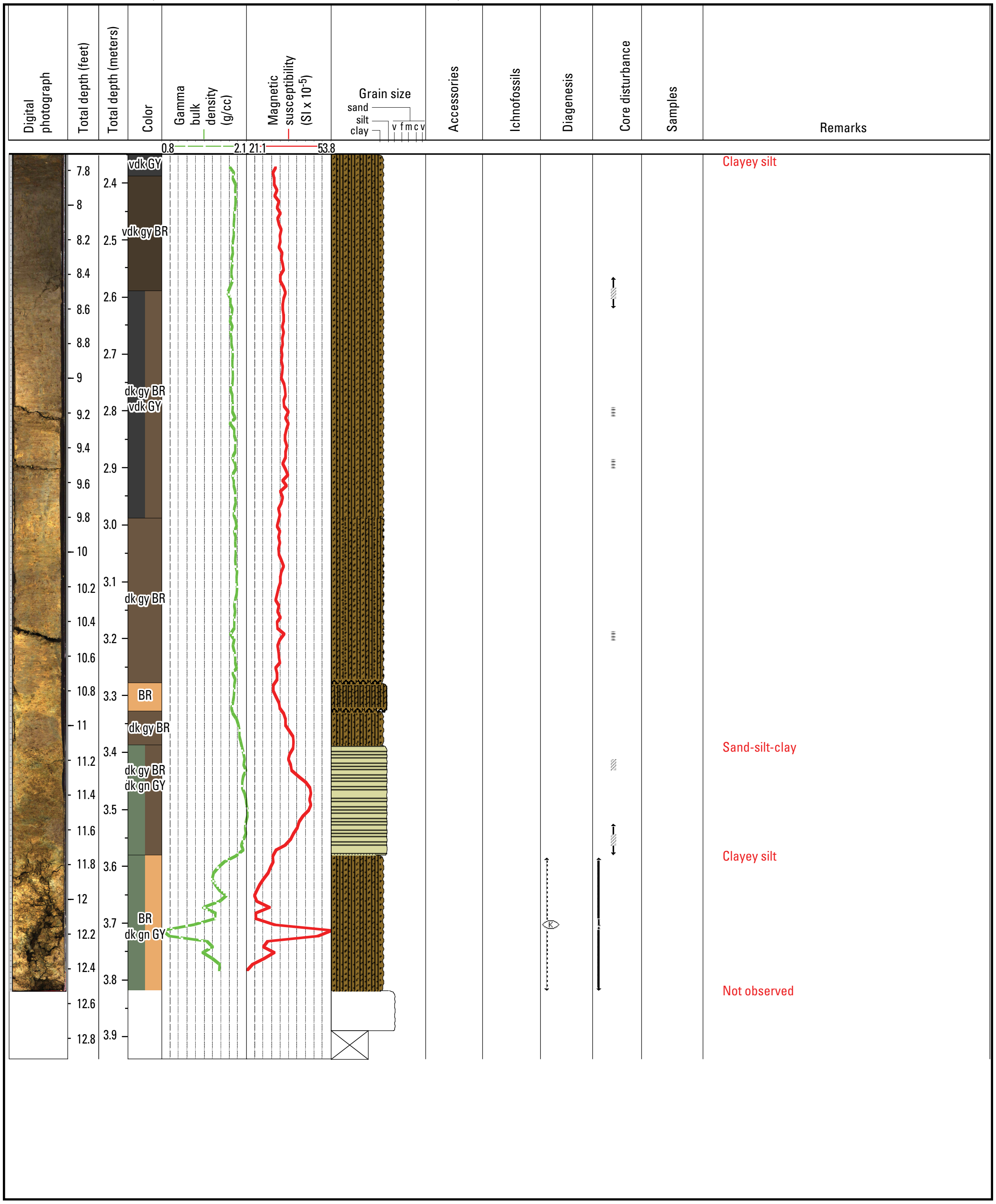


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

Core: 11b #3A
Section 3 of 10 (2.35–3.94 meters; 7.71–12.92 feet)

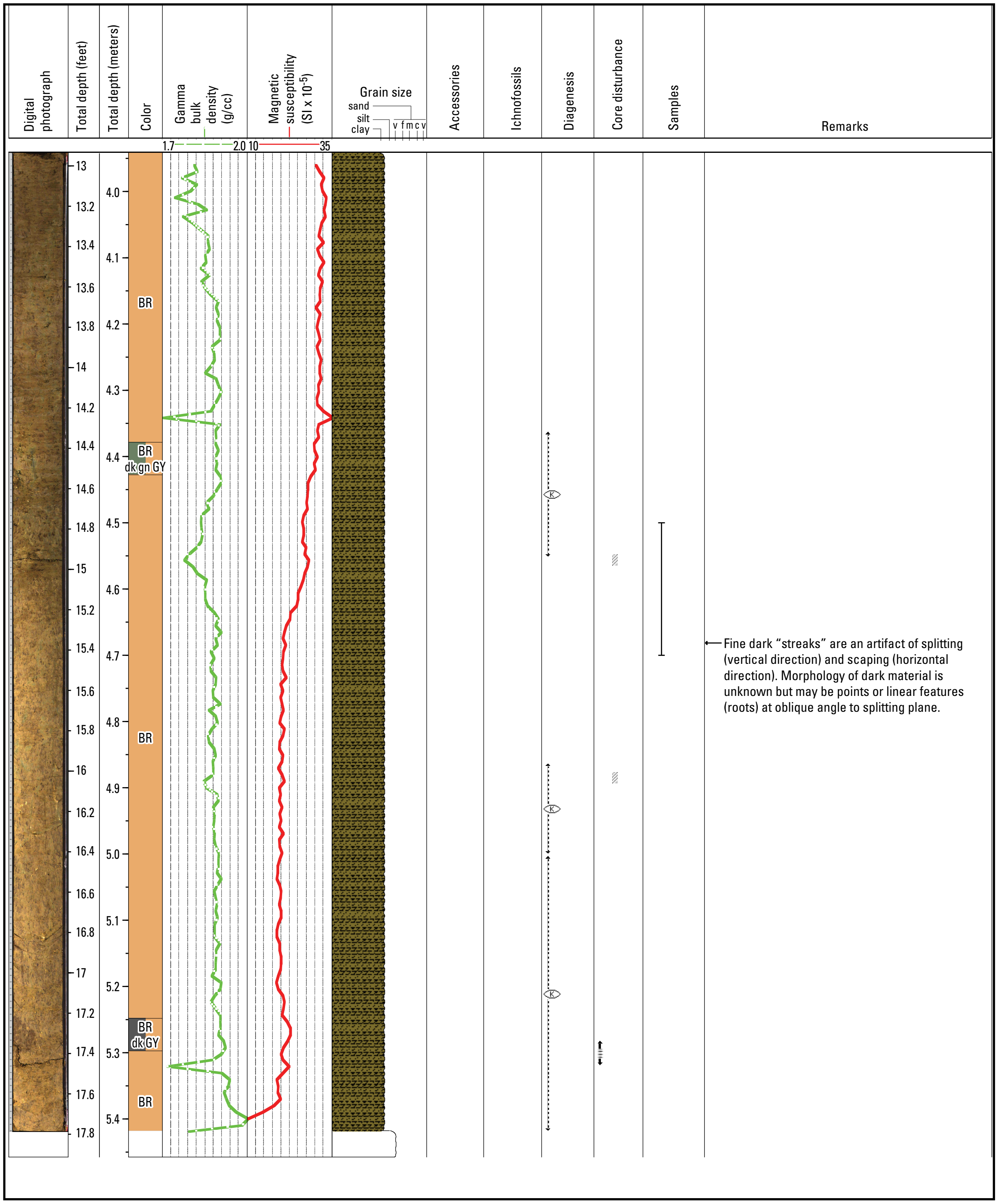


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

Core: 11b #4A
Section 4 of 10 (3.94–5.46 meters; 12.92–17.92 feet)

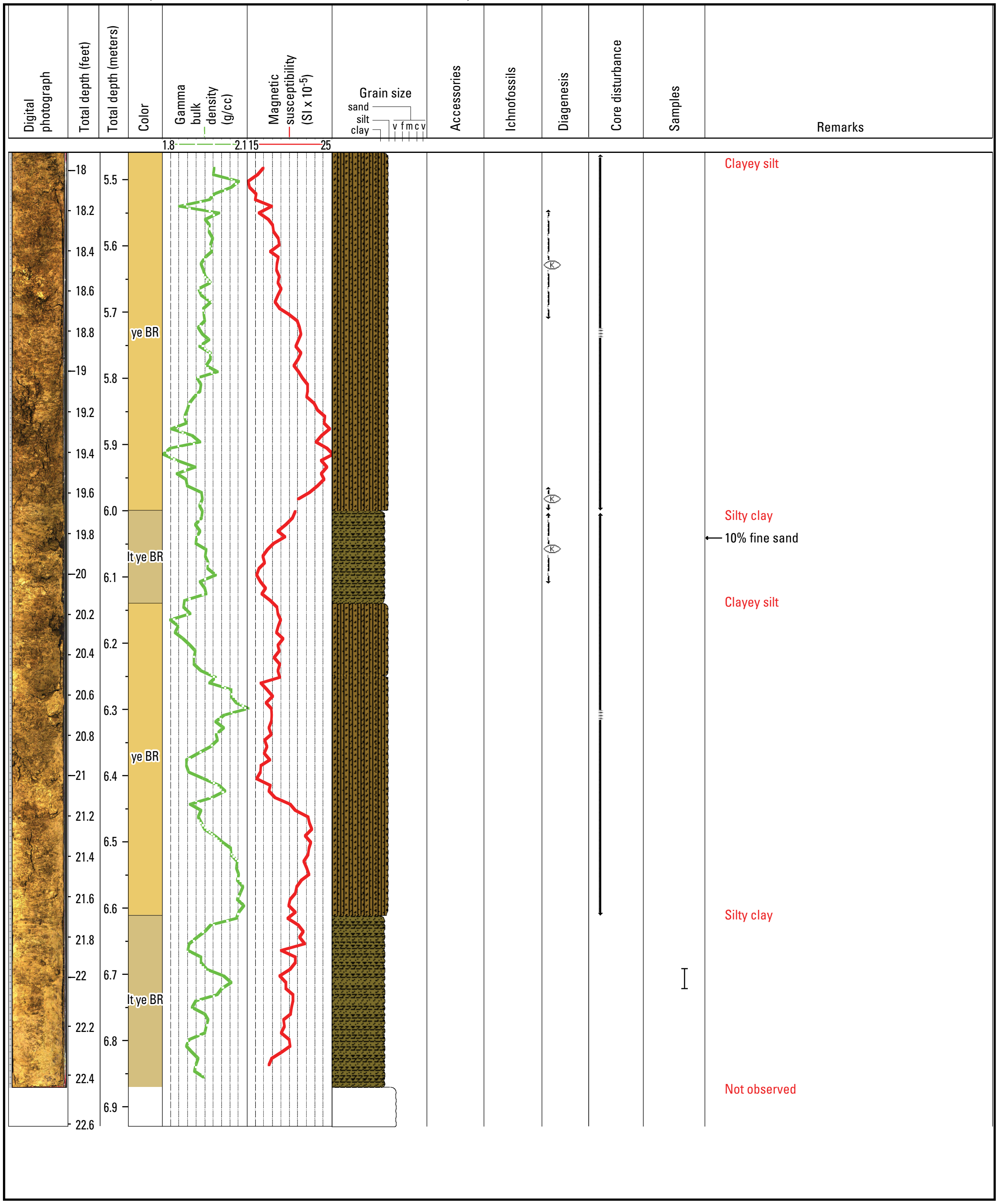


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

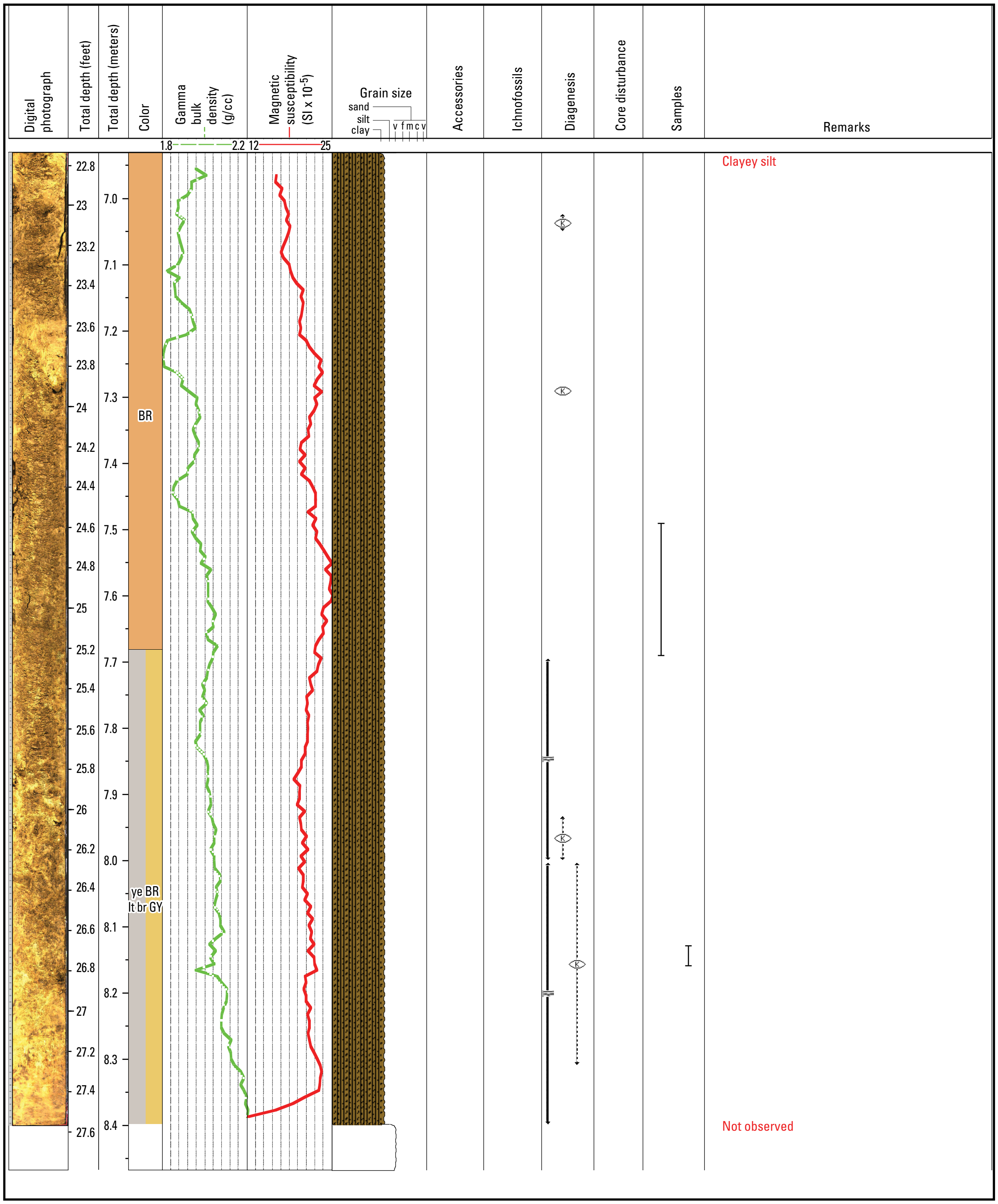
Core: 11b #5A
Section 5 of 10 (5.46–6.93 meters; 17.92–22.75 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

Core: 11b #6A
Section 6 of 10 (6.93–8.47 meters; 22.75–27.79 feet)

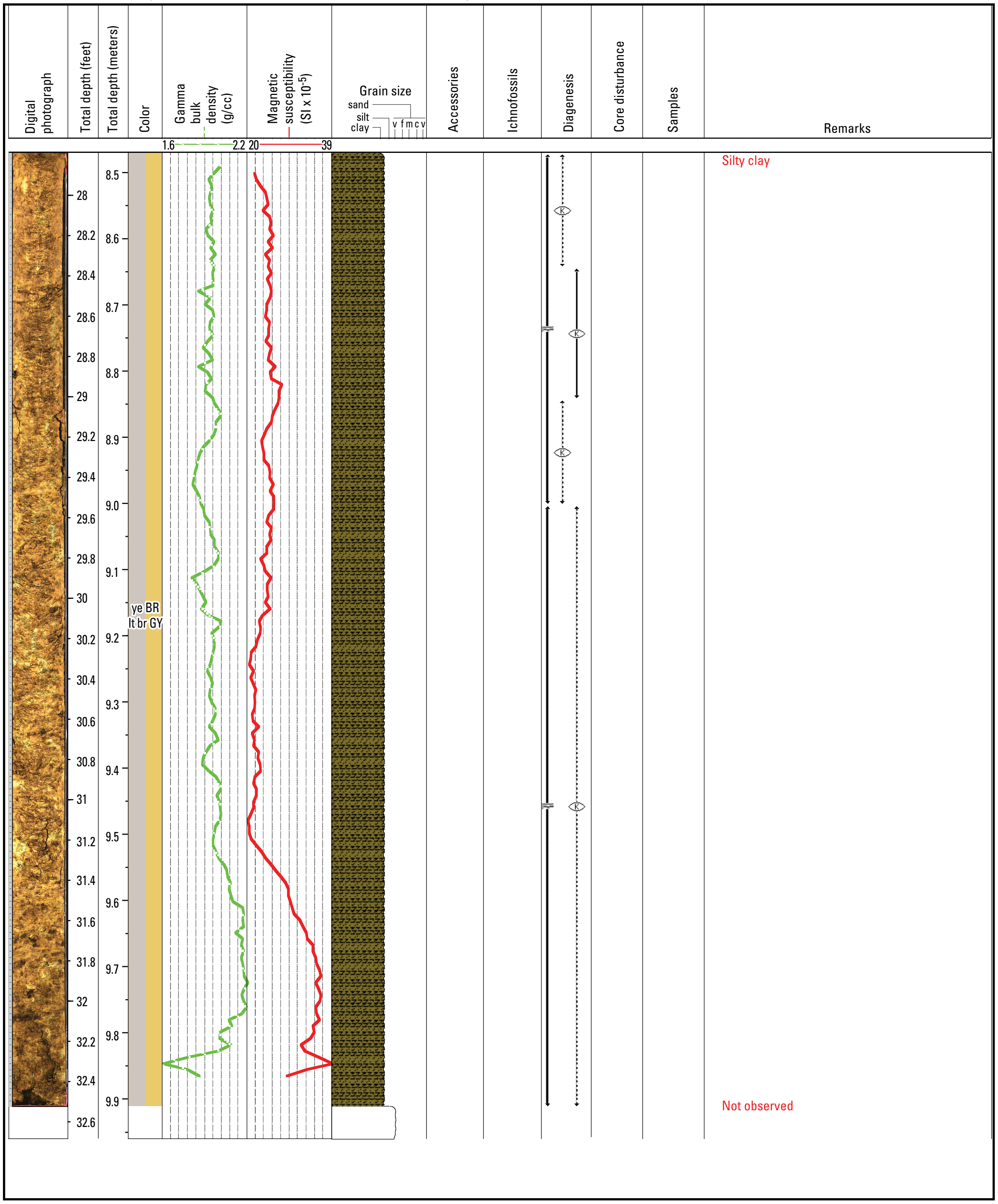


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

Core: 11b #7A
Section 7 of 10 (8.47–9.96 meters; 27.79–32.68 feet)

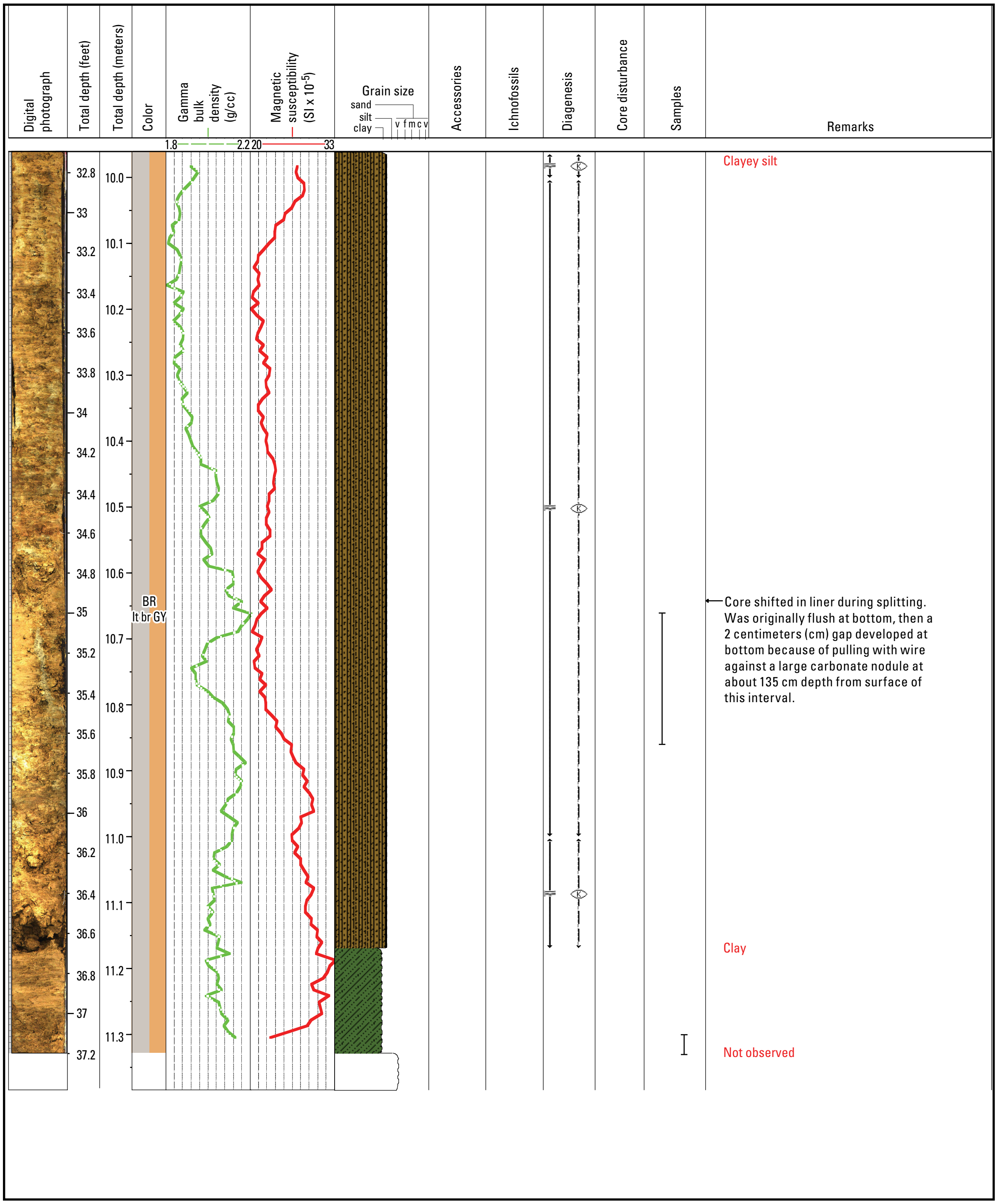


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

Core: 11b #8A
Section 8 of 10 (9.96–11.39 meters; 32.68–37.37 feet)

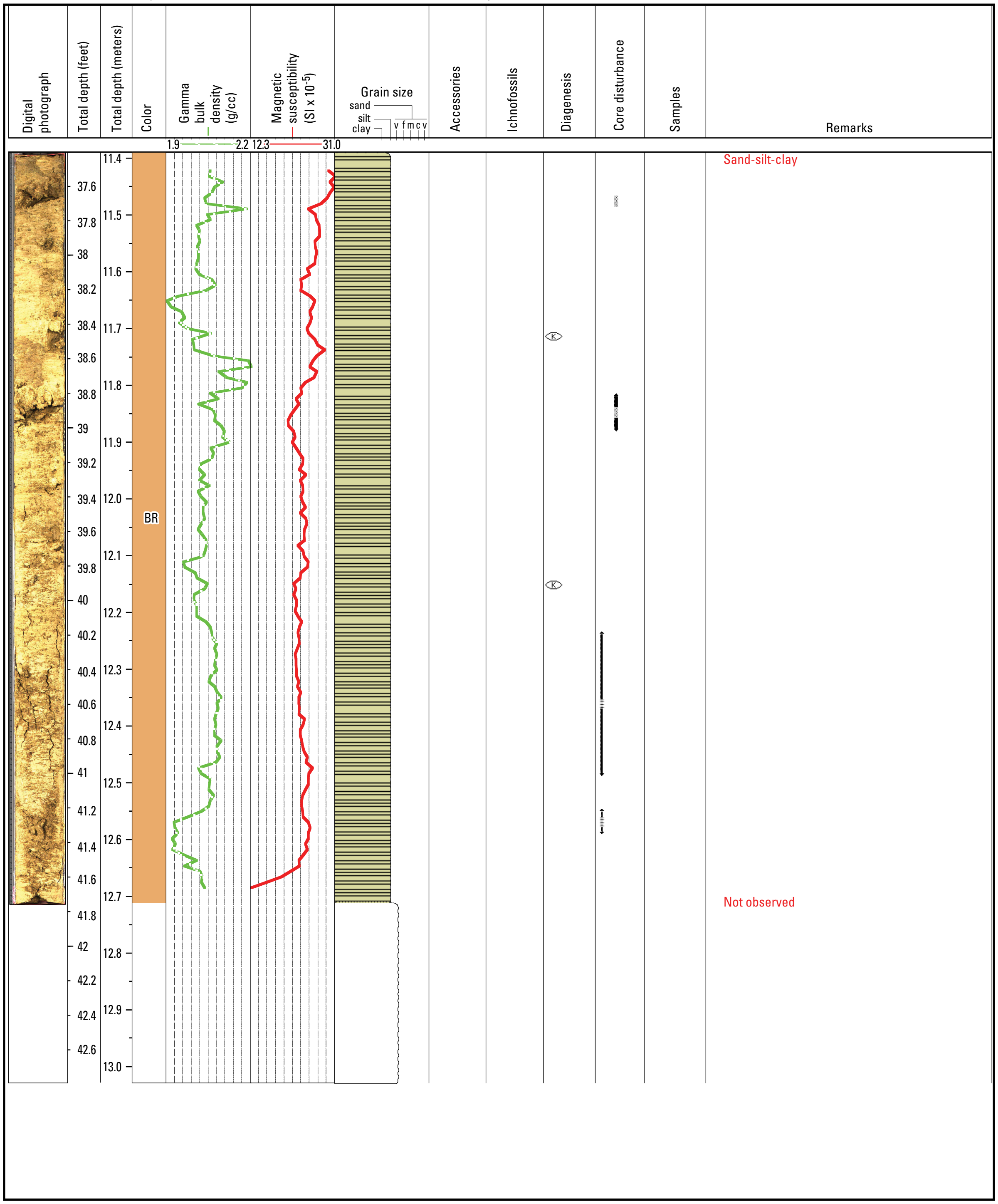


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

Core: 11b #9A
Section 9 of 10 (11.39–13.03 meters; 37.37–42.75 feet)

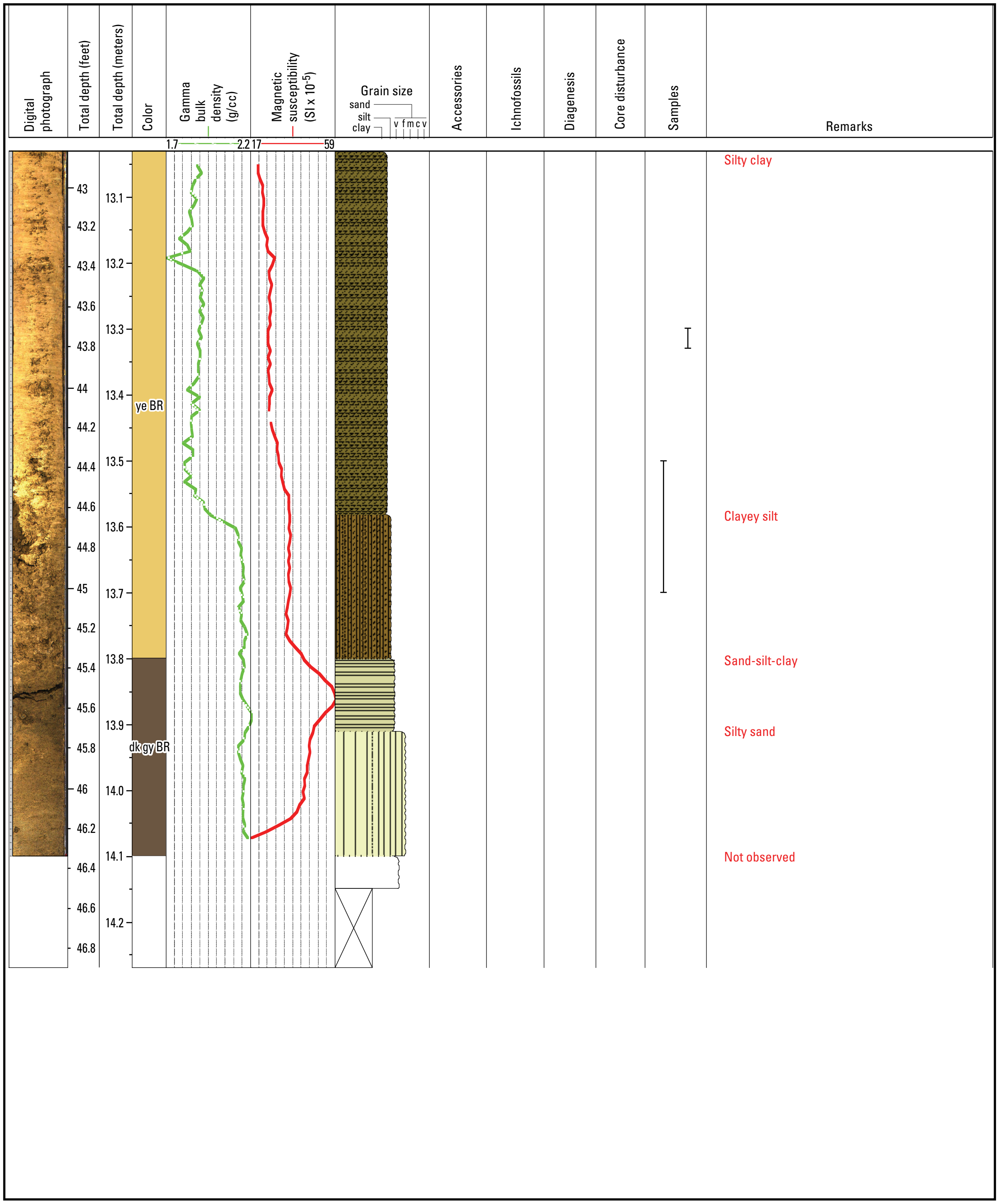


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-11b
Collected: Aug. 22, 2012
Land surface elevation: 10.37 m
USGS station number: 384102121421402

Core: 11b #10A
Section 10 of 10 (13.03–14.27 meters; 42.75–46.83 feet)

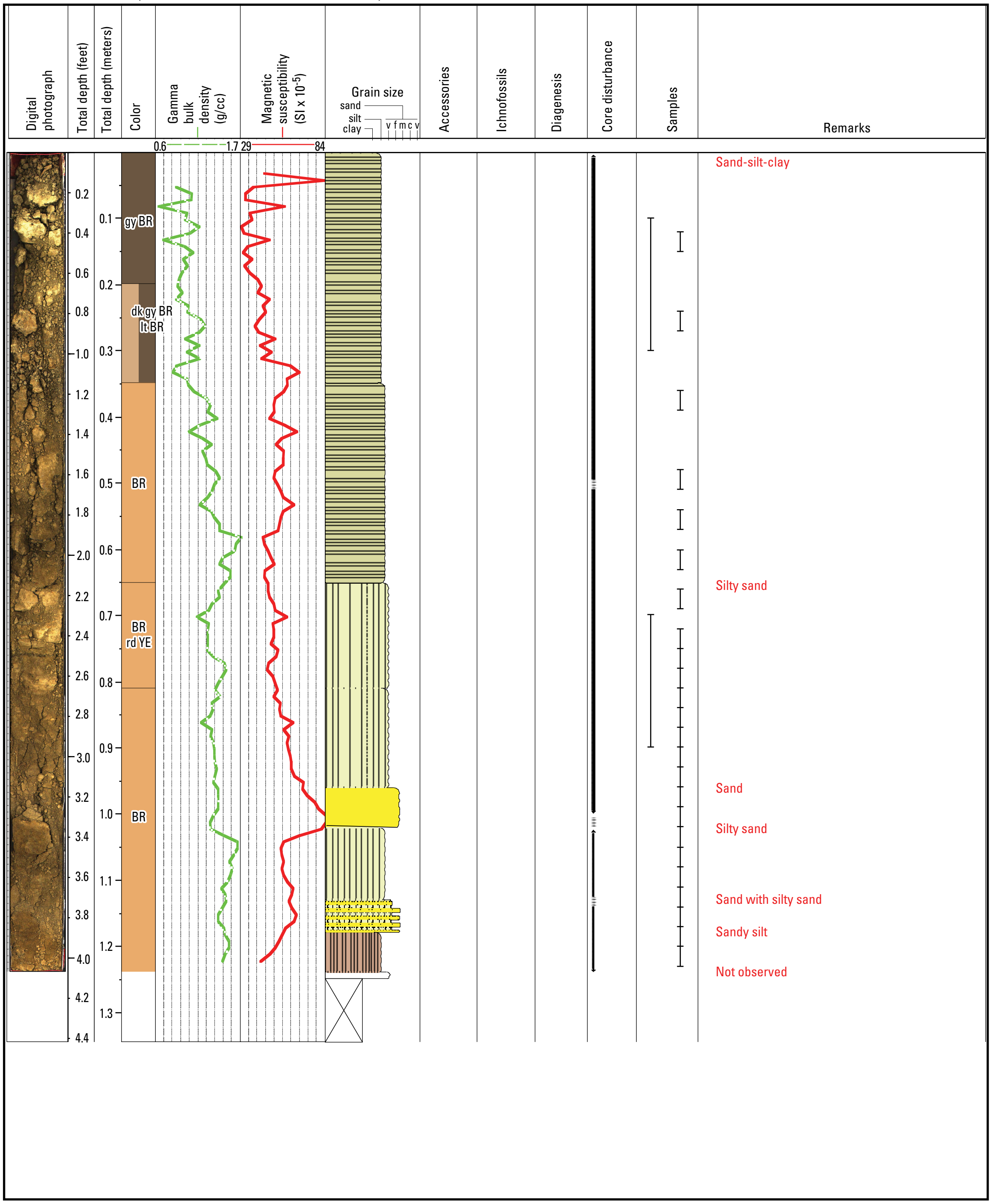


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-12a
Collected: Aug. 21, 2012
Land surface elevation: 10.23 m
USGS station number: 384103121412901

Core: 12a #1A
Section 1 of 6 (0–1.35 meters; 0–4.42 feet)

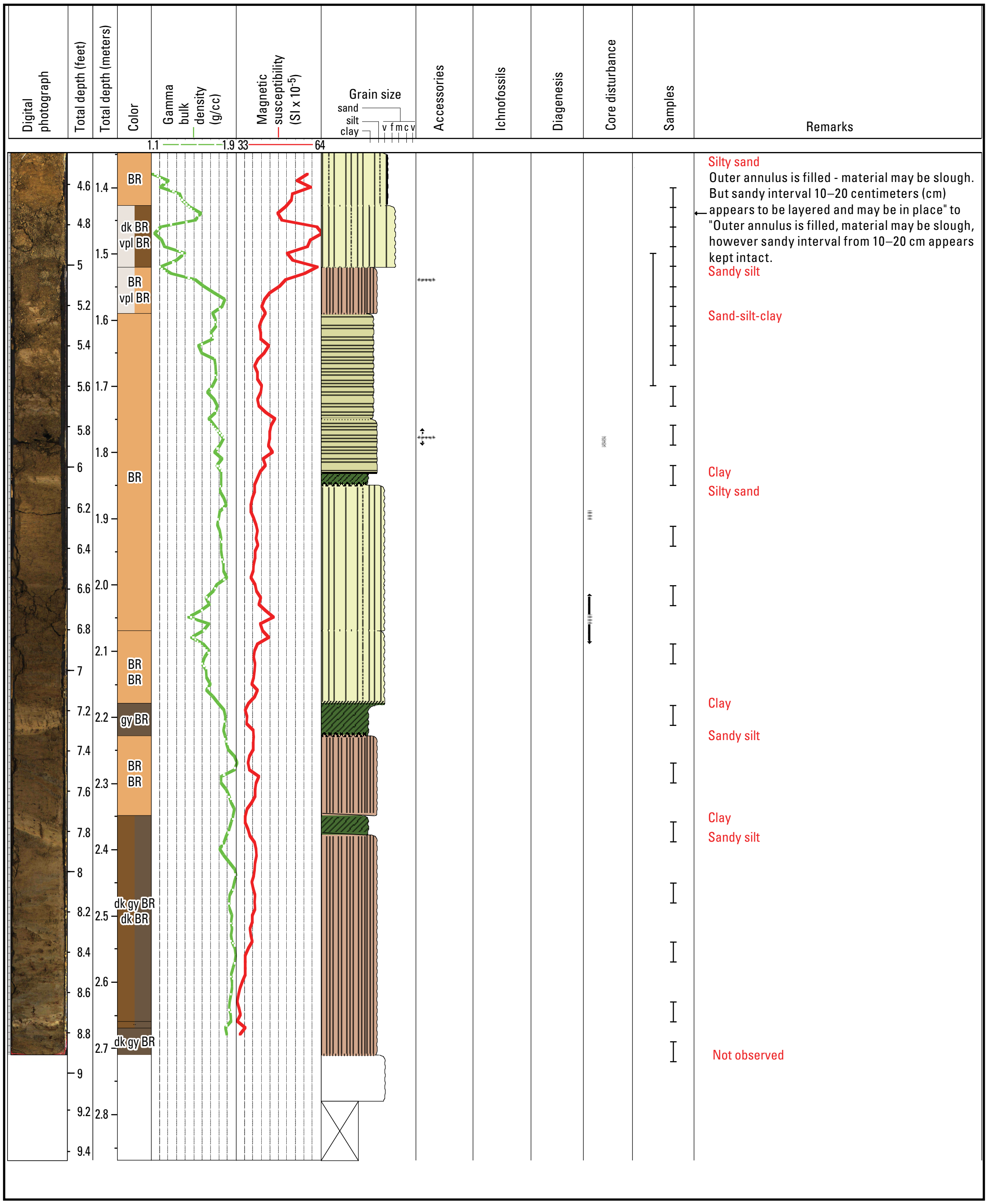


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-12a
Collected: Aug. 21, 2012
Land surface elevation: 10.23 m
USGS station number: 384103121412901

Core: 12a #2A
Section 2 of 6 (1.35–2.87 meters; 4.42–9.42 feet)

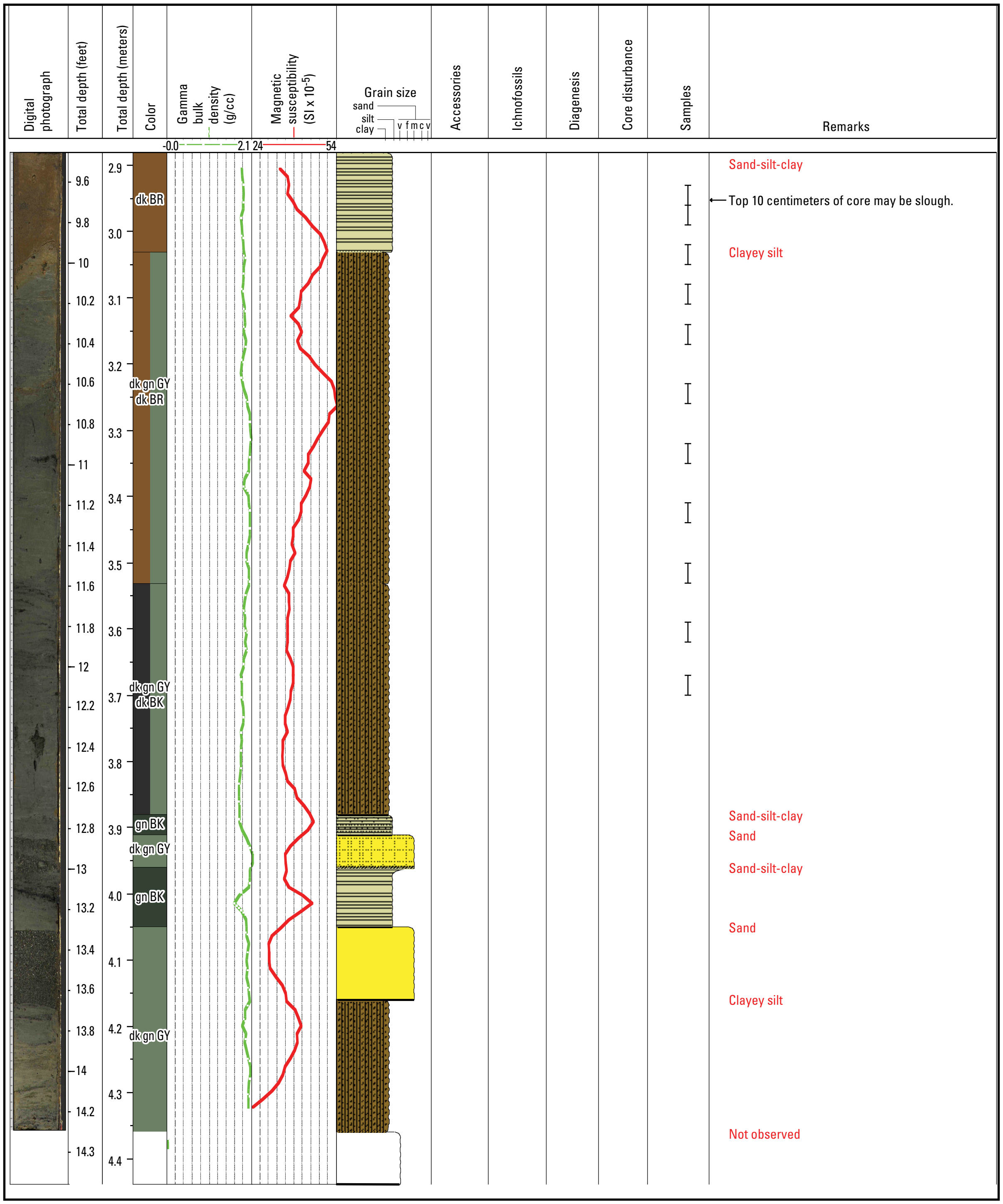


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-12a
Collected: Aug. 21, 2012
Land surface elevation: 10.23 m
USGS station number: 384103121412901

Core: 12a #3A
Section 3 of 6 (2.87–4.44 meters; 9.42–14.58 feet)

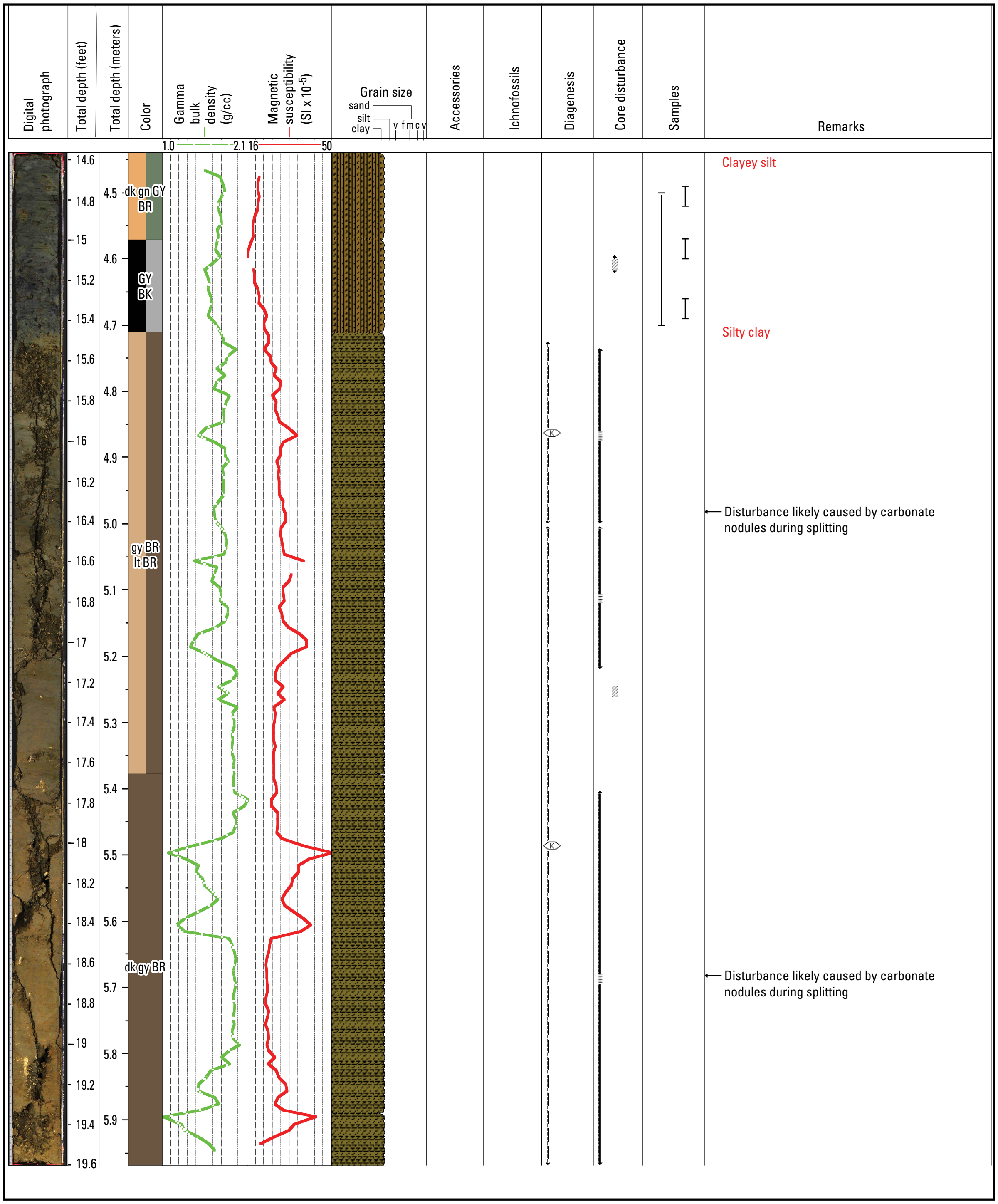


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-12a
Collected: Aug. 21, 2012
Land surface elevation: 10.23 m
USGS station number: 384103121412901

Core: 12a #4A
Section 4 of 6 (4.44–5.97 meters; 14.58–19.58 feet)

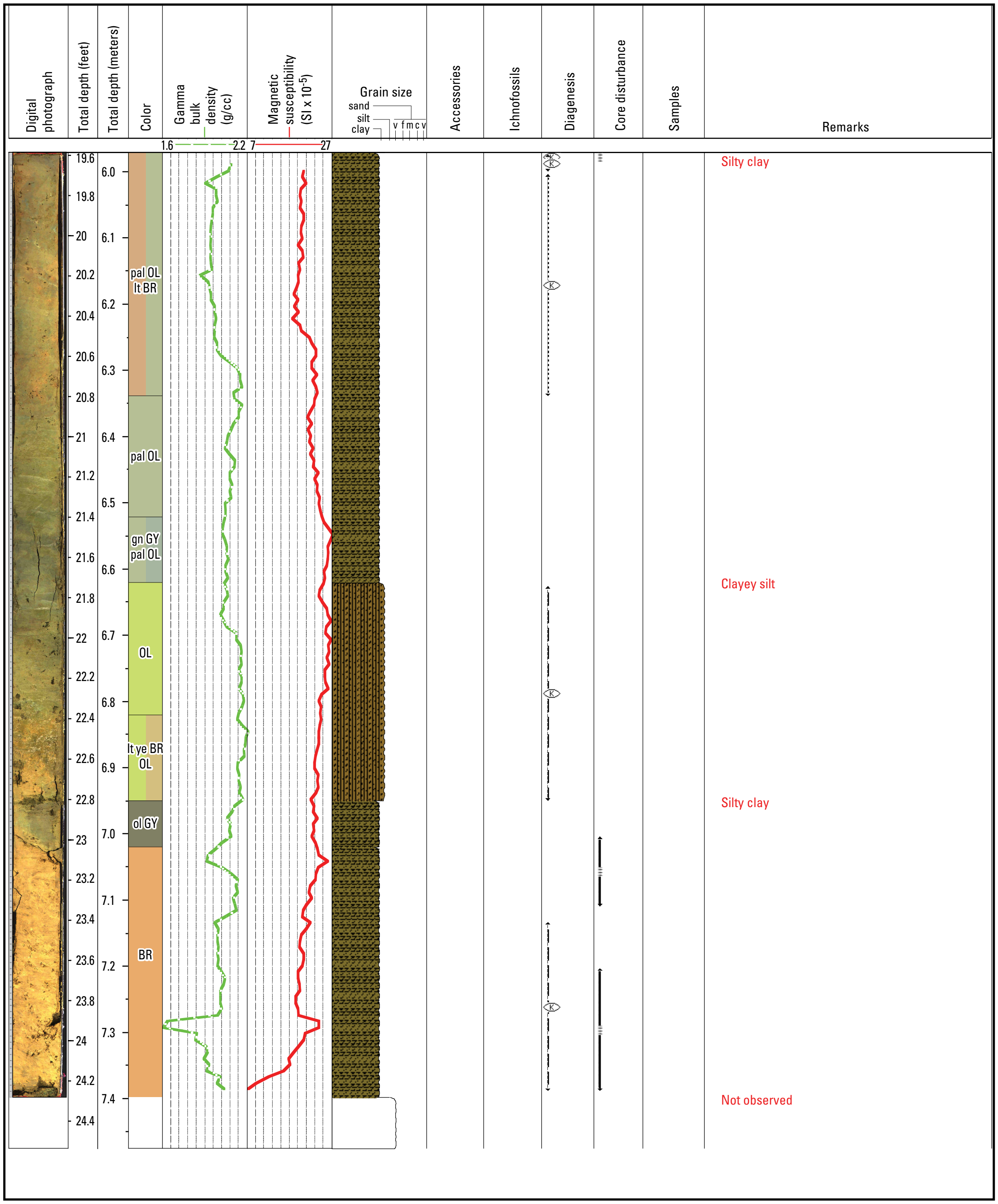


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-12a
Collected: Aug. 21, 2012
Land surface elevation: 10.23 m
USGS station number: 384103121412901

Core: 12a #5A
Section 5 of 6 (5.97–7.48 meters; 19.58–24.54 feet)

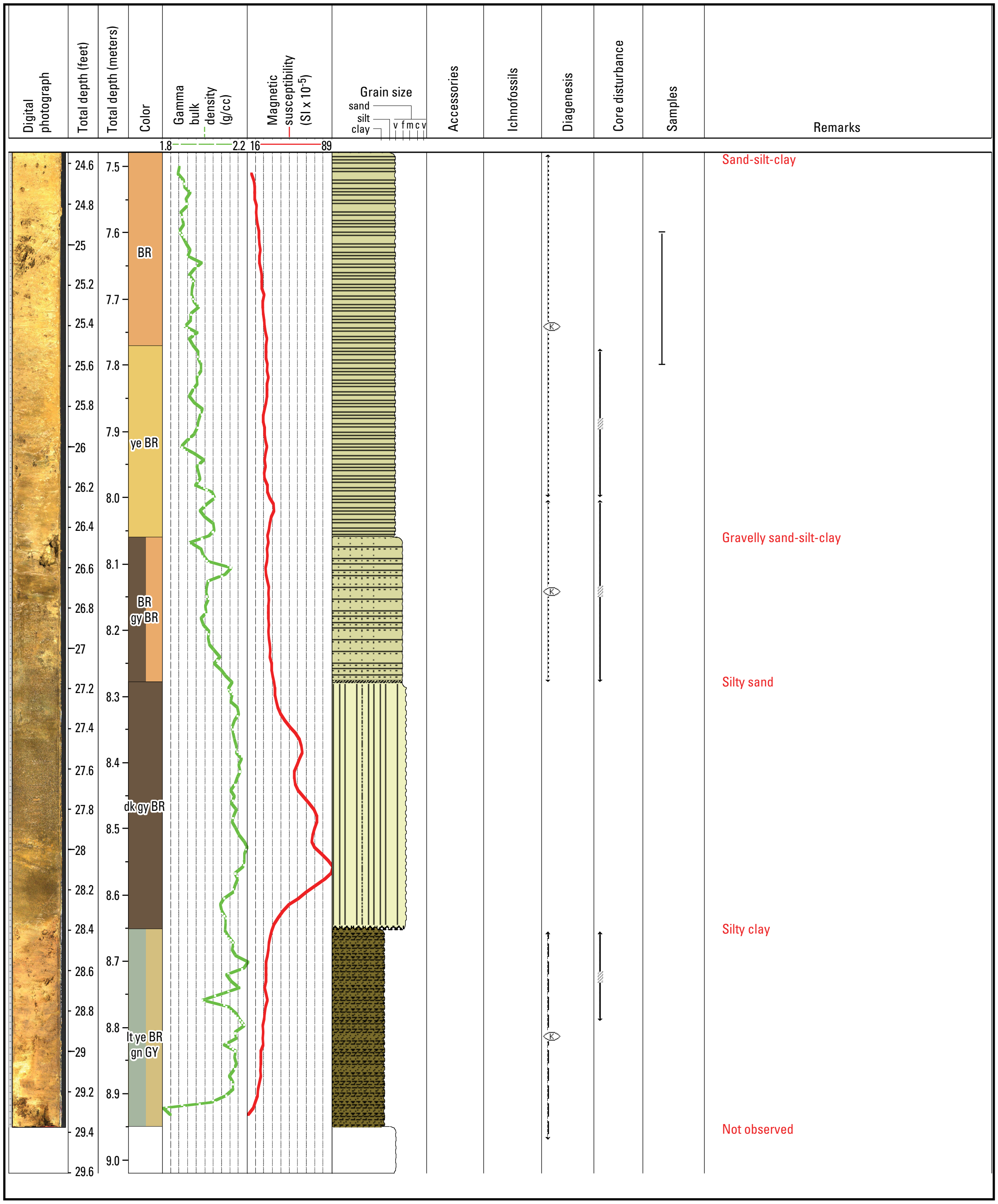


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-12a
Collected: Aug. 21, 2012
Land surface elevation: 10.23 m
USGS station number: 384103121412901

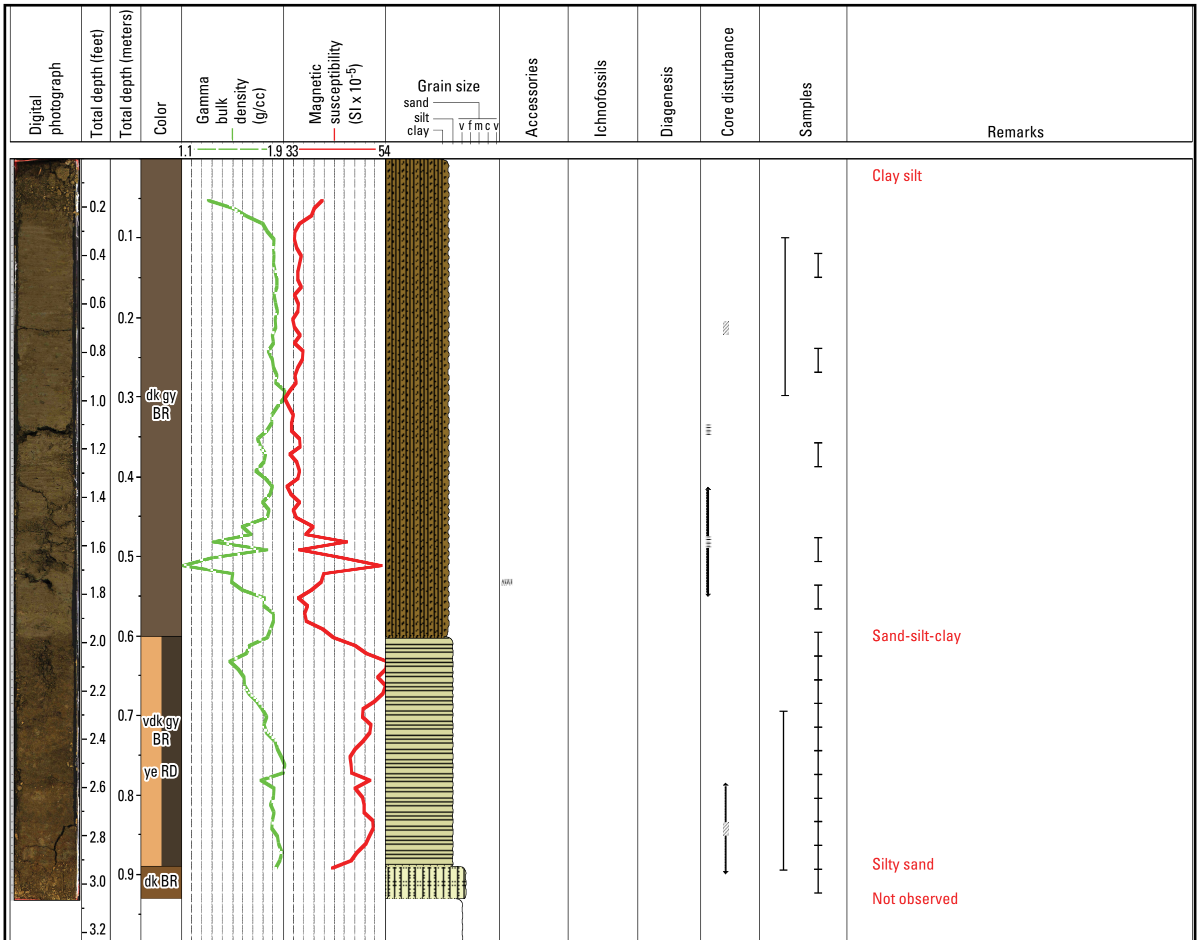
Core: 12a #6A
Section 6 of 6 (7.48–9.02 meters; 24.54–29.58 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-13b
Collected: Aug. 23, 2012
Core: 13b #1A
Land surface elevation: 9.75 m
Section 1 of 6 (0–0.99 meters; 0–3.25 feet)
USGS station number: 384102121405702

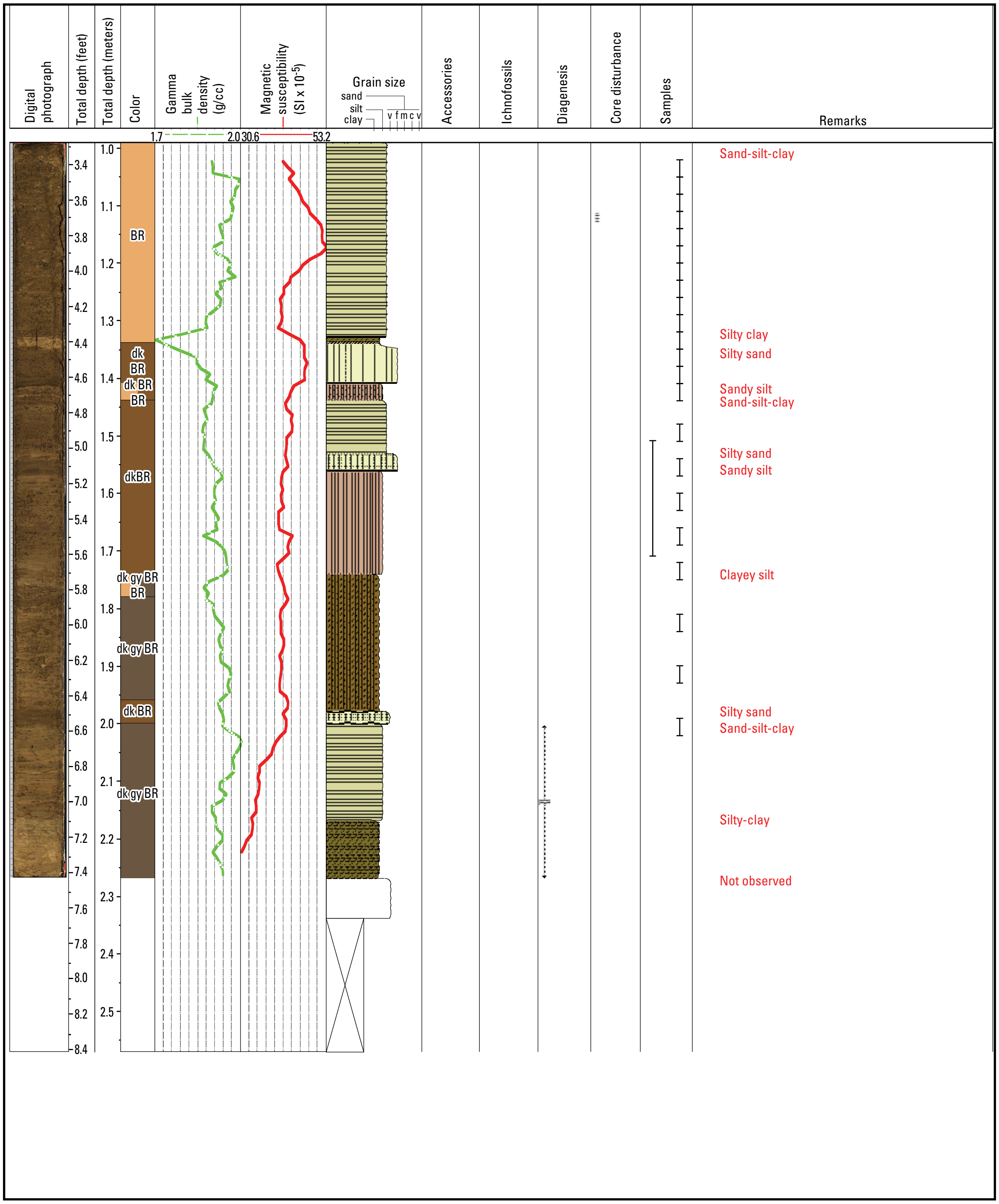


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-13b
Collected: Aug. 23, 2012
Land surface elevation: 9.75 m
USGS station number: 384102121405702

Core: 13b #2A
Section 2 of 6 (0.99–2.57 meters; 3.25–8.42 feet)

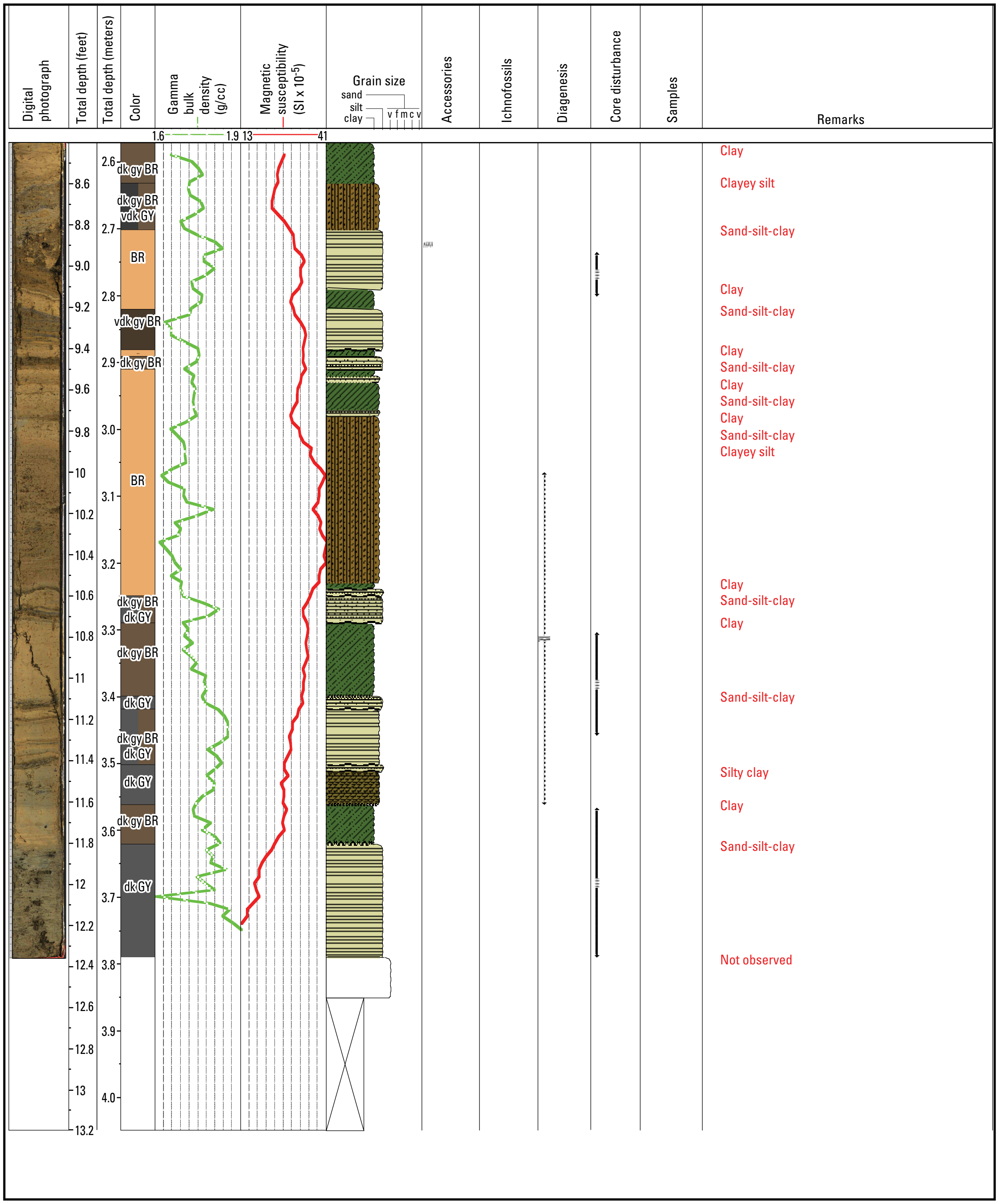


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-13b
Collected: Aug. 23, 2012
Land surface elevation: 9.75 m
USGS station number: 384102121405702

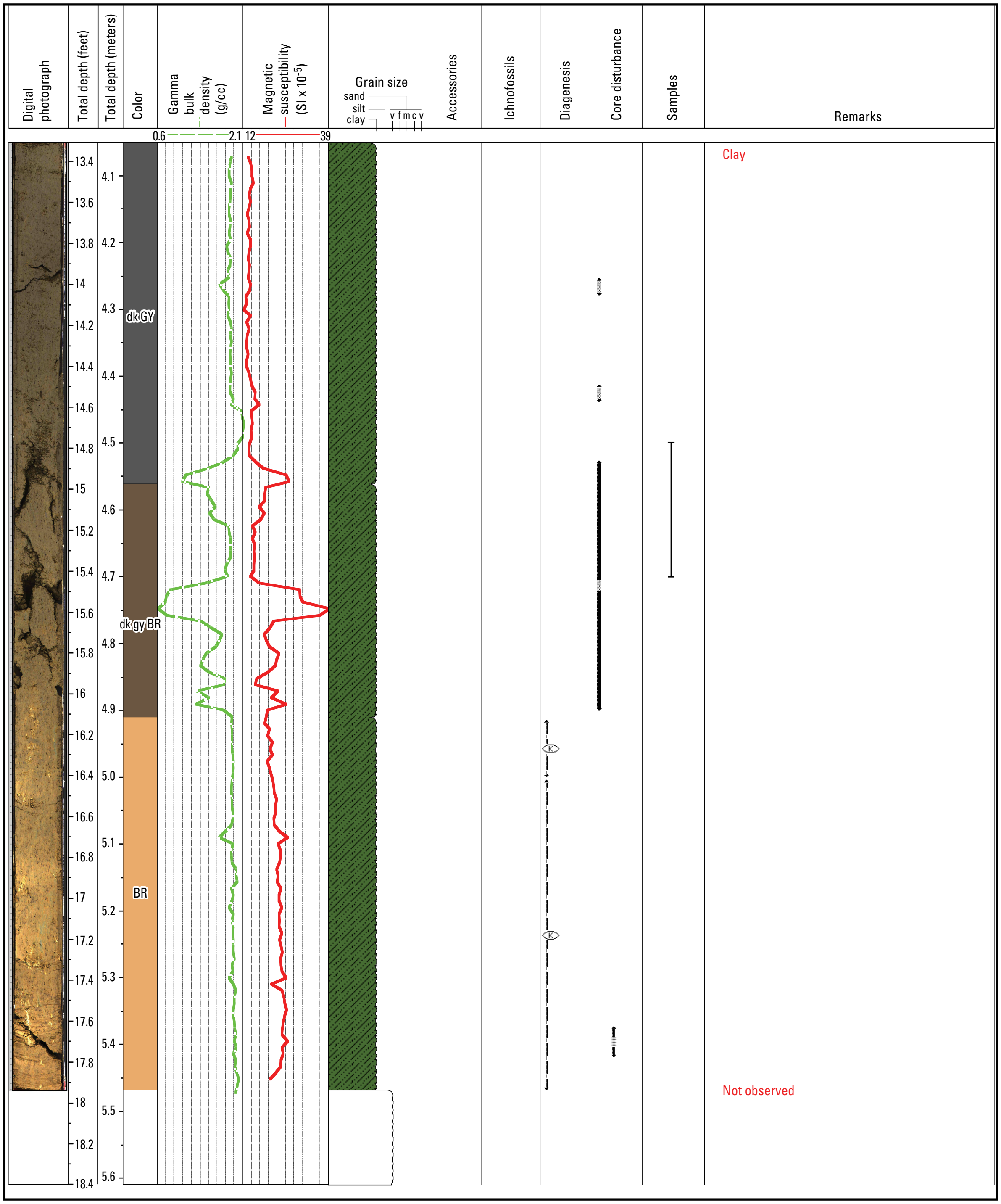
Core: 13b #3A
Section 3 of 6 (2.57–4.05 meters, 8.42–13.29 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-13b
Collected: Aug. 23, 2012
Land surface elevation: 9.75 m
USGS station number: 384102121405702

Core: 13b #4A
Section 4 of 6 (4.05–5.61 meters; 13.29–18.42 feet)

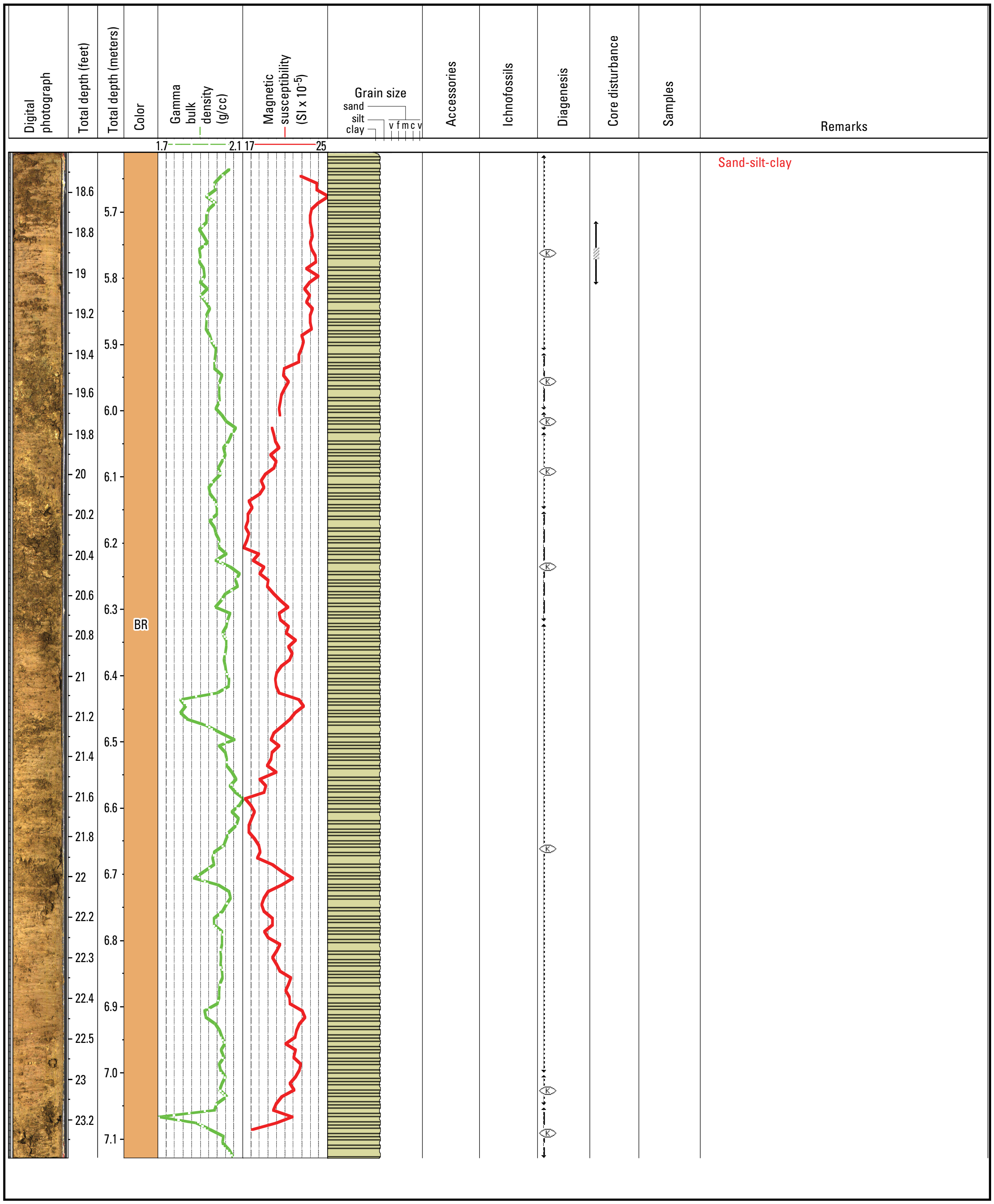


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-13b
Collected: Aug. 23, 2012
Land surface elevation: 9.75 m
USGS station number: 384102121405702

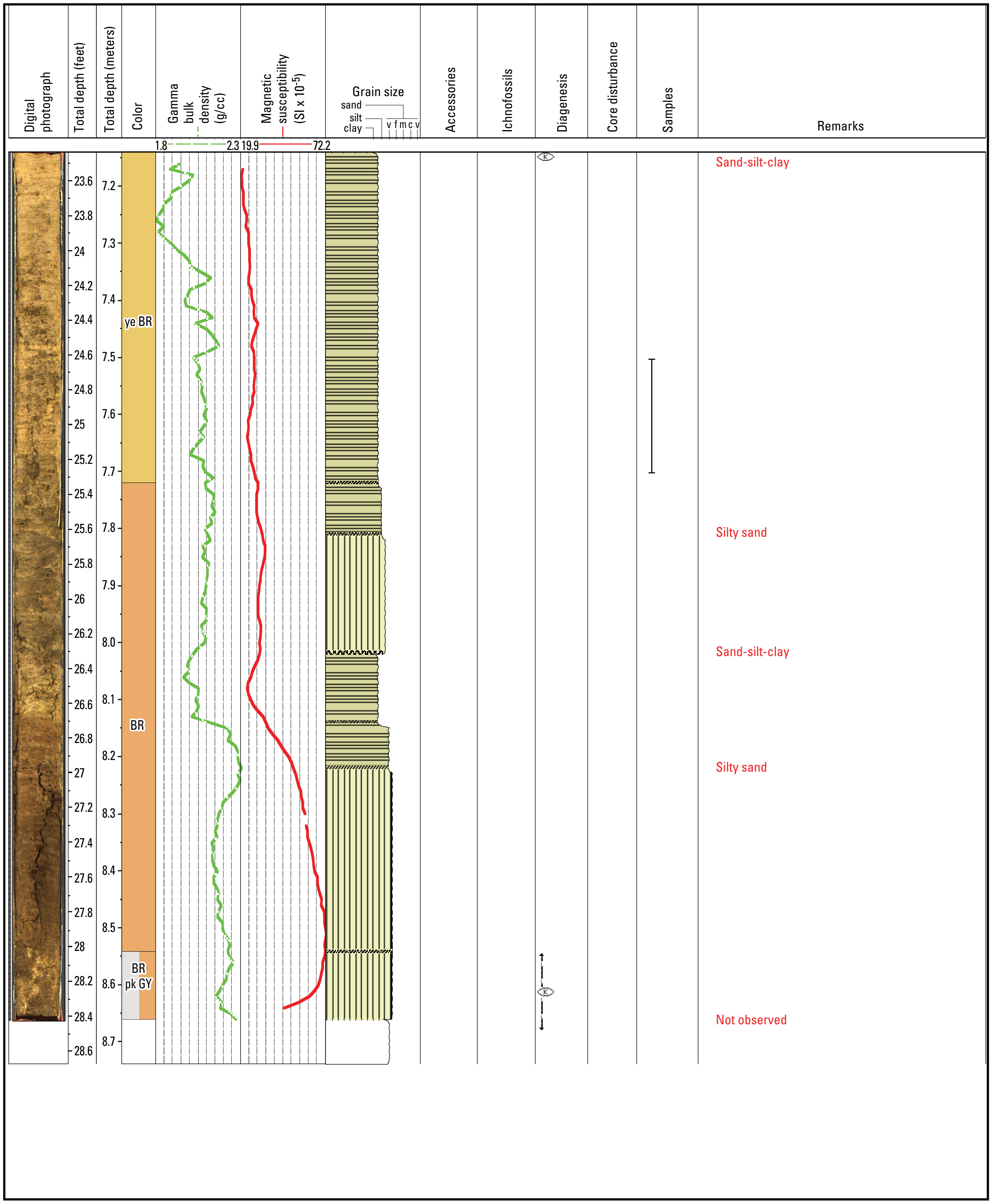
Core: 13b #5A
Section 5 of 6 (5.61–7.14 meters; 18.42–23.42 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-13b
Collected: Aug. 23, 2012
Land surface elevation: 9.75 m
USGS station number: 384102121405702

Core: 13b #6A
Section 6 of 6 (7.14–8.66 meters; 23.42–28.42 feet)

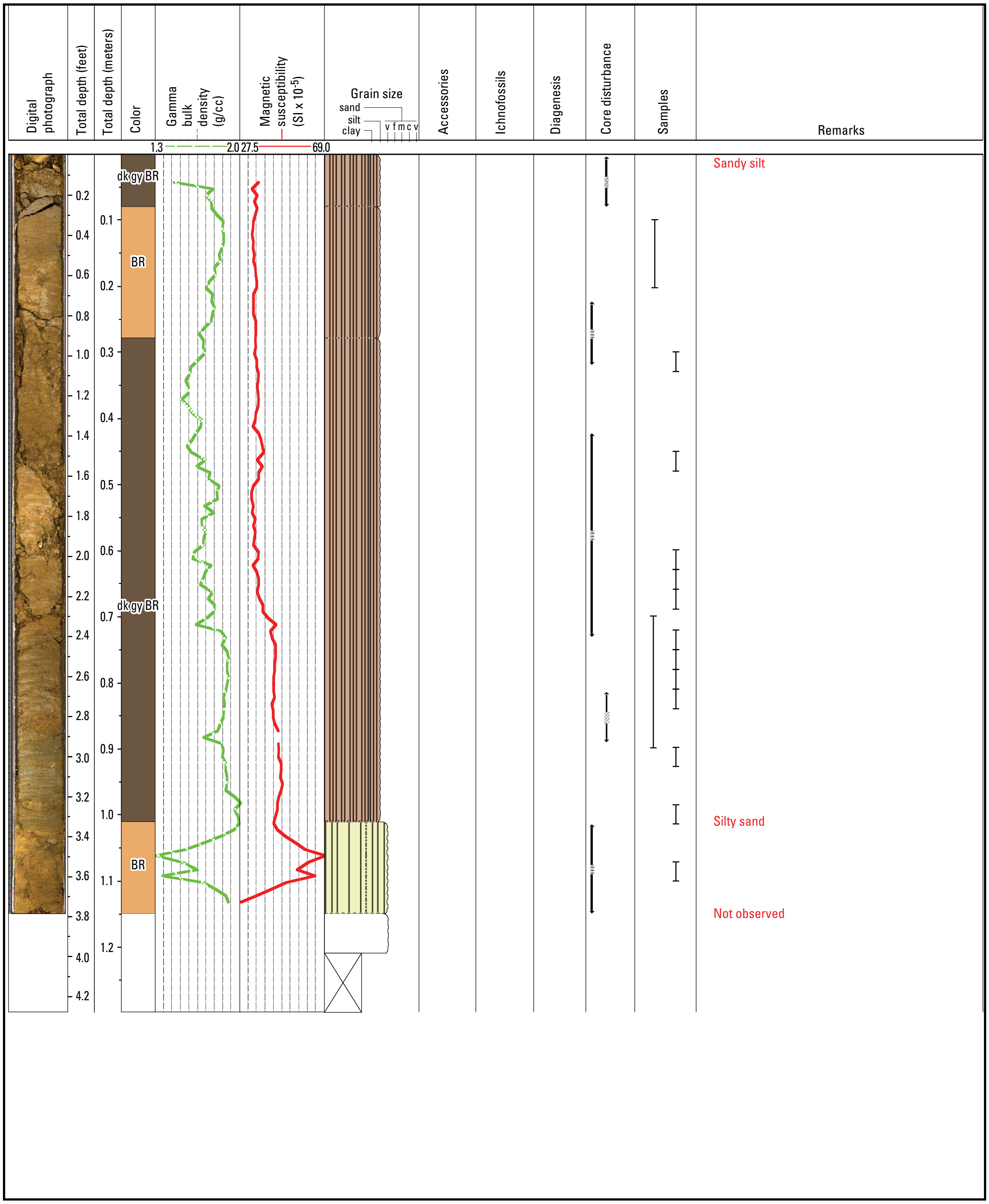


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-14a
Collected: Aug. 24, 2012
Land surface elevation: 9.20 m
USGS station number: 384153121405401

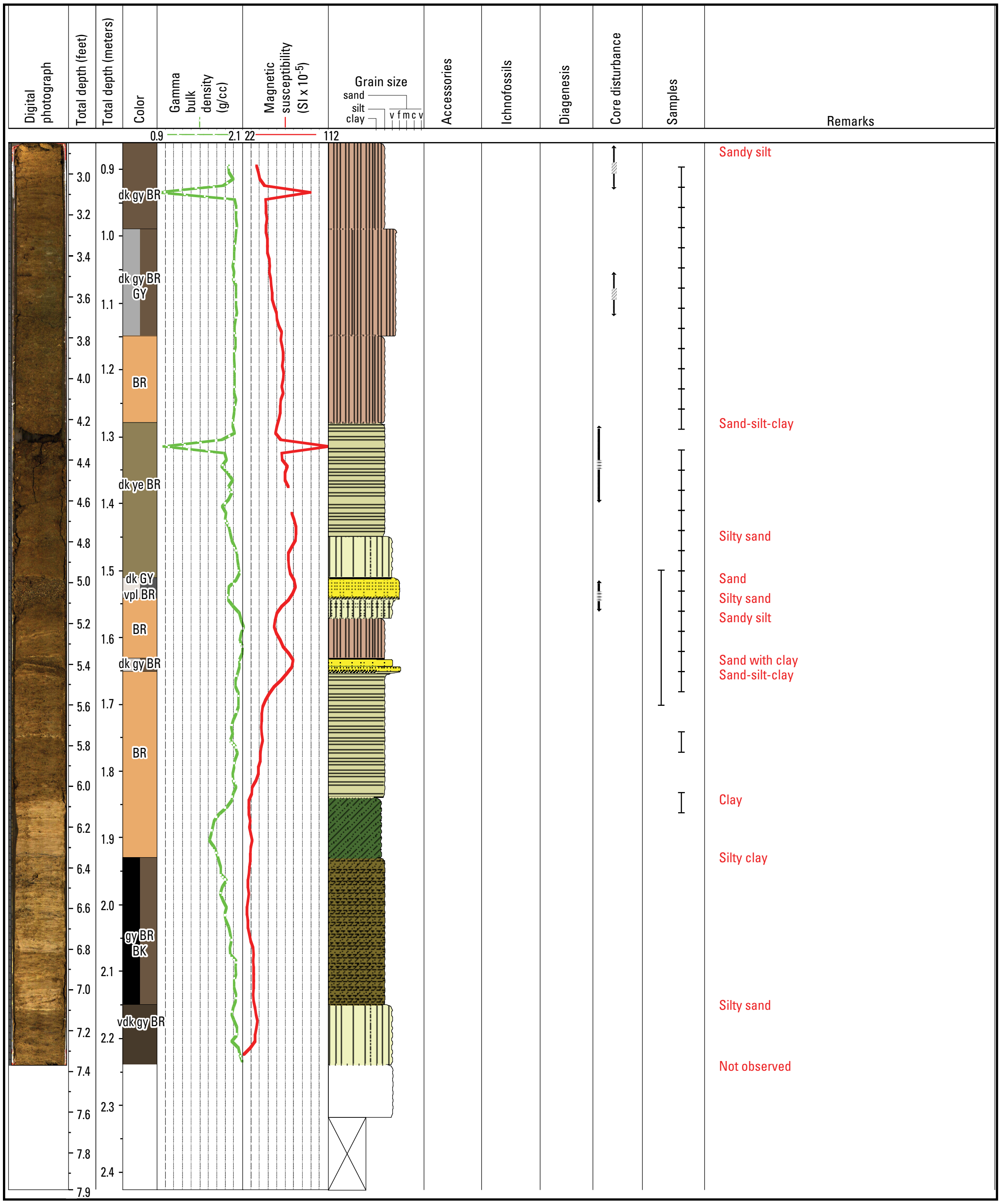
Core: 14a #1A
Section 1 of 6 (0–1.30 meters; 0–4.25 feet)



U.S. Geological Survey (USGS)
Cache Creek Settling Basin, Yolo County, Calif.

Site:Testhole-14b
Collected: Aug. 24, 2012
Land surface elevation: 9.20 m
USGS station number: 384153121405402

Core: 14b #2A
Section 2 of 6 (0.86–2.43 meters; 2.83–7.96 feet)

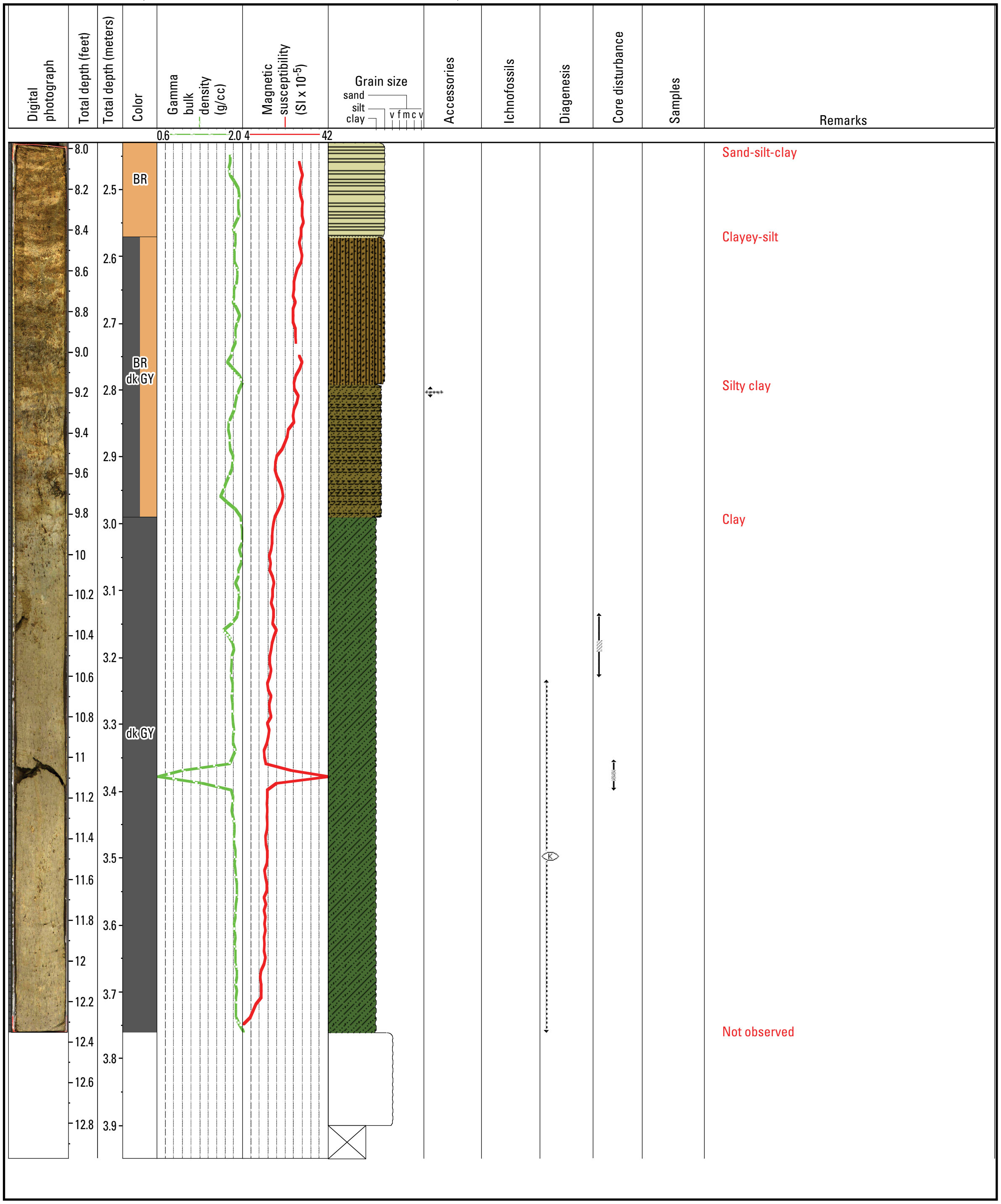


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-14b
Collected: Aug. 24, 2012
Land surface elevation: 9.20 m
USGS station number: 384153121405402

Core: 14b #3A
Section 3 of 6 (2.43–3.95 meters; 7.96–12.96 feet)

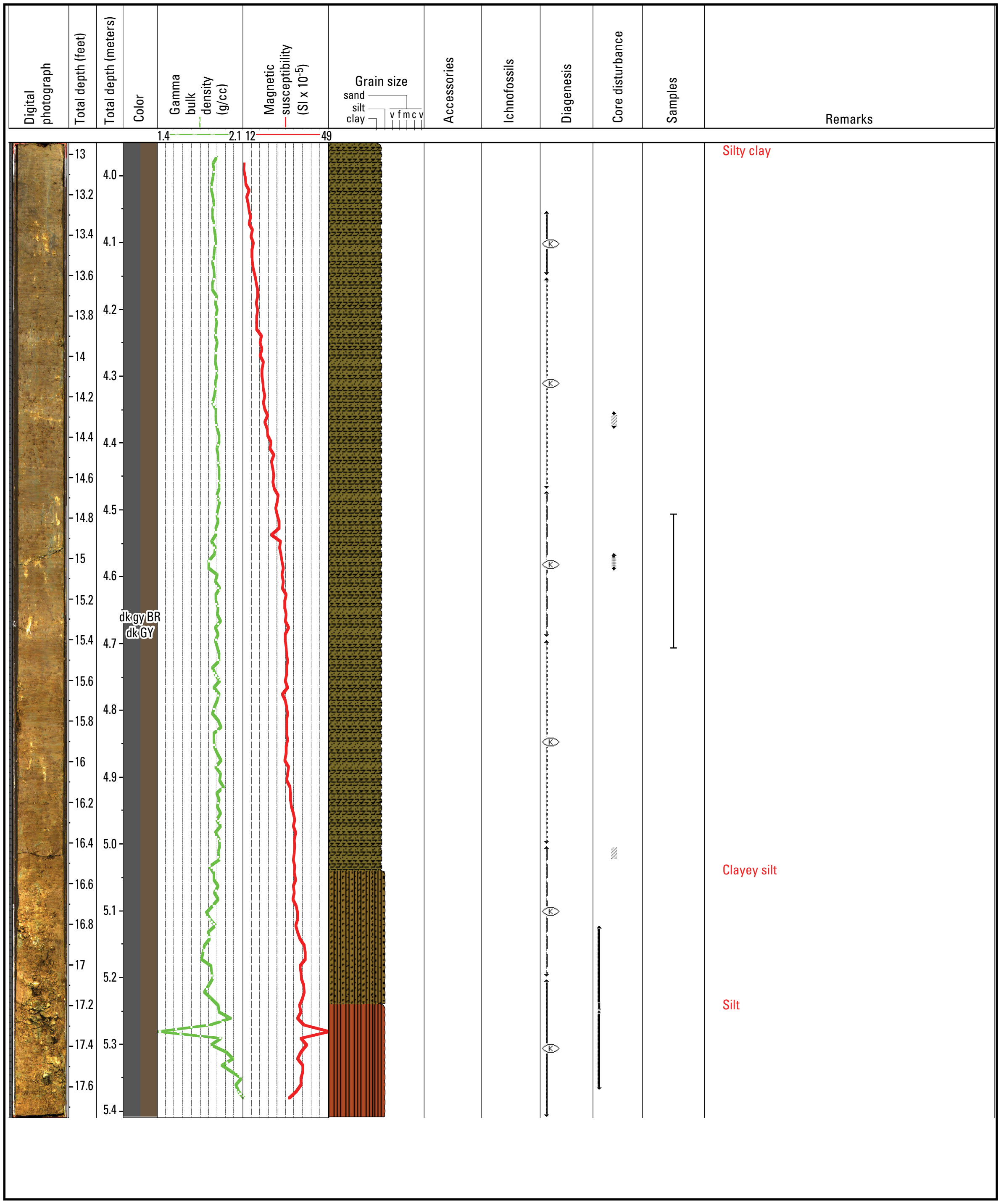


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-14b
Collected: Aug. 24, 2012
Land surface elevation: 9.20 m
USGS station number: 384153121405402

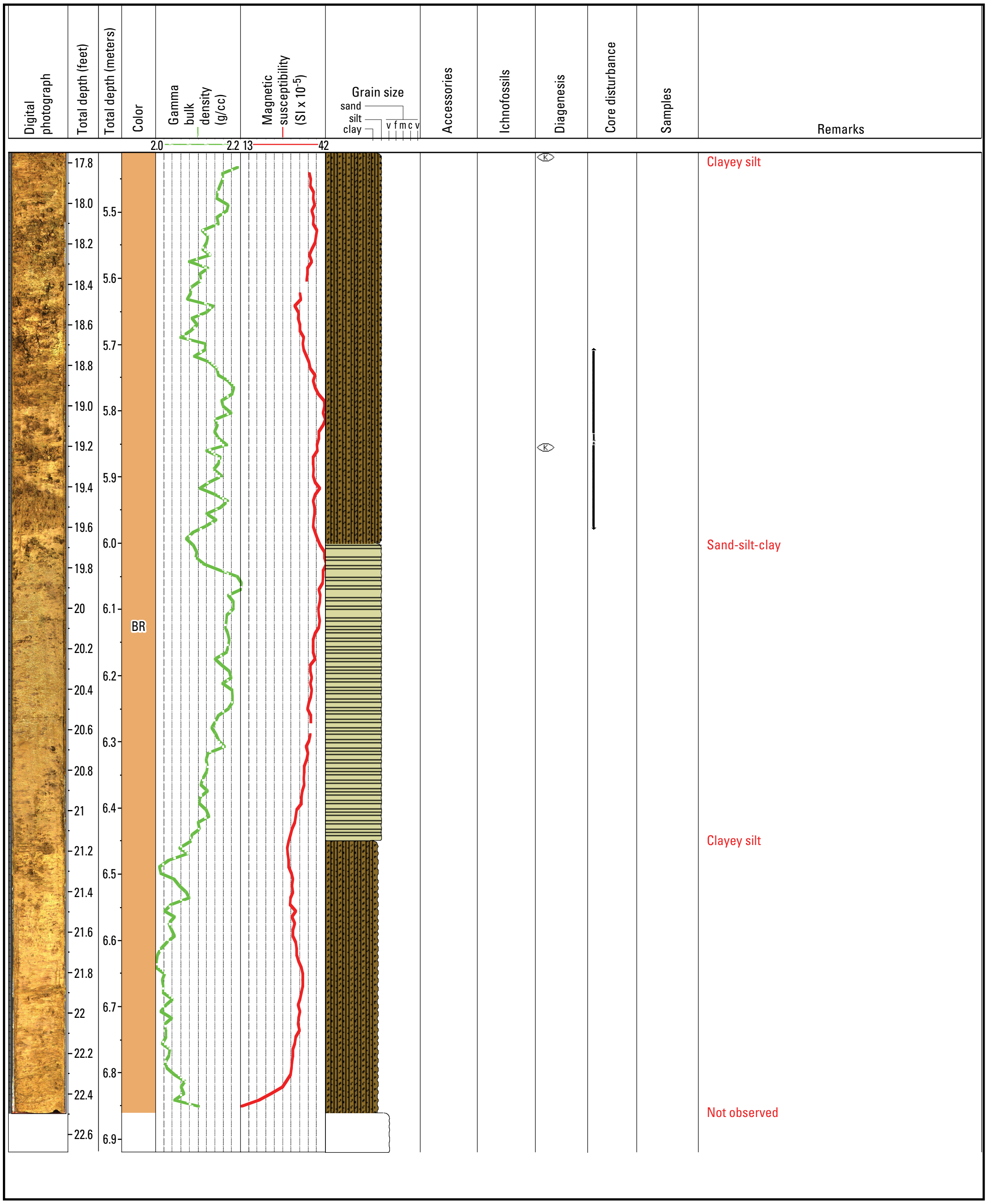
Core: 14b #4A
Section 4 of 6 (3.95–5.41 meters; 12.96–17.75 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-14b
Collected: Aug. 24, 2012
Core: 14b #5A
Land surface elevation: 9.20 m
Section 5 of 6 (5.41–6.92 meters; 17.75–22.71 feet)
USGS station number: 384153121405402

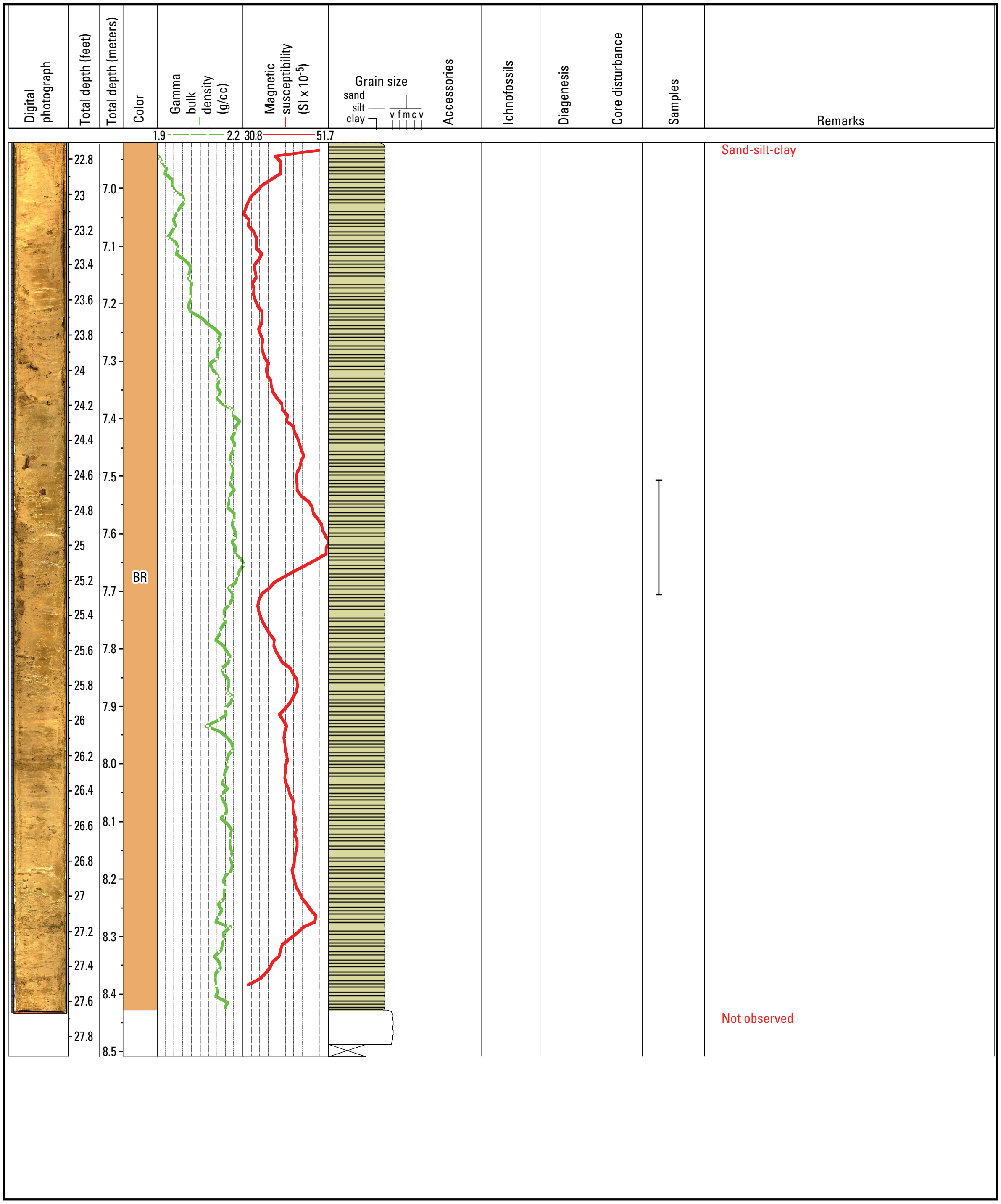


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-14b
Collected: Aug. 24, 2012
Land surface elevation: 9.20 m
USGS station number: 384153121405402

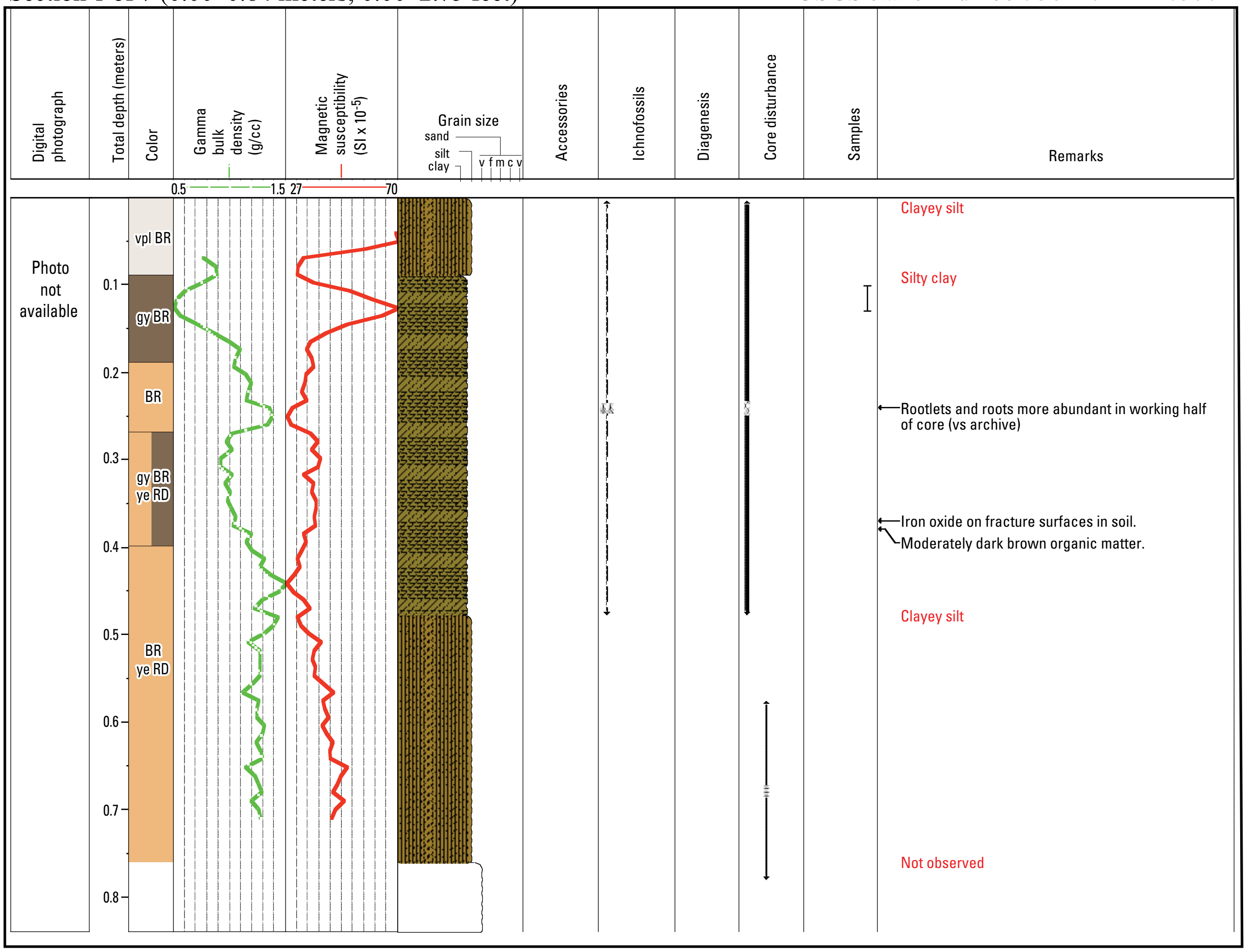
Core: 14b #6A
Section 6 of 6 (6.92–8.51 meters; 22.71–27.92 feet)



U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-15b
Collected: Aug. 21, 2012
Core: 15b #1A
Land surface elevation: 9.65 m
Section 1 of 7 (0.00–0.84 meters; 0.00–2.75 feet)
USGS station number: 384102121403702

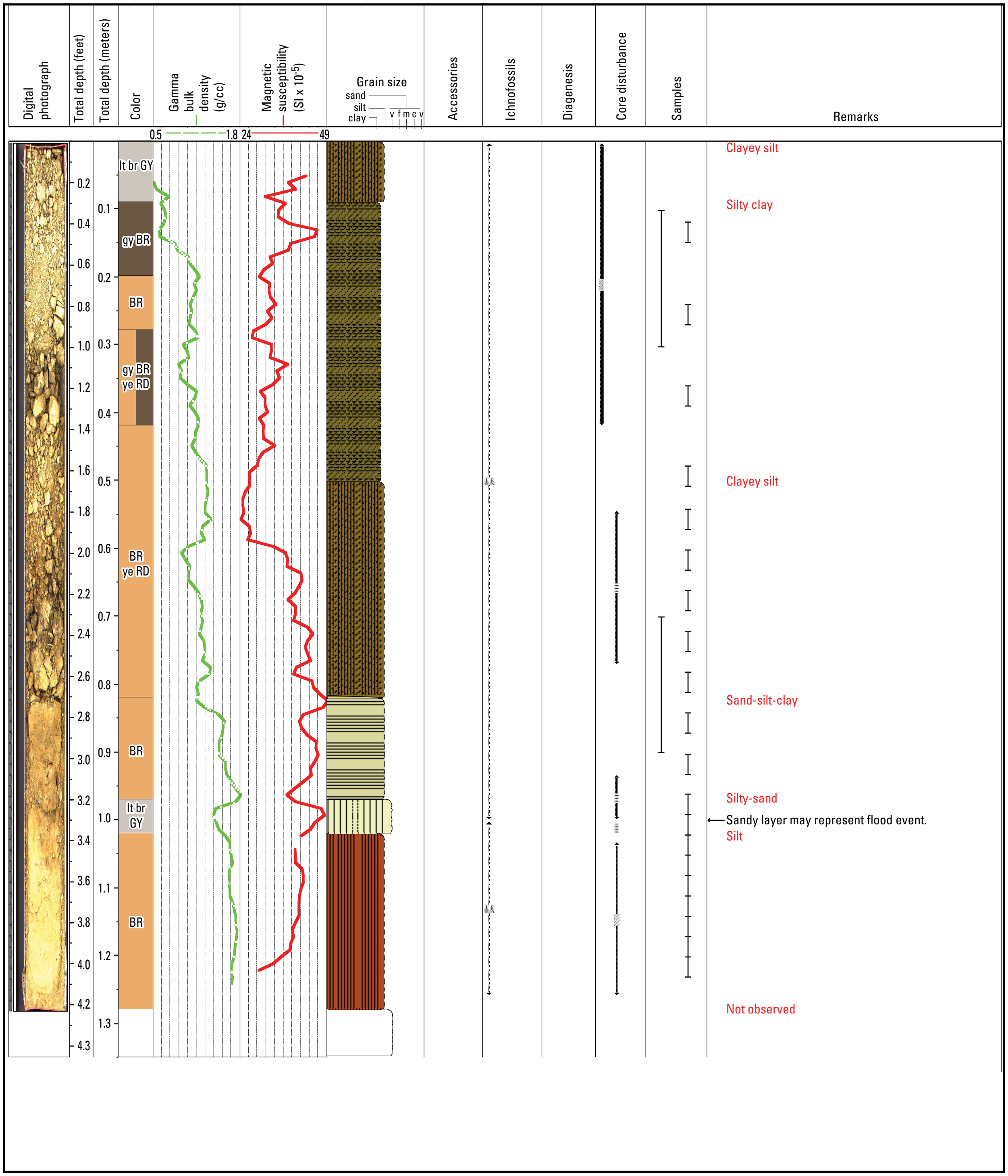


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-15a
Collected: Aug. 20, 2012
Land surface elevation: 9.65 m
USGS station number: 384102121403701

Core: 15a #1A
Section 2 of 7 (0–1.35 meters; 0–4.42 feet)

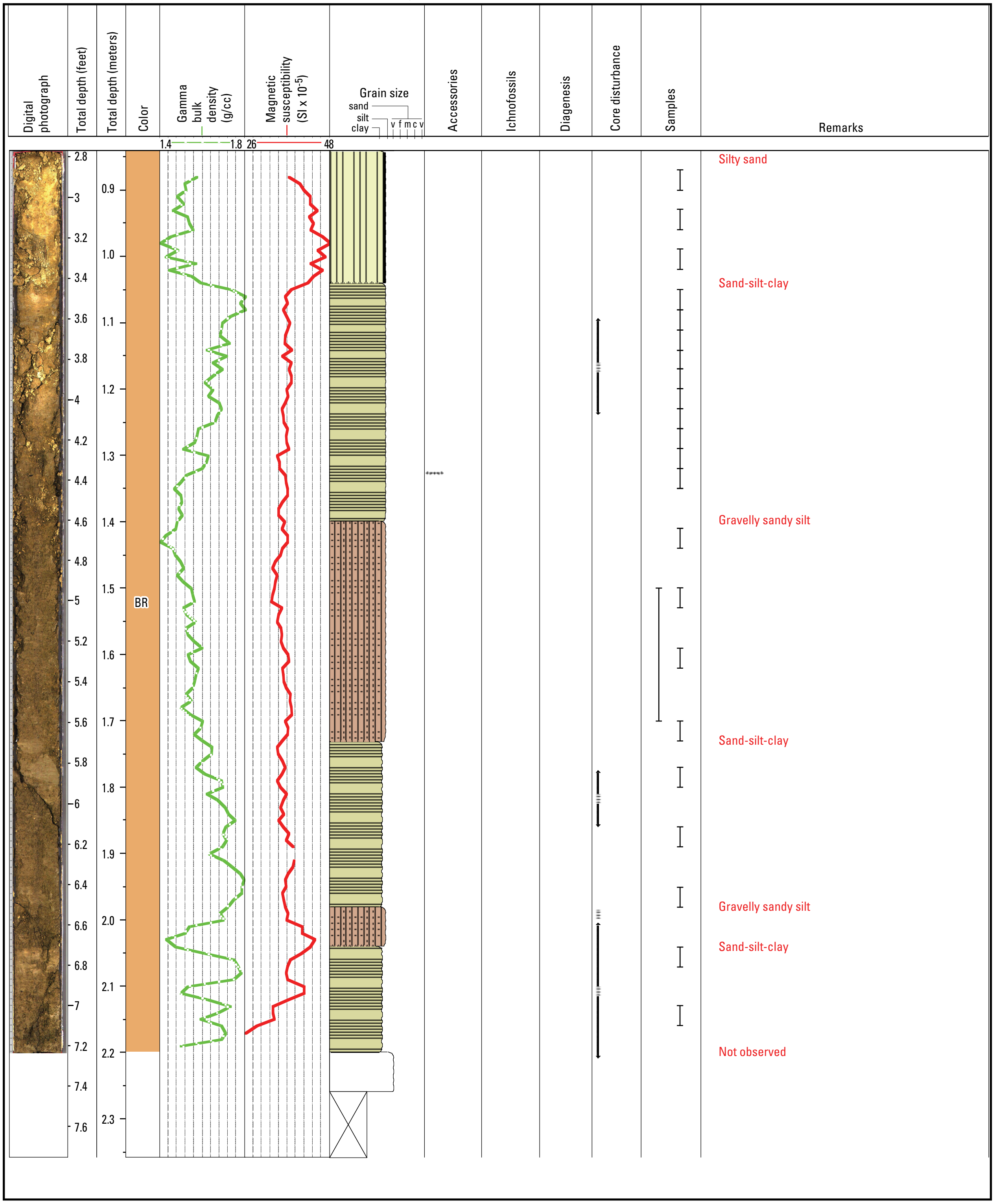


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-15b
Collected: Aug. 21, 2012
Land surface elevation: 9.65 m
USGS station number: 384102121403702

Core: 15b #2A
Section 3 of 7 (0.84–2.37 meters; 2.75–7.79 feet)

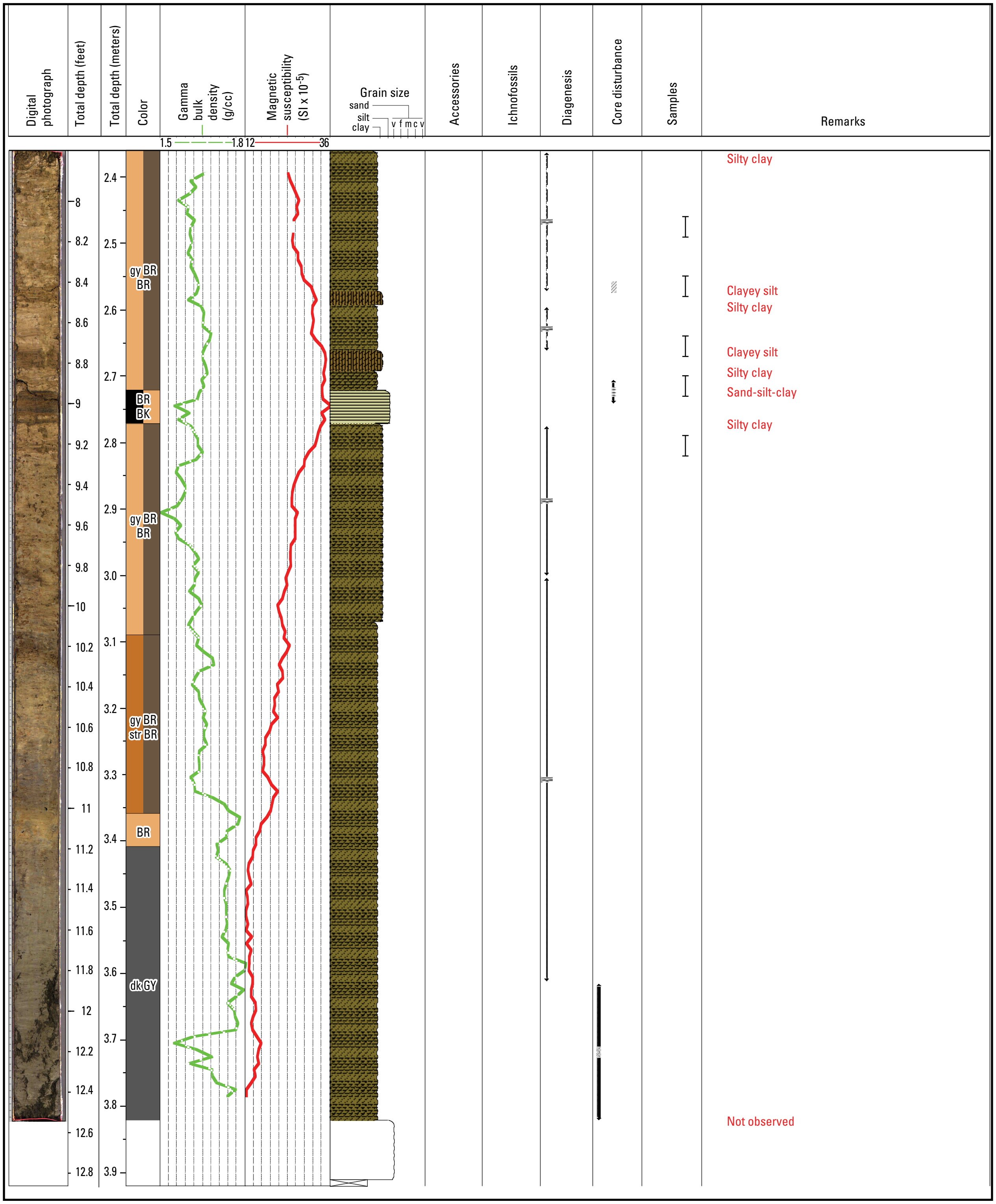


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-15b
Collected: Aug. 21, 2012
Land surface elevation: 9.65 m
USGS station number: 384102121403702

Core: 15b #3A
Section 4 of 7 (2.37–3.93 meters; 7.79–12.88 feet)

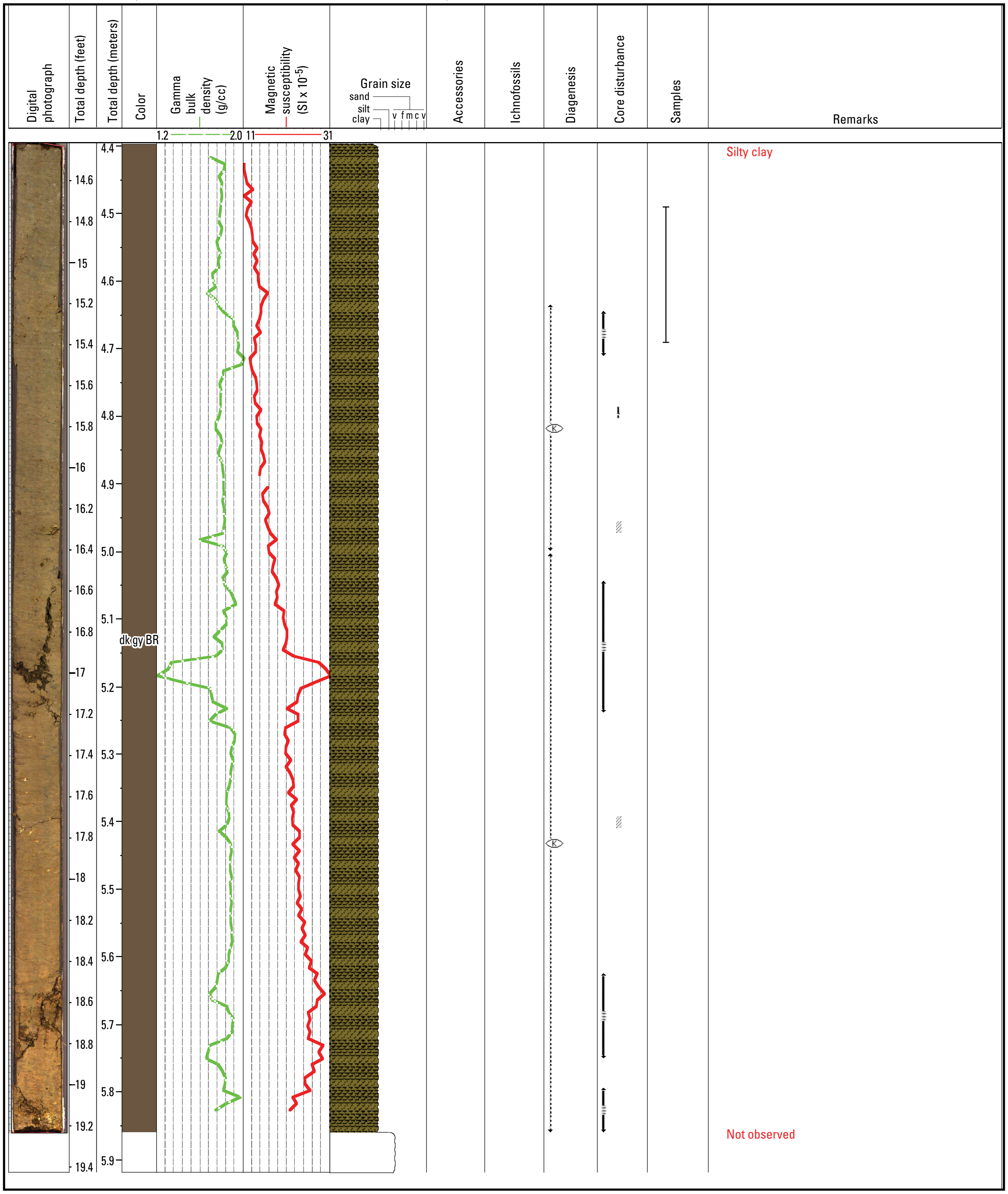


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-15a
Collected: Aug. 20, 2012
Land surface elevation: 9.65 m
USGS station number: 384102121403701

Core: 15a #4A
Section 5 of 7 (4.40–5.94 meters; 14.42–19.48 feet)

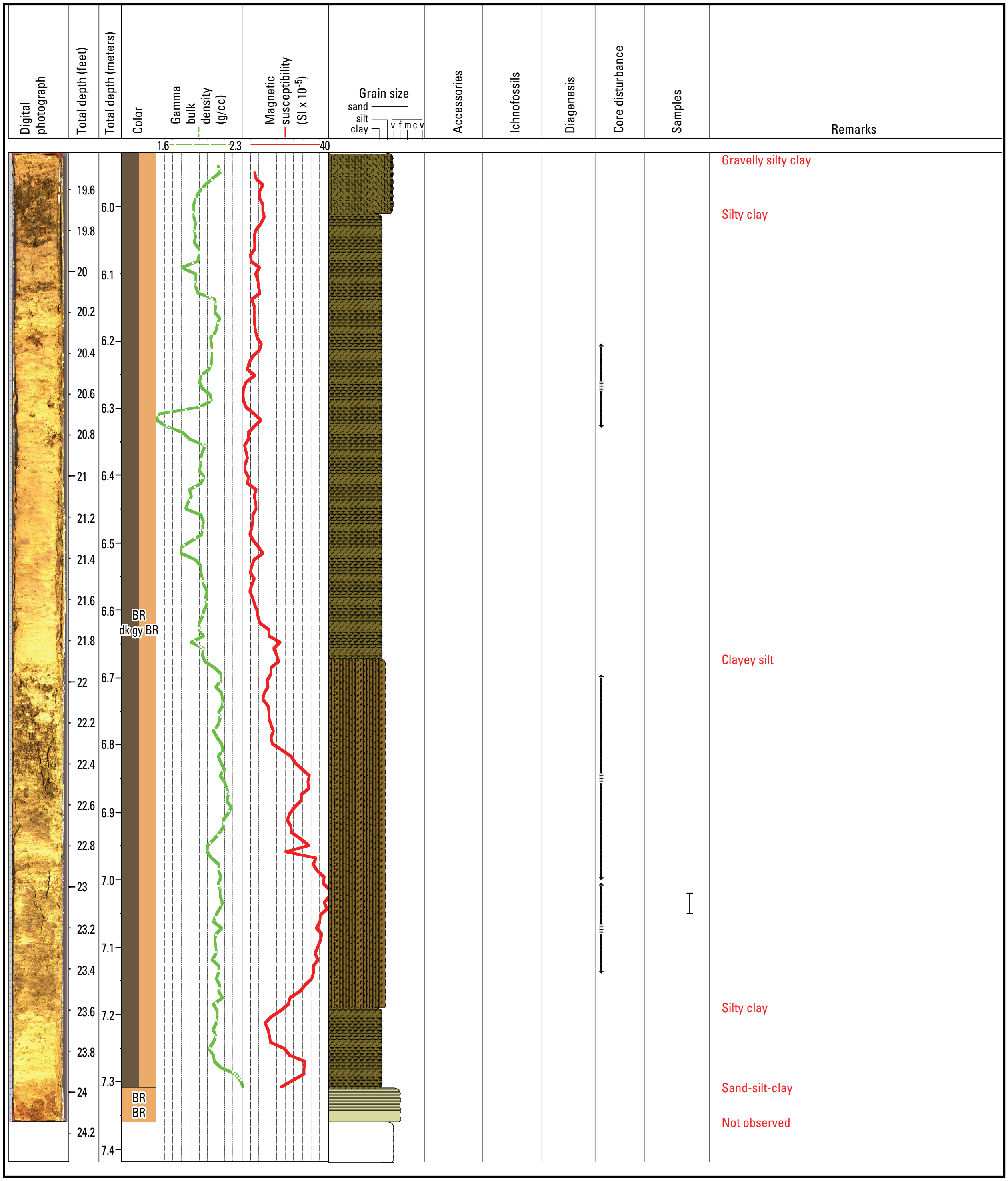


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-15a
Collected: Aug. 20, 2012
Land surface elevation: 9.65 m
USGS station number: 384102121403701

Core: 15a #5A
Section 6 of 7 (5.94–7.42 meters; 19.48–24.33 feet)

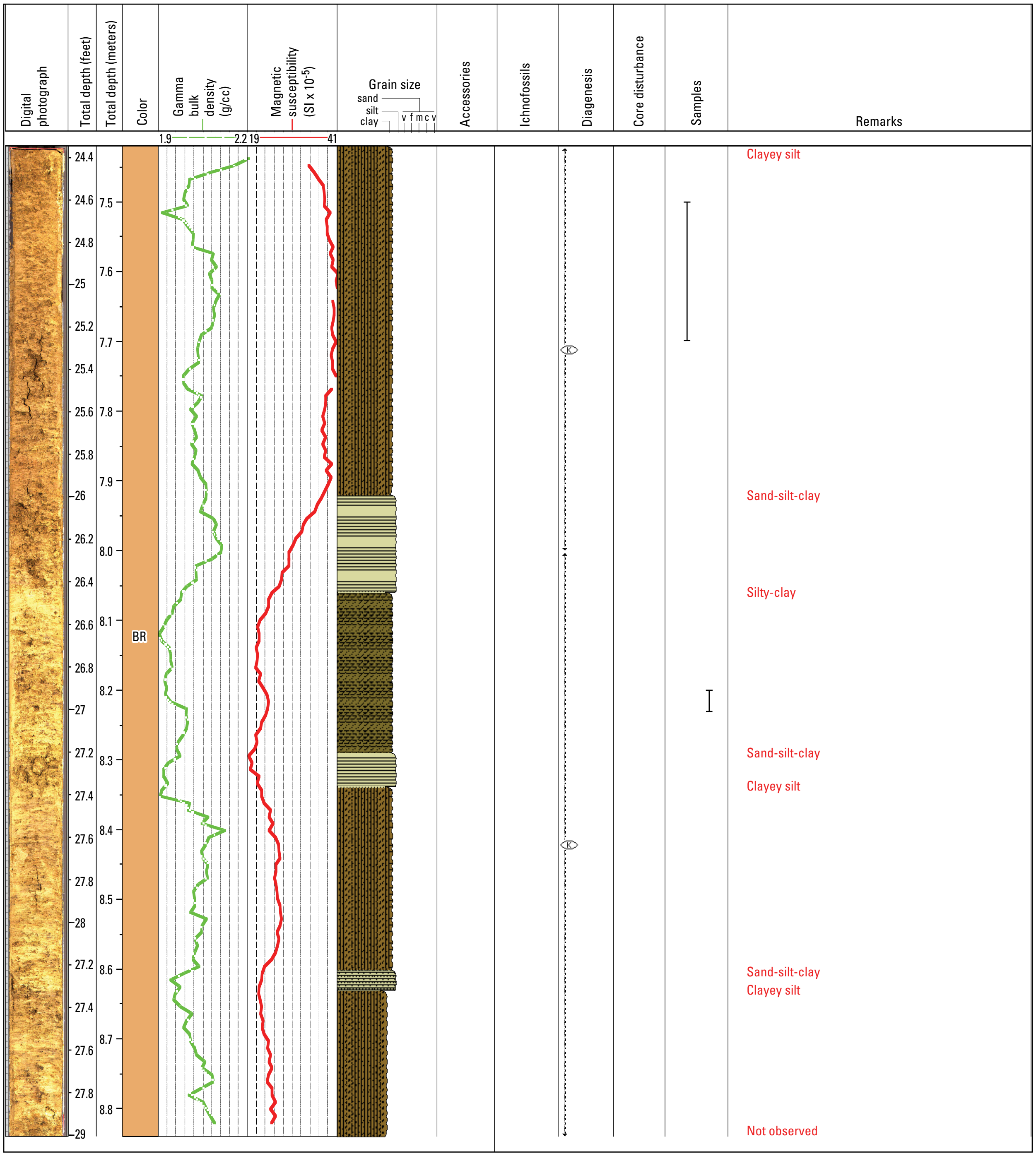


U.S. Geological Survey (USGS)

Cache Creek Settling Basin, Yolo County, Calif.

Site: Testhole-15a
Collected: Aug. 20, 2012
Land surface elevation: 9.65 m
USGS station number: 384102121403701

Core: 15a #6A
Section 7 of 7 (7.42–8.84 meters; 24.33–29.00 feet)



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