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SOUTHERN NEVADA WATER AUTHORITY

Water Resources Division

2015 Delamar, Dry Lake, and Cave Valleys Hydrologic Monitoring, Management, and Mitigation Plan Status and Data Report

March 2016

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Executive Committee

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ACRONYMS

BLM	Bureau of Land Management
BRT	Biological Resource Team
CFA	Cooperative Funding Agreement
CY	Calendar Year
DDC	Delamar, Dry Lake, and Cave valleys
DOI	U.S. Department of the Interior
EC	Executive Committee
JFA	Joint Funding Agreement
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NSE	Nevada State Engineer
NWS	National Weather Service
SNOTEL	SNOwpack TELemetry
SNWA	Southern Nevada Water Authority
SR	State Route
TRP	Technical Review Panel
US 93	U.S. Highway 93
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
WRCC	Western Regional Climate Center

ABBREVIATIONS

°C	degrees Celsius
afy	acre-feet per year
amsl	above mean sea level
bgs	below ground surface
cfs	cubic feet per second
cm	centimeter

ABBREVIATIONS (CONTINUED)

ft	foot
gal	gallon
gpm	gallons per minute
in.	inch
L	liter
m	meter
mg	milligram
mi	mile
µg	microgram
µm	micrometer
µmho	micromho
µS	microsiemen
pmc	percent modern carbon

1.0 INTRODUCTION

This report was prepared by the Southern Nevada Water Authority (SNWA) in satisfaction of monitoring and reporting requirements set forth in the *Hydrologic Monitoring and Mitigation Plan for Delamar, Dry Lake, and Cave Valleys* (DDC3M Plan) (SNWA, 2011a). The location of the primary monitoring area associated with this plan is presented in Figure 1-1. This is the ninth hydrologic data report in a series of reports associated with the Delamar, Dry Lake, and Cave valleys (DDC) hydrologic monitoring, management, and mitigation program. The reports document historic hydrologic conditions and plan status since 2007 (SNWA, 2008, 2009, 2010, 2011b, 2012, 2013, 2014, and 2015).

The report provides the Nevada State Engineer (NSE) hydrologic data collected in 2015 and the current status of each element of the DDC3M Plan. This report also satisfies the hydrologic data collection and reporting requirements of the U.S. Department of the Interior (DOI) and SNWA Stipulation Agreement. The DDC3M Plan contains all the hydrologic monitoring elements of Exhibit A of the Stipulation Agreement, as well as, monitoring related to non-federal water-rights as required by the NSE.

1.1 Background

On January 7, 2008, prior to the NSE hearing for applications 53987 through 53992, a Stipulation for Withdrawal of Protests (Stipulation, 2008) was executed between SNWA and DOI on behalf of the Bureau of Indian Affairs, the Bureau of Land Management (BLM), the National Park Service, and the U.S. Fish and Wildlife Service (USFWS) (collectively known as the DOI Bureaus). Exhibits A and B of the Stipulation require the development of biologic and hydrologic monitoring plans. As part of the Stipulation, an Executive Committee (EC) was established to oversee the implementation of the agreement. A Technical Review Panel (TRP), composed of technical representatives of parties to the stipulation, was established to develop and oversee implementation of the hydrologic monitoring, management, and mitigation plan. A Biological Resource Team (BRT) was also established to oversee the development and implementation of the biological monitoring plan.

On July 9, 2008, SNWA was granted groundwater rights in DDC hydrographic areas (HA180-182) for municipal and domestic purposes under permits 53987 through 53992. Ruling 5875 required the development of biologic and hydrologic monitoring plans. The hydrologic DDC3M Plan associated with this ruling was approved by the NSE on December 22, 2009.

Since the issuance of Ruling 5875, an opinion by the Nevada Supreme Court required that the NSE re-notice SNWA's original groundwater applications and reopen the protest period (Great Basin Water Network, et. al. v. NSE, et. al., June 17, 2010) (NSC, 2010). A new hearing was held by the NSE during September through November 2011 regarding the previously permitted water-right

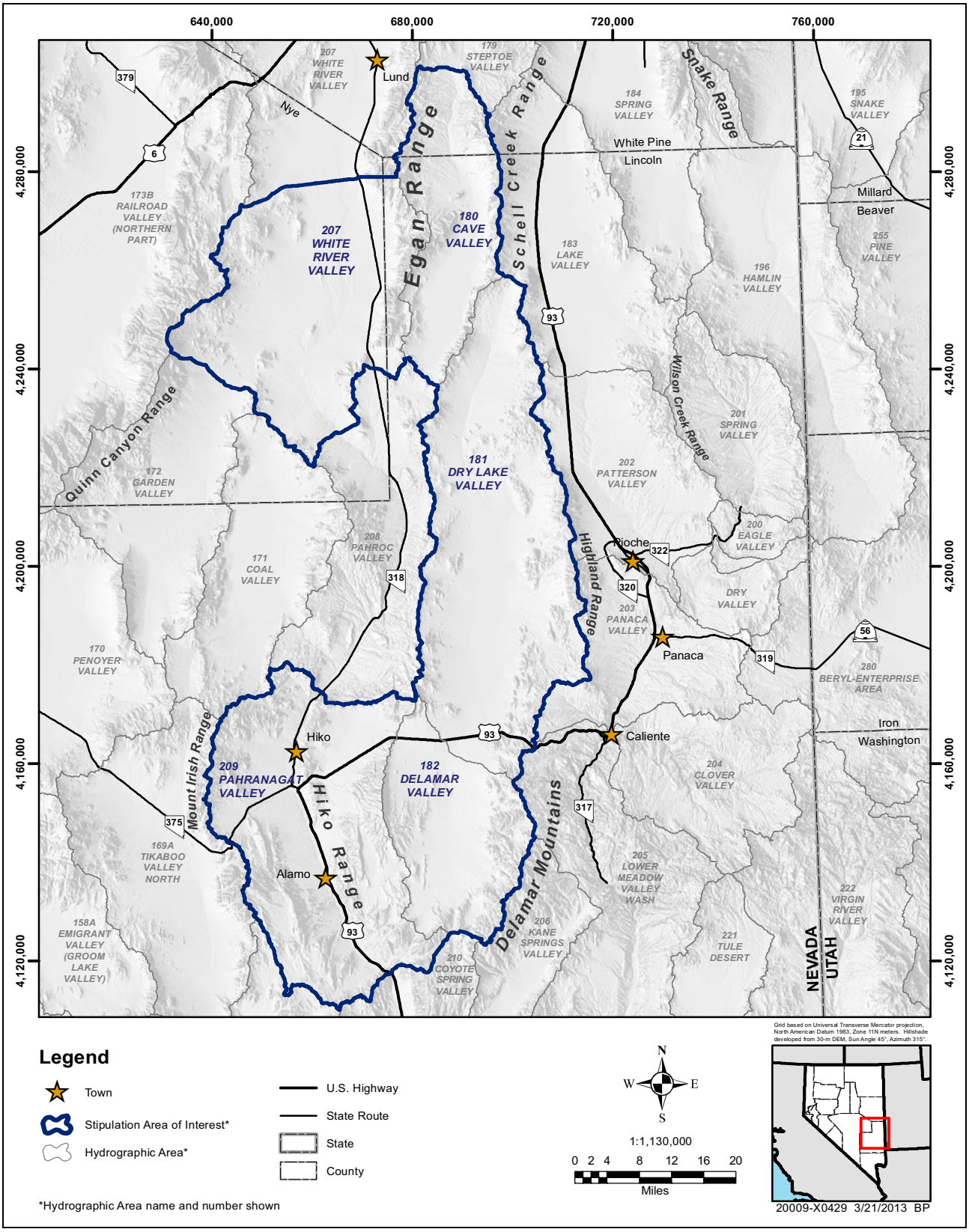

Figure 1-1
DDC3M Plan Primary Monitoring Area

applications. On March 22, 2012, the NSE issued Rulings 6165 through 6167 once again granting SNWA DDC applications 53987 through 53992. Rulings 6165 through 6167 approved the SNWA Hydrologic Monitoring and Mitigation Plan for DDC and required annual data reports be submitted to the NSE.

1.2 Major Activities Performed in 2015

Major activities associated with the DDC3M Plan completed in 2015 are as follows:

- Continued implementation of the DDC3M Plan.
- Performed periodic water-level measurements on monitoring network wells. Maintained continuous water-level and spring discharge recording instrumentation at locations specified in the plan.
- USFWS installed two shallow piezometers at Maynard Spring.
- Submitted required monitoring data quarterly to the NSE and the TRP. Maintained the SNWA data-exchange web site accessible by NSE, EC, TRP, and BRT.
- Maintained BLM right-of-way access for three future monitor-well locations.

1.3 Report Scope

Section 2.0 of this report presents the hydrologic data collected from the groundwater, spring, and precipitation monitoring networks associated with the DDC3M Plan. Section 3.0 presents anticipated activities in 2016. Section 4.0 documents report references. Appendix A through Appendix G present tables and graphs of various hydrologic data discussed in the report. Photos documenting 2015 spring and fall conditions of program springs located within DDC are also presented.

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2.0 DDC3M PLAN STATUS AND DATA

The hydrologic data collected in Calendar Year (CY) 2015 and the current status of each major element of the DDC3M Plan are presented in this section.

2.1 Hydrologic Monitoring Program

The DDC3M Plan requires that a hydrologic monitoring program and network be established to collect data for the purposes of defining baseline hydrologic conditions prior to SNWA groundwater withdrawals in DDC and evaluating the effects of these withdrawals. The network includes monitor wells and springs located within DDC and adjacent hydrographic areas. The monitoring locations are presented on Figure 2-1. The plan also requires reporting of available regional precipitation-station data with an established historical record.

2.2 Monitor-Well Network

The DDC3M Plan includes monitoring of new and existing wells completed in the basin-fill, carbonate-rock, and volcanic-rock aquifers at strategic locations to provide representative groundwater data across the program area. Monitor-well locations were selected with consideration of the hydrogeologic conditions at each location. Water-level measurements were regularly collected from the wells in accordance with SNWA field operating procedures. Geologic reconnaissance, stratigraphic and structural field mapping, aerial photo documentation, surface geophysics, and a review of existing hydrogeologic data were performed to assist in well-site selection. This network will provide long-term monitoring of groundwater conditions and early detection of drawdown propagation, if any, induced by SNWA groundwater development that might adversely affect existing water-right holders and groundwater-dependent areas sustaining critical habitat for endangered and/or threatened species.

2.2.1 Existing-Well Monitoring Network

The DDC3M plan includes continuous groundwater level data collected at six representative monitor wells in the project area. Groundwater levels are also measured quarterly at nine additional network wells associated with the DDC3M Plan. This network includes seven SNWA wells, three private wells, four U.S. Geological Survey (USGS) MX wells, and one BLM well located in DDC and the adjacent White River Valley and Pahranagat Valley hydrographic areas. The locations of the monitor wells in the network are shown on Figure 2-1. Well-location coordinates, elevation, construction attributes, and monitoring frequencies are presented in Table 2-1. Professional surveys of location coordinates, ground-surface elevations, and measuring-point elevations of the wells were completed in 2008, 2009, and 2011.

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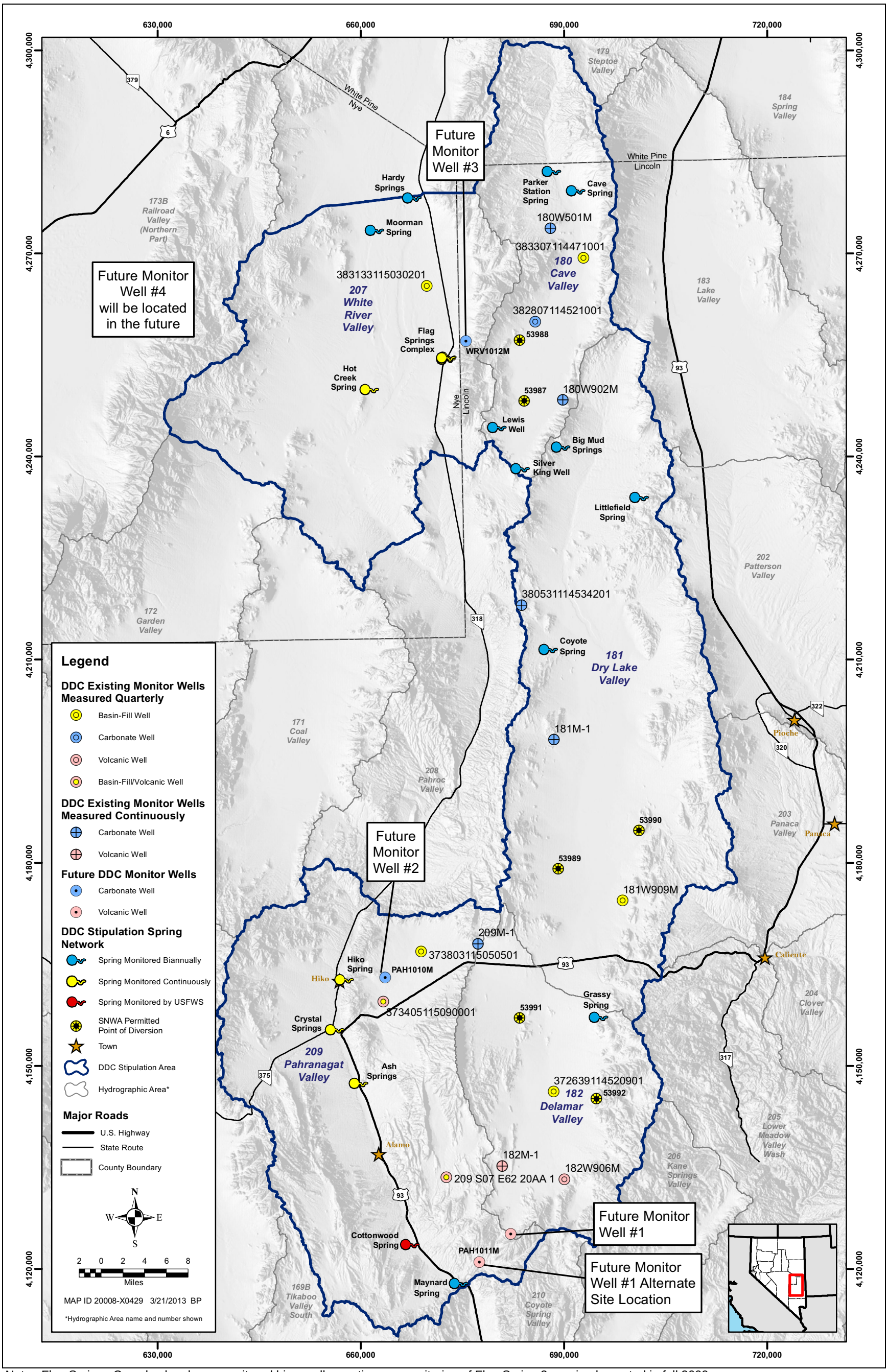

Note: Flag Springs Complex has been monitored biannually; continuous monitoring of Flag Spring 2 was implemented in fall 2009.

Figure 2-1
DDC Monitor-Well and Spring Network

Table 2-1
DDC Existing-Well Monitoring Network

SNWA Site Number	NDWR Station Local Number[b]	Location[a]		Surface[c] Elevation (ft amsl)	Completion Date	Drill Depth (ft bgs)	Well Depth (ft bgs)	Well Casing Diameter (in.)	Screened Interval (ft bgs)	Open Interval (ft bgs)	Aquifer	Monitor Frequency
		UTM Northing (m)	UTM Easting (m)									
180W902M	180 N06 E64 19ADCC1	4,248,355.59	689,816.08	5,984.89	10/19/2005	917	903	12	195-882	77-917	Carbonate	Continuous
382807114521001	180 N07 E63 14BADD1	4,259,963.15	685,737.56	6,012.39	9/30/1980	460	460	10	210-250, 375-435	40-460	Carbonate[d]	Quarterly
383307114471001	180 N08 E64 15BCBC1	4,269,378.23	692,859.57	6,162.55	---	---	---	7	---	---	Basin Fill	Quarterly
180W501M	180 N09 E64 31CBBD1	4,273,712.79	687,971.03	6,428.63	9/23/2005	1,215	1,212	6	788-1,192	54-1,215	Carbonate	Continuous
182W906M	182 S07 E64 19ACDB1	4,133,304.57	690,065.21	4,796.96	9/2/2005	1,735	1,703	6	1,275-1,678	130-1,735	Volcanic	Quarterly
182M-1	182 S07 E63 18AAAA1	4,135,293.37	680,867.32	4,597.78	7/10/2005	1,345	1,331	12	1,006-1,290	58-1,345	Volcanic	Continuous
372639114520901	182 S06 E63 12AD 1	4,146,220.24	688,472.41	4,706.30	5/10/1980	1,215	1,195	10	920-980, 1,040-1,180	40-1,215	Basin Fill	Quarterly[e]
181W909M	181 S03 E65 07CCDA1	4,174,462.59	698,676.17	4,799.41	10/16/2007	1,285	1,260	12	637-1,240	183-1,285	Basin Fill	Quarterly
181M-1	181 N01 E63 36ABAA1	4,198,199.90	688,534.99	4,963.07	8/30/2005	1,501	1,471	6	765-1,451	58-1,501	Carbonate	Continuous
380531114534201	181 N03 E63 27CAA 1	4,218,085.09	683,720.32	5,456.35	1/1/1981	2,395	2,395	10	---	775-2,395	Carbonate	Continuous[d]
209 S07 E62 20AA 1	209 S07 E62 20AA 1	4,133,610.32	672,648.88	4,082.46	1/10/1981	695	695	8	600-695	55-695	Basin Fill/ Volcanic	Quarterly
373405115090001	209 S04 E61 28CD 1	4,159,504.38	663,314.66	4,230.58	9/19/1968	1,314	1,314	12	1,200-1,300	52-1,314	Basin Fill/ Volcanic	Quarterly
373803115050501	209 S04 E61 01AACB1	4,166,944.29	668,927.03	4,528.90	---	---	700	8	---	---	Basin Fill	Quarterly
209M-1	209 S03 E62 35DAAD1	4,168,065.79	677,323.46	5,097.30	8/4/2005	1,616	1,616	6	1,274-1,595	50-1,616	Carbonate	Continuous
383133115030201	207 N08 E62 30CD 1	4,265,229.62	669,732.25	5,290.20	---	---	101	2	---	---	Basin Fill	Quarterly

[a]Professional survey complete on location and elevation. All coordinates are Universal Transverse Mercator, North American Datum, 1983, Zone 11.
[b]Station Local Numbers provided by the Nevada Division of Water Resources.
[c]Elevations are North American Vertical Datum of 1988 (NAVD88).
[d]Carbonate bedrock was encountered at 265 ft bgs according to the well log.
[e]Well is monitored continuously by the USGS.
Well-construction data are based upon best available information from well logs, MX Project Report (Ertec Western Inc., 1981), and direct field measurements.
Monitoring frequency agreed to by the TRP.

SNWA constructed seven monitor wells associated with this network in 2005. These consist of four 6-in. diameter and three 12-in. diameter monitor wells in DDC. Geologic analysis reports were completed for each of the seven SNWA monitor wells included in the network (Eastman, 2007a through g). Copies of the reports have been posted on the SNWA data-exchange web site.

Continuous water-level data were collected at the six designated monitor wells within the network. Site visits were performed approximately once every quarter to obtain periodic water-level measurements and download continuous data for processing and analysis. Physical measurements of water levels were compared to pressure transducer data to verify proper function of the instrumentation.

The USGS collects continuous data at two USGS-MX wells within the network 372639114520901 USGS-MX (Delamar Well) and 380531114534201 USGS-MX (N. Dry Lake).

Periodic water-level measurements collected by SNWA in CY 2015 are presented in Appendix A. Period of record and CY 2015 hydrographs for the nine network wells that are monitored quarterly are also presented in Appendix A. Water-level data collected by SNWA and USGS at the six continuously monitored network wells are presented in Appendix B. Appendix B also includes tables presenting periodic and mean daily continuous water-level data as well as associated CY 2015 and period of record hydrographs. Period of record USGS data are presented at the National Water Information System's website at http://waterdata.usgs.gov/nv/nwis/gw.

2.2.2 Future Monitor Wells

The installation of four new monitor wells is required by the monitoring plan. In 2009, three primary sites and one contingency site were selected by the TRP and NSE for the installation of three of these monitor wells. The location of the fourth well will be selected after additional baseline data are collected and information is known regarding future production-well locations. Location coordinates of future monitor wells, estimated surface elevation and depth to groundwater are presented in Table 2-2. The future monitor-well location sites are presented in Figure 2-1.

Table 2-2
Future DDC Monitor Wells

Well Name	Location[a]		Estimated Surface Elevation (ft amsl)	Estimated Depth to Water (ft)
	UTM Northing (m)	UTM Easting (m)		
WRV1012M	4,257,087	675,519	5,794	420
PAH1010M	4,163,098	663,576	4,380	700
DEL4003X	4,125,223	682,153	4,738	1,450
PAH1011M (DEL4003X alternate site)	4,121,019	677,508	3,727	635

[a]All coordinates are Universal Transverse Mercator, North American Datum, 1983, Zone 11.

The northernmost future monitor well, WRV1012M, is located on the west side of the Egan Range northeast of Flag Springs in White River Valley. This well is anticipated to be completed in the Ely Springs Dolomite. The location was selected as a monitoring point between Flag Springs and southern Cave Valley. The new well and other existing monitor wells in Cave Valley will provide baseline water-level data to assist in the evaluation of the hydraulic gradient through Shingle Pass. The depth to groundwater is estimated to be approximately 420 ft bgs at this location.

The second future monitor well, PAH1010M, is located on the east side of the Hiko Range in Sixmile Flat in Pahranagat Valley. The site is located 3.5 mi east of Hiko Spring. The target completion zone is saturated fractured carbonate rocks within the middle to lower units of the Guilmette Formation and possibly the Simonson Dolomite. Carbonate bedrock is anticipated to be encountered within 50 ft of land surface, and it is expected that rocks will be fractured at depth because of the movement along the range-front fault and ancillary normal faults. The depth to water in this area is estimated to be approximately 700 ft bgs.

Both WRV1012M and PAH1010M are located on BLM managed land, and right-of-way applications have been approved and are being maintained.

The third future monitor well will be installed at the well site of a proposed SNWA exploratory well, DEL4003X, which is located near the southern boundary of Delamar Valley within a structural feature of the Pahranagat Shear Zone. This well is anticipated to be completed in volcanic materials. An alternative site, PAH1011M, was identified and is also located along a major structural feature of the Pahranagat Shear Zone but southwest of the exploratory well site. The right-of-way applications have been approved by BLM for both locations. Selection of the primary or alternative site for a monitor well will be determined in consensus with the TRP.

2.2.3 Exploratory- and Production-Well Monitoring

The exploratory and production-well monitoring section of the DDC3M Plan states that SNWA shall record discharge and water levels in all completed SNWA production wells on a continuous basis. SNWA has not constructed any production wells associated with this project; however, continuous measurements will be collected from all future production wells. Quarterly water-level measurements are required in all SNWA exploratory wells.

Water-level data were collected quarterly from one SNWA exploratory test well and its associated monitor well. The wells, one 6-in. diameter monitor well (CAV6002M2) and one 20-in. diameter test well (CAV6002X), were installed in southern Cave Valley near Monitor Well 180W902M on October 13 and 28, 2007, respectively. Well-construction attributes and the locations of the two wells are presented in Table 2-3 and Figure 2-2. Periodic water-level data and the associated hydrographs from the test and exploratory wells are presented in Appendix C.

2.2.4 Aquifer Testing

A constant-rate pumping test will be performed on each future production well to evaluate aquifer properties. Aquifer-testing results will be used to assess well performance, provide aquifer-property

Table 2-3
SNWA DDC Exploratory Test Well and Associated Monitor Well

Site Number	Station Local Number[b]	Location[a]		Surface[c] Elevation (ft amsl)	Completion Date	Drill Depth (ft bgs)	Well Depth (ft bgs)	Well Casing Diameter (in.)	Screened Interval (ft bgs)	Open Interval (ft bgs)	Aquifer	Monitor Frequency
		UTM Northing (m)	UTM Easting (m)									
CAV6002X	180 N06 E64 19DABB1	4,248,307.58	689,819.01	5,987.97	10/28/2007	917	901	20	219-901	50-917	Carbonate	Quarterly
CAV6002M2	180 N06 E64 19ACDD1	4,248,365.83	689,782.96	5,982.81	10/13/2007	893	885	6	159-882	50-893	Carbonate	Quarterly

[a]Professional survey complete on location and elevation. All coordinates are Universal Transverse Mercator, North American Datum, 1983, Zone 11.
[b]Station Local Numbers provided by the Nevada Division of Water Resources.
[c]Elevations are North American Vertical Datum of 1988 (NAVD88).

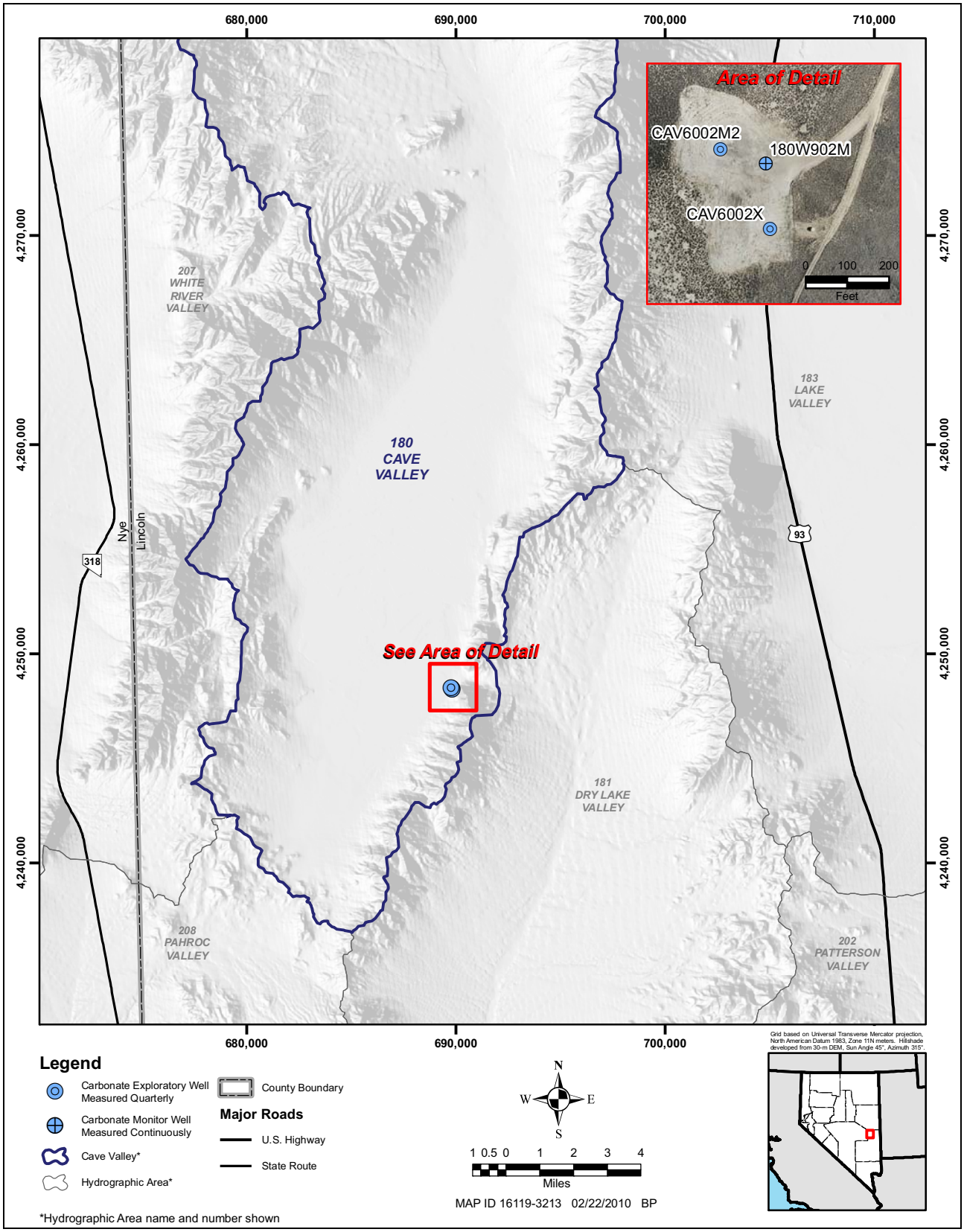

Figure 2-2
SNWA DDC Exploratory Test Well and Associated Monitor Well

data and assist in evaluating potential future pumping effects. Well-performance step tests and 72-hour constant-rate tests have been performed on SNWA Test Well CAV6002X and Monitor Well 180W902M located in Cave Valley. A summary and results of the tests are presented in *Hydrologic Data Analysis Report for Test Well CAV6002X in Cave Valley Hydrographic Area 180* (Prieur et al., 2011).

2.3 Spring Monitoring Network

The DDC3M Plan spring monitoring network has two components each of which were implemented in 2009. The first component consists of nine springs in White River and Pahranagat valleys that are monitored for discharge. The second component consists of eight springs within DDC that are monitored biannually for discharge (if measurable), field water-quality parameters, and general physical condition. The spring locations and monitoring frequency are listed in Table 2-4 and presented in Figure 2-3. Baseline photos of all spring locations and detailed descriptions were presented in SNWA (2009). A description of each spring and corresponding discharge data are presented in this section.

2.3.1 White River and Pahranagat Valleys Springs

Nine springs located in White River and Pahranagat valleys are included in the spring monitoring network. Hot Creek, Ash, and Crystal springs are currently being monitored continuously through a cooperative funding agreement (CFA) between SNWA, USGS, and the Nevada Division of Water Resources (NDWR). USGS also measures discharge biannually at Flag Springs and Moorman Spring as part of the CFA.

SNWA established spring discharge monitoring sites at Hardy and Hiko springs in 2009. SNWA and NSE staff collaborated to secure property access and install the flume at Hardy Springs, and a flow meter and data logger at Hiko Spring. The flow meter provides continuous discharge data on the agricultural diversion pipeline to which Hiko Spring is diverted.

SNWA coordinated with the Nevada Department of Wildlife (NDOW) to install a flume and continuous-monitoring instrumentation at Flag Spring 2 (Middle Flag Spring) in 2009. Flag Spring 1 and 3 continue to be measured at least quarterly by SNWA and biannually by USGS.

Maynard Spring is monitored quarterly by SNWA. SNWA will document conditions at this site dependent upon continued property access. Cottonwood Spring is monitored by USFWS, however no data were provided by USFWS for inclusion in this report.

2.3.1.1 Flag Springs

The Flag Springs are located in Nye County at the NDOW Headquarters for the Wayne Kirsch Wildlife Management Area approximately 60 mi south of Ely, Nevada, along Nevada State Route (SR) 318 (Figure 2-3). Three primary springs (South, Middle, and North) compose the Flag Springs complex which forms the headwaters of Sunnyside Creek. Sunnyside Creek flows into the Adams-McGill Reservoir where the water is used for livestock, wildlife, and recreation.

Table 2-4
DDC3M Plan Spring Monitoring Locations and Monitoring Frequencies

Basin Number	Station Number	Station Name	Elevation[a]	Location[b]		Monitoring Frequency
				UTM Northing (m)	UTM Easting (m)	
180	1800101	Cave Spring	6,490	4,279,249	691,760	Biannual
	1800301	Parker Station Spring	6,490	4,282,096	688,179	
	381624114540302	USBLM Silver King Well	6,230	4,238,220	683,551	
	381943114562201	Lewis Well	6,260	4,244,297	680,106	
181	1810301	Littlefield Spring	6,150	4,233,949	701,112	Biannual
	1810401	Coyote Spring	5,220	4,211,513	687,693	
	1810501	Big Mud Springs	6,430	4,241,387	689,547	
182	1820101	Grassy Spring	5,790	4,157,193	695,124	
207	2070501	Hot Creek Spring near Sunnyside, NV	5,230	4,249,926	661,290	Continuous
	2071101	Moorman Spring	5,300	4,273,440	662,053	Biannual
	2071501	Hardy Springs	5,350	4,278,196	667,553	
209	2090101	Hiko Spring	3,880	4,162,744	657,549	Continuous
	2090201	Cottonwood Spring	3,240	4,123,643	667,261	Quarterly[c]
	2090801	Maynard Spring	3,110	4,117,909	674,444	Biannual[d]
Flag Springs						
207	2071301	Flag Spring 3 (South)	5,290	4,254,416	672,579	Quarterly
	2071302	Flag Spring 2 (Middle)	5,280	4,254,570	672,576	Continuous
	2071303	Flag Spring 1 (North)	5,290	4,254,696	672,719	Quarterly
Crystal Springs						
209	09415589	Crystal Springs Diversion near Hiko, NV	3,820	4,155,336	656,011	Continuous
	2090401	Crystal Springs near Hiko, NV	3,800	4,155,348	656,165	
Ash Springs						
209	09415639	Ash Springs Diversion at Ash Springs, NV	3,600	4,147,415	659,716	Continuous
	2090501	Ash Springs	3,600	4,147,460	659,684	

[a]All elevations are rounded to the nearest 10 ft, North American Vertical Datum, 1988 (NAVD88). High-resolution Global Positioning System (GPS) will be used to determine elevations at a later date.
[b]All coordinates are Universal Transverse Mercator, North American Datum, 1983 (NAD83) Zone 11.
[c]Monitoring performed by USFWS and data to be provided to SNWA and presented in the annual data report.
[d]Monitoring frequency will be increased to quarterly after monitoring points are established in consultation with USFWS and BLM.

Monitoring of the Flag Springs complex currently consists of continuous monitoring of Flag Spring 2 (Middle Flag Spring), using a Parshall flume which was installed through a cooperative project with NDOW and SNWA, in November 2009, and monitoring of Flag Spring 1 and 3 (North and South Flag Spring) orifices at least quarterly by SNWA and twice a year by USGS.

Miscellaneous discharge measurements for 2015 and a historical hydrograph are presented in Appendix D. A continuous discharge hydrograph for Flag Spring 2 is also presented in Appendix D.

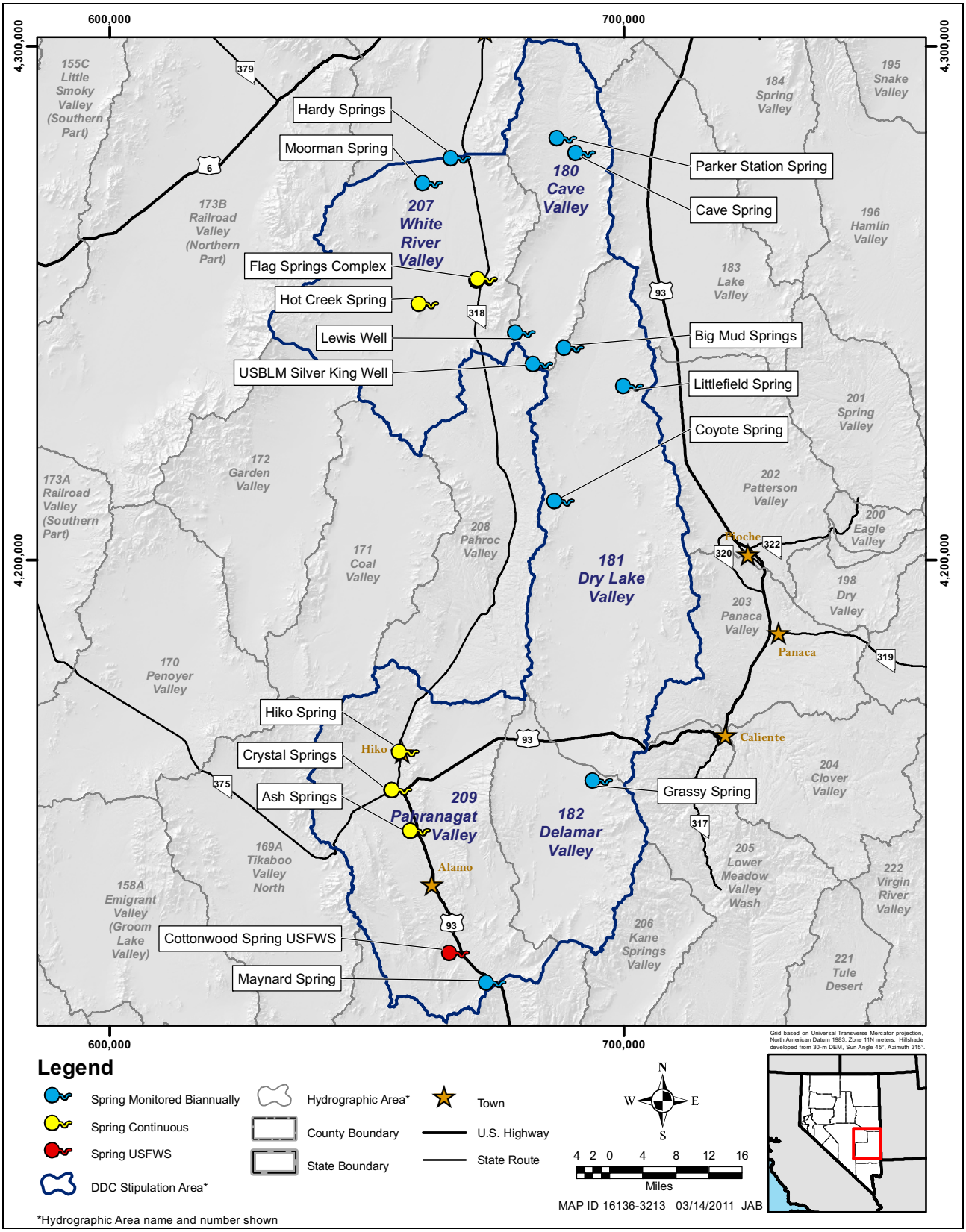

Figure 2-3
Locations of DDC3M Plan Spring Monitoring Sites

2.3.1.2 Hardy Springs

Hardy Springs is located approximately 16 mi south of Lund, Nevada, and 1.5 mi west of SR 318 in White River Valley in Nye County (Figure 2-3). Hardy Springs is composed of five individual spring orifices that discharge into a main channel that is a tributary to the White River. In August 2009, SNWA installed a new flume to obtain biannual discharge measurements upstream of an old diversion approximately 100 to 150 ft downstream of the confluence of Hardy Springs. Hydrologic data collected in 2015 are presented in Appendix D.

The channel between Hardy Springs and the flume was modified in 2011 by a contractor with permission from the landowner to provide a water source to a power transmission line construction project. Photographs of the original condition of the channel and the modified condition with reservoir are presented in SNWA (2014). Discharge measurements performed by SNWA in 2015 used a 3-in. modified Parshall flume located between the confluence of the five springs and reservoir inlet.

2.3.1.3 Moorman Spring

Moorman Spring is located in White River Valley approximately 20 mi southwest of Lund, Nevada, in Nye County (Figure 2-3). The spring discharges from the alluvium along a fault scarp. The spring forms a small pool, approximately 30 ft long and 15 to 20 ft wide, behind an old irrigation diversion structure. The discharge at Moorman Spring is currently measured biannually through the CFA.

Discharge data collected at Moorman Spring during 2015 and a hydrograph of the historical data are presented in Appendix D.

2.3.1.4 Hot Creek Spring

Hot Creek Spring is located in southern White River Valley, approximately 36 mi southwest of Lund, Nevada, and 2 mi west of Adams-McGill Reservoir in Nye County (Figure 2-3). The spring discharge forms Hot Creek, which flows southeast to the Adams-McGill Reservoir. The spring and reservoir are located on the Wayne Kirch Wildlife Management Area, administered by NDOW. At one time, the flow of Hot Creek could be diverted to the Dacey Reservoir to the northeast. Spring discharge is currently being monitored continuously by USGS through the CFA.

A detailed description, site photos, and discussion of historical measurements at Hot Creek Spring are presented in SNWA (2009). Data collected through 2015, along with historical mean daily discharge data from 2006 to 2015 are provided in Appendix D. Discharge measurements prior to 2006 were measured below the current gage, 50 to 60 ft below the ponded swimming area.

2.3.1.5 Ash Springs

Ash Springs is located in Ash Springs, Nevada, approximately 600 ft east of U.S. Highway 93 (US 93) (Figure 2-3). The spring, which has been historically used for irrigation and domestic supply, is composed of many orifices that extend more than a quarter mile along the north-south-trending

Hiko Fault. The spring area was developed in the 1970s and through the 1980s as a privately owned resort. The main orifice is on public land administered by the BLM. Ash Springs discharge and irrigation diversion are currently measured by the USGS using two gaging stations which are funded through the CFA. The two stations were relocated by the USGS in 2011.

A detailed description, photos, and discussion of historical data collected at Ash Springs are presented in SNWA (2009). Hydrologic data collected through WY 2015, historical mean daily discharge, and a 30-day moving average of mean daily discharge values for Ash Springs are presented in Appendix D.

2.3.1.6 Crystal Springs

Crystal Springs is located approximately a quarter mile west of the SR 318/SR 375 junction and a half mile west of the US 93/SR 318 junction in Lincoln County. Crystal Springs is approximately 4 mi south of Hiko, Nevada, and 5 mi north of Ash Springs, Nevada (Figure 2-3). This locale, used as a watering location and campsite, was the principal stopover on the Mormon Trail alternate route (State of Nevada, 2004). Discharge from the main channel of the spring and irrigation diversion is currently monitored by USGS through the CFA.

A detailed description and photo documentation of Crystal Springs are presented in SNWA (2009), including a discussion of the historical data collected at the spring complex. Hydrologic data collected through WY 2015, historical mean daily discharge, days of diversion, and annual discharge data are presented in Appendix D.

2.3.1.7 Hiko Spring

Hiko Spring is located on the Cannon Ranch approximately a half mile northeast of Hiko, Nevada, in the north end of Pahranagat Valley (Figure 2-3) and has historically provided water for various uses. Hiko Spring discharges from the base of the Hiko Range and currently provides water for domestic, agricultural, and wildlife purposes.

SNWA monitors discharge at Hiko Spring continuously using a flow meter and datalogger installed on the 18-in.-diameter pipe located approximately 0.5 mi southwest of the spring. The monitoring station was constructed in June 2009 in cooperation with the Hiko Spring Irrigation District and the owners of the Cannon and Whipple Ranches.

The Hiko Irrigation Company uses a perpetual calendar which assigns irrigation times to each of the twelve members of the company. One complete rotation of the 12 users equates to 11.5 days. There are time intervals during each rotation when water is diverted above the flow meter. Daily discharge rates vary between 4.3 to 8.3 cfs depending upon the season and irrigation needs of the individual users.

A detailed description and photo documentation of Hiko Spring are presented in SNWA (2009), including a discussion of the historical data collected at the spring complex. Hydrologic data collected during WY 2015 and a historical hydrograph are presented in Appendix D.

2.3.1.8 Maynard Spring

Maynard Spring is located off of US 93 about 14 mi southeast of Alamo, Nevada, and 2.5 mi southeast of Lower Pahranagat Lake on BLM land in Pahranagat Valley (Figure 2-3). The spring is composed of two springheads, referred to as North Maynard Spring and South Maynard Spring, which are separated by a distance of approximately 400 ft. Photos of Maynard Spring in May and October 2015 are presented in Figures E-1 and E-2 of Appendix E. Observations in 2015 indicated no measurable discharge.

The USFWS installed two piezometers at Maynard Spring. Information on the piezometer construction and data collected by USFWS is provided in Appendix F.

2.3.1.9 Cottonwood Spring

Cottonwood Spring is approximately 9.5 mi south of Alamo, Nevada, 1 mi west of US 93 on the USFWS Pahranagat Wildlife Refuge (Figure 2-3), and 1.5 mi south of the Refuge Headquarters along the Corn Creek/Alamo Road. As per Exhibit A of the Stipulation, USFWS will provide available data collected from Cottonwood Spring to the TRP; however, no data has been available to date. SNWA will include any future discharge measurements collected and provided by USFWS in the annual data report. The water at Cottonwood Spring is used for wildlife. Photo documentation and historical data reported for Cottonwood Spring is presented in SNWA (2009).

2.3.2 DDC Springs Biannual Monitoring

Eight spring monitoring locations within the DDC valleys were selected by the TRP in consultation with the NSE for biannual monitoring. These springs are generally characterized as being sourced in the mountain block and having no hydraulic connection to the regional aquifer. However, biannual baseline monitoring is being performed to document variability in spring conditions.

Springs included in the program are Grassy Spring in Delamar Valley; Coyote, Big Mud, and Littlefield springs in Dry Lake; Parker Station and Cave springs in northern Cave Valley; and Lewis Well and Silver King Well in southern Cave Valley. Spring locations are presented in Figure 2-3. Several of the springs (Grassy, Big Mud, Coyote, and Lewis Well) have been modified in the past with a collector system to transmit water to distribution points away from the spring. Silver King Well is a shallow dug well with a gravity discharge line routed to a stock-watering area.

Field visits to the sites are conducted in the spring and fall of each year when site-access conditions permit. Spring water-quality is measured in the field for pH, electrical conductivity, and temperature. Photographs are taken to document site conditions.

Physical descriptions, photos, and historical hydrologic and water-chemistry data for the springs are presented in SNWA (2009).

Site visits were performed in May and October 2015. Data collected during the visit and photo documentation are presented in Appendices D and E, respectively.

2.3.2.1 Cave Spring

Cave Spring is located at the far southwest corner of a low northeast-southwest-trending hill approximately 3 mi southeast of Parker Station, Nevada (Figure 2-3). The decrease in discharge rates during the summer months and the cold temperature of the water indicate that this spring is fed solely by local recharge. Biannual discharge measurements and conditions are being documented at the spring with permission from the owner, Cave Valley Ranch, LLC.

A detailed description and photo documentation of Cave Spring are presented in SNWA (2009), including a discussion of historical data collected at the spring. Hydrologic data collected during 2015 are presented in Appendix D. A photo of the spring, taken in May 2015, is presented in Figure E-3. The photo taken in October 2015 is presented in Figure E-4. Both photos show dry conditions.

Currently, there are no active diversions at the spring. Historically, it appears that a small, hand-dug well was constructed in the stream channel and was used to divert water by pump. The water now flows freely down the channel into a small reservoir in the center of the valley where it is used for livestock watering.

2.3.2.2 Parker Station

Parker Station is in north-central Cave Valley, approximately 16 mi southeast of Lund, Nevada. Parker Station was once used as a stagecoach station. This site is located in Lincoln County, nearly a mile south of the White Pine/Lincoln County line.

Parker Station Spring lies on Cave Valley Ranch, LLC, property. A photo of spring discharge in the Parker Station Area in May and October 2015 are presented in Figures E-5 and E-6, respectively. A photo of a permanent flume installed in the southern reservoir discharge channel and owned by Cave Valley Ranch, LLC. is presented in Figure E-7. Currently some water flows around the flume. Discharge just upstream of the southern reservoir channel is measured by SNWA using a temporary flume twice a year.

2.3.2.3 Lewis Well

The Lewis Well is located in southern Cave Valley, approximately 36 mi south of Lund, Nevada, and 6 mi east of SR 318 (Figure 2-3). It is located at the base of the Egan Range on the eastern slope. The well was reportedly constructed in 1925 and was completed with a 42-in. steel casing to a depth of 26 ft. Photos of the springhead area for Lewis Well taken in May and October 2015 are presented in Figures E-8 and E-9, respectively. A photo of spring discharge at a manhole access to a collection system near the spring head is presented in Figure E-10.

2.3.2.4 Silver King Well

The Silver King Well is a hand-dug well located within Lincoln County, Nevada, in southern Cave Valley as shown in Figure 2-3. The dug well may have been a modification to a historic spring. Water is discharged from the Silver King Well by gravity drainage through approximately 600 ft of 2-in.

pipe into a partially buried trough. Photos of the Silver King Well and discharge area are presented in SNWA (2009). Photos taken May and October 2015 are presented in Figures E-11 and E-12, respectively.

The depth-to-water was measured at 10.89 ft bgs on October 6, 2015.

2.3.2.5 Coyote Spring

Coyote Spring is located in Dry Lake Valley on SNWA property approximately 8 mi west-southwest of Bristol Wells, Nevada (Figure 2-3), and lies at the center of an abandoned homestead compound now used for livestock management. Two spring orifices exist at the site. Photos of Coyote Spring and the discharge area in 2009 are presented in SNWA (2009). Photos taken in May and October 2015 are presented in Figures E-13 and E-14, respectively.

Coyote Spring discharges from the base of an escarpment approximately 15 ft high in volcanic rocks. The spring discharge is collected and piped to a large concrete tank. Two site visits occurred during CY 2015. During the spring visit on May 18, 2015, there was insufficient discharge to measure. During the fall site visit on October 5, 2015, discharge was measured at 1.3 gpm.

2.3.2.6 Big Mud Springs

Big Mud Springs are located in northern Dry Lake Valley as shown in Figure 2-3. The springs are located in the Schell Creek Range along Big Mud Pass approximately 7 mi north of Silver King Mountain. A wood fence is present at the springs. The area is surrounded by dense vegetation, such as junipers, willows, and wild roses. A collection basin is in place to divert the spring discharge for stock watering.

Photos of Big Mud Springs and water storage tanks in 2009 are presented in SNWA (2009). Photos of the springhead taken in May and October 2015 are presented in Figures E-15 and E-16, respectively.

2.3.2.7 Littlefield Spring

Littlefield Spring is located approximately 3 mi south of Meloy Spring on the east side of Dry Lake Valley (Figure 2-3). Littlefield Spring discharges from the alluvium near an outcrop of volcanic rock. This spring had a reported discharge of 0.02 cfs in May 1980 (Bunch and Harrill, 1984). No diversions exist near the spring. The spring head for Littlefield Spring was restored in 2004. Photos of the spring discharge area taken in May and October 2015 are presented in Figure E-17 and Figure E-18, respectively. Discharge measurements were made during these site visits on May 18 and October 5, 2015. They were 0.03 cfs each.

2.3.2.8 Grassy Spring

Grassy Spring is located in Delamar Valley approximately 40 mi south of Bristol Wells, Nevada, along the western flank of the Delamar Mountains (Figure 2-3). Photos of Grassy Spring taken in May and October 2015 are presented in Figures E-19 and E-20. Grassy Spring is currently used for

stock watering. The discharge is captured at the source and is transferred to livestock-watering tanks through black polyvinyl tubing.

The spring discharges from alluvial sediments in close contact with volcanic rocks. The discharge was measured volumetrically at the livestock tank, approximately 300 ft west of the spring. Discharge was measured at 0.04 gpm during the site visit on May 18, 2015. On October 5, 2015, the tank was dry and there was no measurable discharge.

2.4 Precipitation-Station Network

Precipitation-station data from selected network sites which are currently operating and have an established historical record in the vicinity of the study area were compiled and are presented in Appendix G. Data collected from the precipitation network will assist in assessing climate variability in the vicinity of the project basins and discerning pumping effects from natural variability. The precipitation stations associated with the network are listed in Table 2-5 and are presented on Figure 2-4.

The precipitation-station network includes the following:

- One high-altitude precipitation station operated by NDWR located in the Wilson Creek Range. These data are cited from Nevada Division of Water Resources (NDWR, 2016).
- Eight high-altitude precipitation stations maintained and operated by USGS through the CFA with SNWA and NDWR. These data are cited from USGS National Water Information System (USGS, 2016).
- Ten National Oceanic and Atmospheric Administration, National Weather Service (NOAA/NWS) Stations. Data were obtained through the Western Regional Climate Center (WRCC). These data are cited from Western Regional Climate Center (WRCC, 2016).
- One U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) SNOwpack TELemetry (SNOTEL) site located in the Egan Range. This site provides precipitation and snow-accumulation data. These data are cited from USDA Natural Resources Conservation Service (USDA, 2016).

Provisional CY 2015 precipitation data for the stations, along with historical data and statistics, are presented in Appendix G. USGS data from all of the eight high-altitude precipitation stations were unavailable as of time of report publication. SNWA will continue to compile and report precipitation data from these sites as long as the data are made available and the stations are operational.

2.5 Water Chemistry

A summary of historical water-chemistry data for samples collected from program wells and springs were presented in SNWA (2009). The historical samples were collected by SNWA, USGS, and Desert Research Institute. Additionally, data reported in published reports dating as far back as 1912

Table 2-5
DDC Precipitation-Station Locations

Station Number	Station Name	Location[a]		Surface Elevation[b] (ft amsl)	Data Source
		UTM Northing (m)	UTM Easting (m)		
RP1830101	Mount Wilson (NDWR)	4,254,245	731,613	7,370	NDWR
RP1730201	Blue Eagle Ranch Hanks	4,264,579	626,889	4,780	WRCC
RP1790202	McGill	4,365,043	691,693	6,270	WRCC
RP2010201	Spring Valley State Park	4,214,070	747,476	5,950	WRCC
RP2020201	Pioche	4,201,608	724,101	5,990	WRCC
RP2050201	Caliente	4,166,217	719,251	4,400	WRCC
RP2050202	Elgin	4,136,286	717,627	3,420	WRCC
RP2070201	Sunnyside	4,254,668	672,599	5,297	WRCC
RP2070202	Lund	4,303,974	672,091	5,546	WRCC
RP2090201	Hiko	4,158,266	656,900	3,900	WRCC
RP2090202	Pahranagat Wildlife Refuge	4,126,390	666,716	3,400	WRCC
RP2070301	Ward Mountain	4,333,574	677,187	9,200	NRCS (SnoTel)
RP1730401	Quinn Canyon Range	4,228,799	620,297	9,050	USGS
RP1820401	Unnamed Peak South of Chokecherry Peak	4,154,830	700,904	7,800	USGS
RP1820402	Unnamed Peak in South Delamar Mountains	4,135,352	701,473	7,800	USGS
RP1830401	Mount Wilson (USGS)	4,236,084	728,118	9,200	USGS
RP1840401	Mount Washington	4,309,377	732,764	10,440	USGS
RP1840402	Cave Mountain	4,337,545	706,107	10,650	USGS
RP2030401	Highland Peak	4,196,772	712,963	9,330	USGS
RP2090401	Mount Irish	4,168,657	641,846	8,607	USGS

[a]All coordinates in Universal Transverse Mercator, North American Datum, 1983 (NAD83), Zone 11.
[b]Elevations are North American Vertical Datum, 1988 (NAVD88).

(Carpenter, 1915) were included in the report. On July 2, 2009, water samples were collected by SNWA from Hiko and Hardy springs and analyzed for a suite of chemical constituents. The results for these samples were presented in SNWA (2010).

On March 31, 2010, the TRP held a conference call to discuss the water-chemistry sampling programs required by the DDC3M Plan. The TRP recommended to the EC that the water-chemistry sampling program be postponed and implemented after the three future monitor wells specified in the DDC3M Plan have been installed. The EC approved the TRP recommendation. Implementation of the program will include collection of two rounds of water-chemistry samples six months apart at 10 locations selected by the TRP. SNWA will collect and submit samples for chemical analysis for the

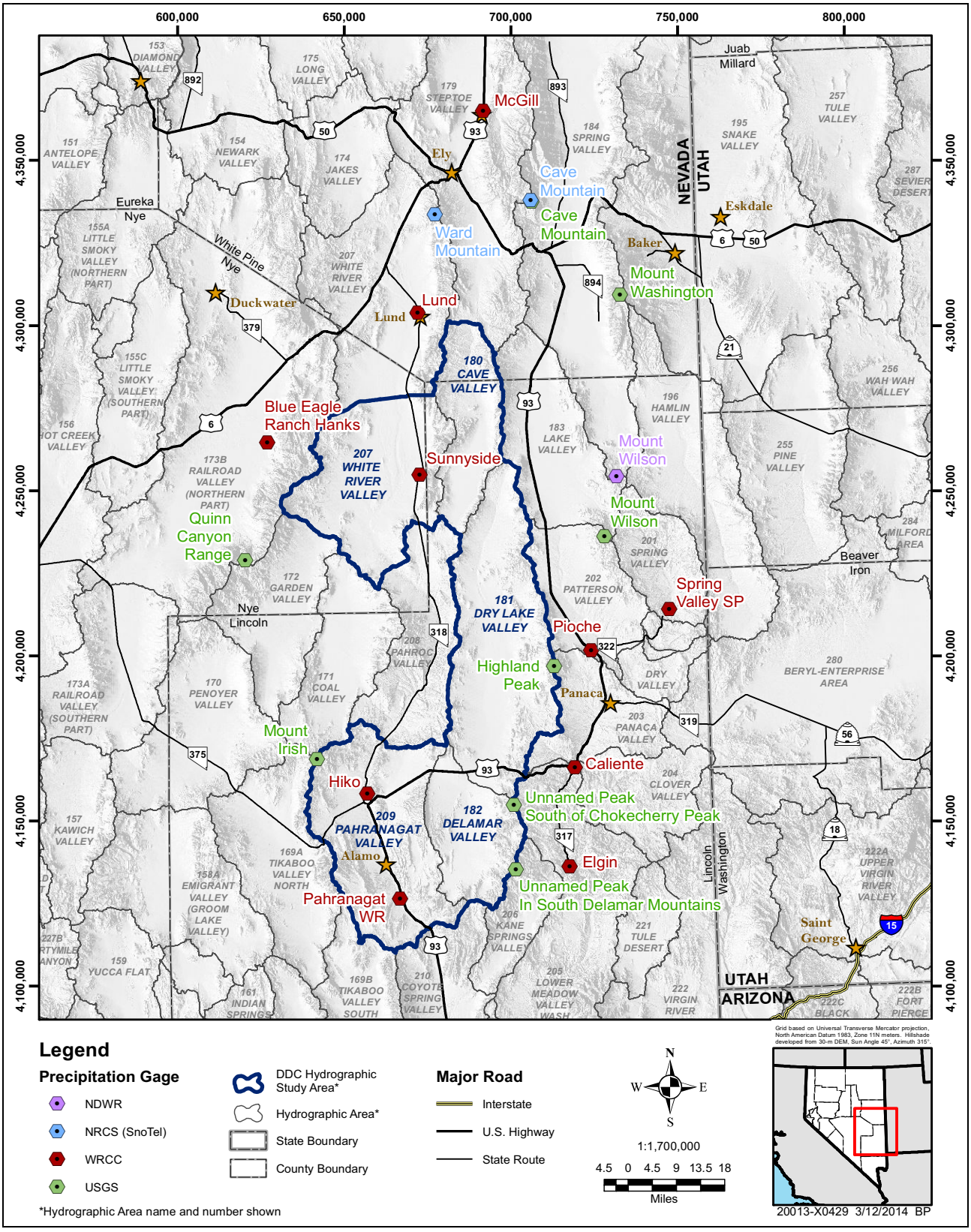

Figure 2-4
DDC Precipitation-Station Locations

water-chemistry parameters listed in Table 2-6. Subsequent sampling will be performed once every 5 years following the start of SNWA groundwater production.

Table 2-6
Water-Chemistry Parameters

Field Parameters	Major Ions	Isotopes	Minor and Trace Elements
Water temperature	TDS	Oxygen-18	Arsenic
Air temperature	Calcium	Deuterium	Barium
pH	Sodium	Tritium	Cadmium
Electrical conductivity	Potassium	Chlorine-36[a]	Chromium
Dissolved oxygen	Chloride	Carbon-14[a]	Lead
	Bromide	Carbon-13[a]	Mercury
	Fluoride	Strontium-87[a]	Selenium
	Nitrate	Uranium-238[a]	Silver
	Phosphate		Manganese
	Sulfate		Aluminum
	Alkalinity		Iron
	Silica		Bromide
	Magnesium		Fluoride

[a]These parameters shall be included only in the first sampling event and shall not be included in any further water-chemistry sampling performed pursuant to this plan.

2.6 Data Reporting

A data-exchange web site accessible by the NSE, EC, TRP, and BRT members was created in April 2008. The data-exchange web site is used to distribute DDC3M Plan monitoring data to the TRP within 90 days of collection. Data is also submitted directly to the NSE on a quarterly basis in electronic format.

An annual report providing program status and monitoring data is submitted to the TRP and NSE.

2.7 Proposed Schedule of Groundwater Withdrawals

No groundwater production is scheduled until the project is authorized and constructed.

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3.0 ANTICIPATED 2016 SNWA DDC3M PLAN ACTIVITIES

Anticipated DDC3M Plan activities in CY 2016 are summarized below.

- Continue to collect required quarterly and continuous water-level and spring discharge measurements at program sites throughout 2016.

- Report data quarterly to TRP members through the SNWA data-exchange web site. Data will also be submitted to NSE in an approved electronic format and be included in the annual data report to be submitted in March 2017.

SNWA will continue to work with the NSE and the other members of the TRP participants to implement the DDC3M Plan and identify and address technical issues related to the program.

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Appendix A

DDC3M Plan
Periodic Water-Level Data

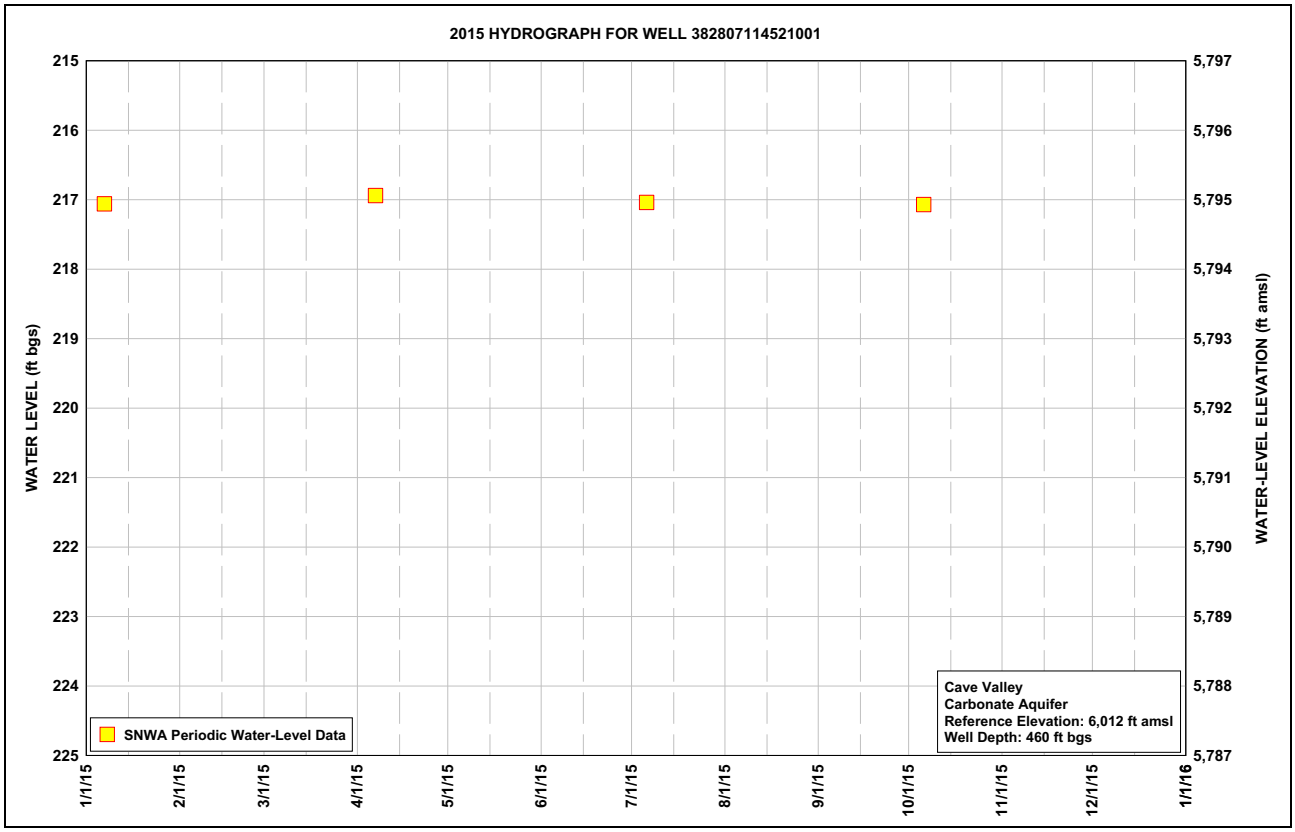
Table A-1
Periodic Water-Level Measurement Data from the DDC Existing-Well Monitoring Network
(Page 1 of 2)

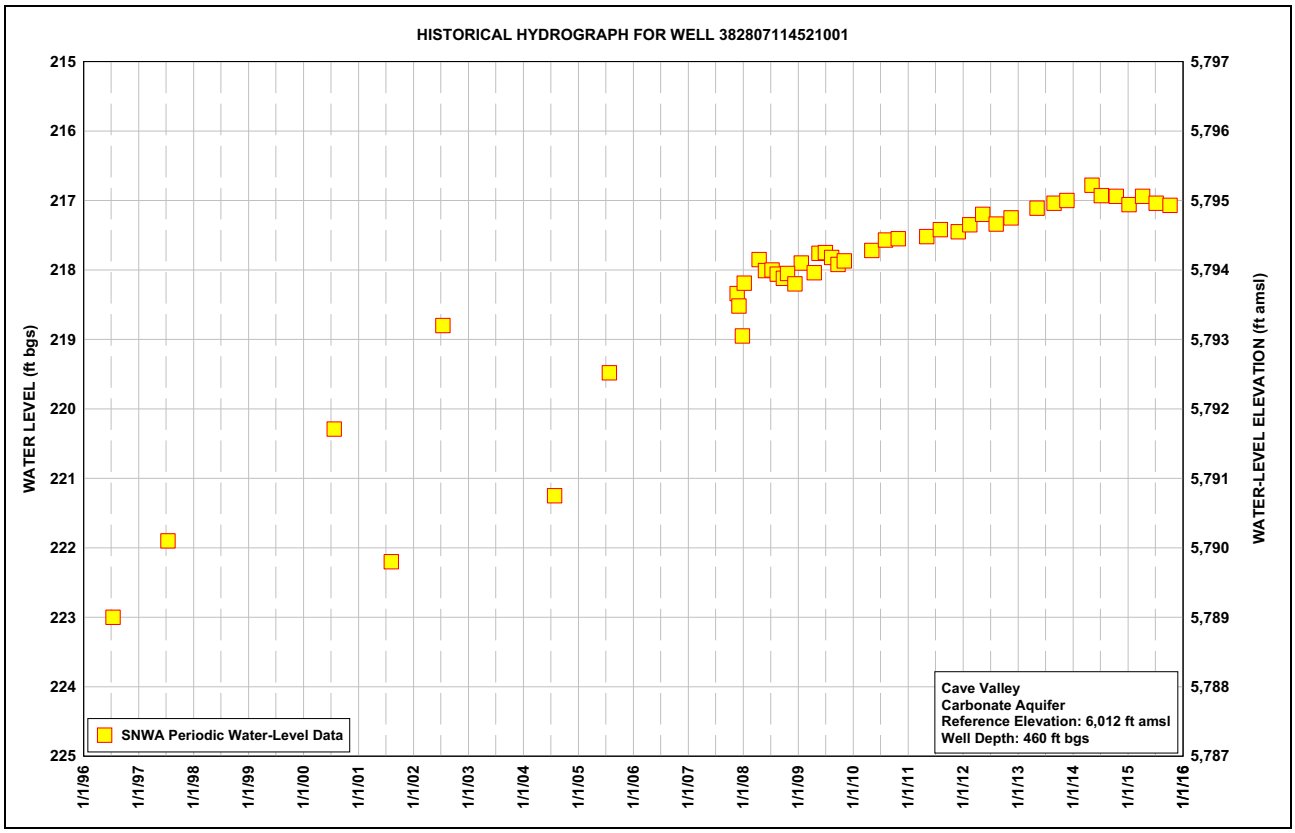
Site Number	Station Local Number[a]	Well Depth (ft bgs)	Surface[b] Elevation (ft amsl)	Water Level			
				Date	Depth to Water (ft bgs)	Well Status[c]	Measurement Method[d]
180W902M[e]	180 N06 E64 19ADCC1	903	5,984.89	1/7/2015	143.95	S	T
				1/15/2015	143.90	S	T
				4/7/2015	144.08	S	T
				7/6/2015	---	---	---
				10/6/2015	144.51	S	T
382807114521001	180 N07 E63 14BADD 1	460	6,012.39	1/7/2015	217.06	S	T
				4/7/2015	216.94	S	T
				7/6/2015	217.04	S	T
				10/6/2015	217.07	S	T
383307114471001	180 N08 E64 15BCBC1	---	6,162.55	1/7/2015	263.02	S	T
				4/7/2015	262.49	S	T
				7/6/2015	262.83	S	T
				10/6/2015	263.00	S	T
180W501M[e]	180 N09 E64 31CBBD1	1,212	6,428.63	1/7/2015	1,059.28	S	T
				4/7/2015	1,059.37	S	T
				7/6/2015	1,059.86	S	T
				10/6/2015	1,060.10	S	T
182W906M	182 S07 E64 19ACDB1	1,703	4,796.96	1/5/2015	1,317.01	S	T
				4/6/2015	1,315.85	S	T
				7/6/2015	1,316.59	S	T
				10/5/2015	1,316.52	S	T
182M-1[e]	182 S07 E63 18AAAA1	1,321	4,597.78	1/5/2015	827.63	S	T
				1/8/2015	826.99	S	T
				2/17/2015	827.18	S	T
				4/6/2015	827.01	S	T
				7/6/2015	827.13	S	T
				10/5/2015	827.15	S	T
181W909M	181 S03 E65 07CCDA1	1,260	4,799.41	1/5/2015	498.66	S	T
				2/17/2015	498.60	S	T
				4/6/2015	498.28	S	T
				7/6/2015	498.69	S	T
				8/6/2015	498.64	S	T
				10/5/2015	498.51	S	T
181M-1[e]	181 N01 E63 36ABAA1	1,472	4,963.07	1/5/2015	675.26	S	T
				2/17/2015	675.20	S	T
				4/6/2015	675.04	S	T
				7/6/2015	675.20	S	T
				10/5/2015	675.13	S	T

Table A-1
Periodic Water-Level Measurement Data from the DDC Existing-Well Monitoring Network
(Page 2 of 2)

Site Number	Station Local Number[a]	Well Depth (ft bgs)	Surface[b] Elevation (ft amsl)	Water Level			
				Date	Depth to Water (ft bgs)	Well Status[c]	Measurement Method[d]
380531114534201[e]	181 N03 E63 27CAA 1	2,395	5,456.35	1/5/2015	845.03	S	T
				4/6/2015	844.27	S	T
				7/6/2015	844.65	S	T
				10/5/2015	844.41	S	T
209 S07 E62 20AA 1	209 S07 E62 20AA 1	695	4,082.46	1/5/2015	600.30	S	T
				4/6/2015	600.20	S	T
				7/6/2015	600.29	S	T
				10/5/2015	600.34	S	T
373405115090001	209 S04 E61 28CD 1	980	4,230.58	1/7/2015	586.80	S	T
				4/8/2015	586.71	S	T
				7/8/2015	586.57	S	T
				10/6/2015	586.79	S	T
373803115050501	209 S04 E61 01AACB1	700	4,528.90	1/7/2015	785.70	S	T
				4/8/2015	785.42	S	T
				7/8/2015	785.35	S	T
				10/6/2015	785.66	S	T
209M-1[e]	209 S03 E62 35DAAD1	1,616	5,097.30	1/5/2015	1,200.37	S	T
				4/8/2015	1,200.19	S	T
				7/8/2015	1,200.02	S	T
				10/6/2015	1,200.40	S	T
383133115030201	207 N08 E62 30CD 1	101	5,290.20	1/5/2015	64.44	S	T
				4/7/2015	64.28	S	T
				7/8/2015	64.26	S	T
				10/5/2015	64.38	S	T
372639114520901	182 S06 E63 12AD 1	1,195	4,706.30	1/5/2015	863.83	S	T
				4/6/2015	863.11	S	T
				7/6/2015	863.55	S	T
				10/5/2015	863.30	S	T

[a]Station Local Numbers provided by the Nevada Division of Water Resources.
[b]Elevations are North American Vertical Datum of 1988 (NAVD88).
[c]S = Static conditions
[d]T = Electric tape measurement
[e]Current year and historical hydrographs with periodic and continuous data are presented in Appendix B.
Note: SNWA tape calibration program started in August 2008.


2015 HYDROGRAPH FOR WELL 382807114521001
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
215
216
217
218
219
220
221
222
223
224
225
5,797
5,796
5,795
5,794
5,793
5,792
5,791
5,790
5,789
5,788
5,787
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 6,012 ft amsl
Well Depth: 460 ft bgs


HISTORICAL HYDROGRAPH FOR WELL 382807114521001
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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216
217
218
219
220
221
222
223
224
225
5,797
5,796
5,795
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5,793
5,792
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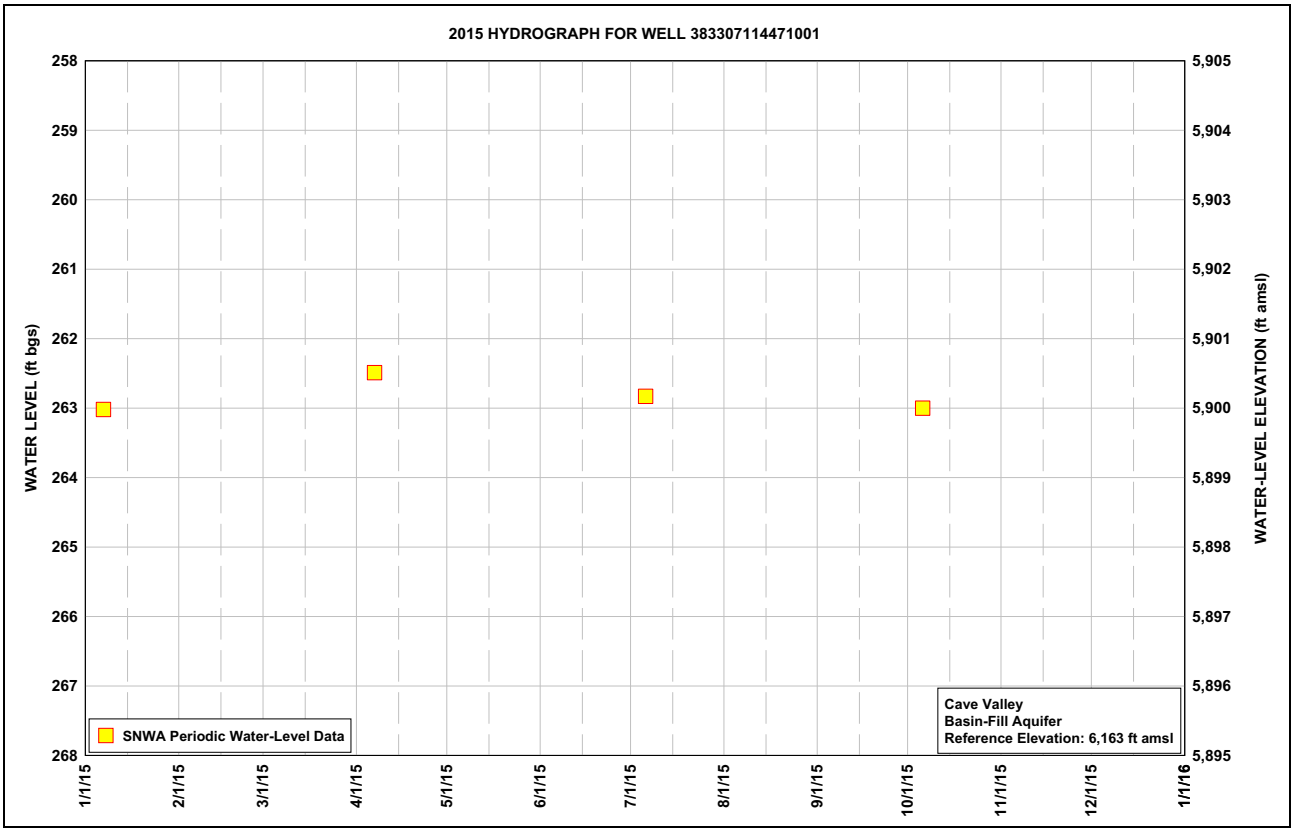
5,790
5,789
5,788
5,787
1/1/96
1/1/97
1/1/98
1/1/99
1/1/00
1/1/01
1/1/02
1/1/03
1/1/04
1/1/05
1/1/06
1/1/07
1/1/08
1/1/09
1/1/10
1/1/11
1/1/12
1/1/13
1/1/14
1/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 6,012 ft amsl
Well Depth: 460 ft bgs


2015 HYDROGRAPH FOR WELL 383307114471001
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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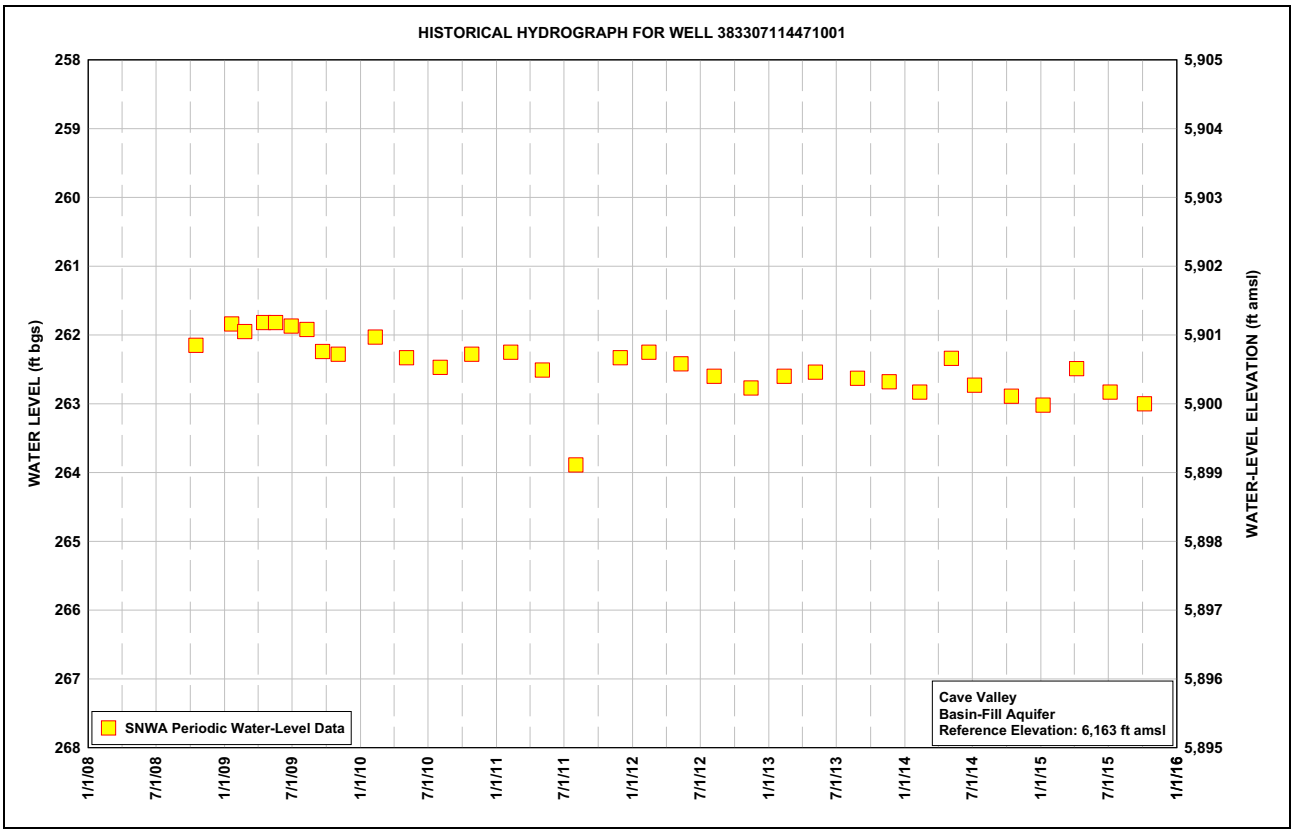
259
260
261
262
263
264
265
266
267
268
5,905
5,904
5,903
5,902
5,901
5,900
5,899
5,898
5,897
5,896
5,895
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Basin-Fill Aquifer
Reference Elevation: 6,163 ft amsl


HISTORICAL HYDROGRAPH FOR WELL 383307114471001
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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261
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263
264
265
266
267
268
5,905
5,904
5,903
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5,900
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5,898
5,897
5,896
5,895
1/1/08
7/1/08
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7/1/09
1/1/10
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1/1/13
7/1/13
1/1/14
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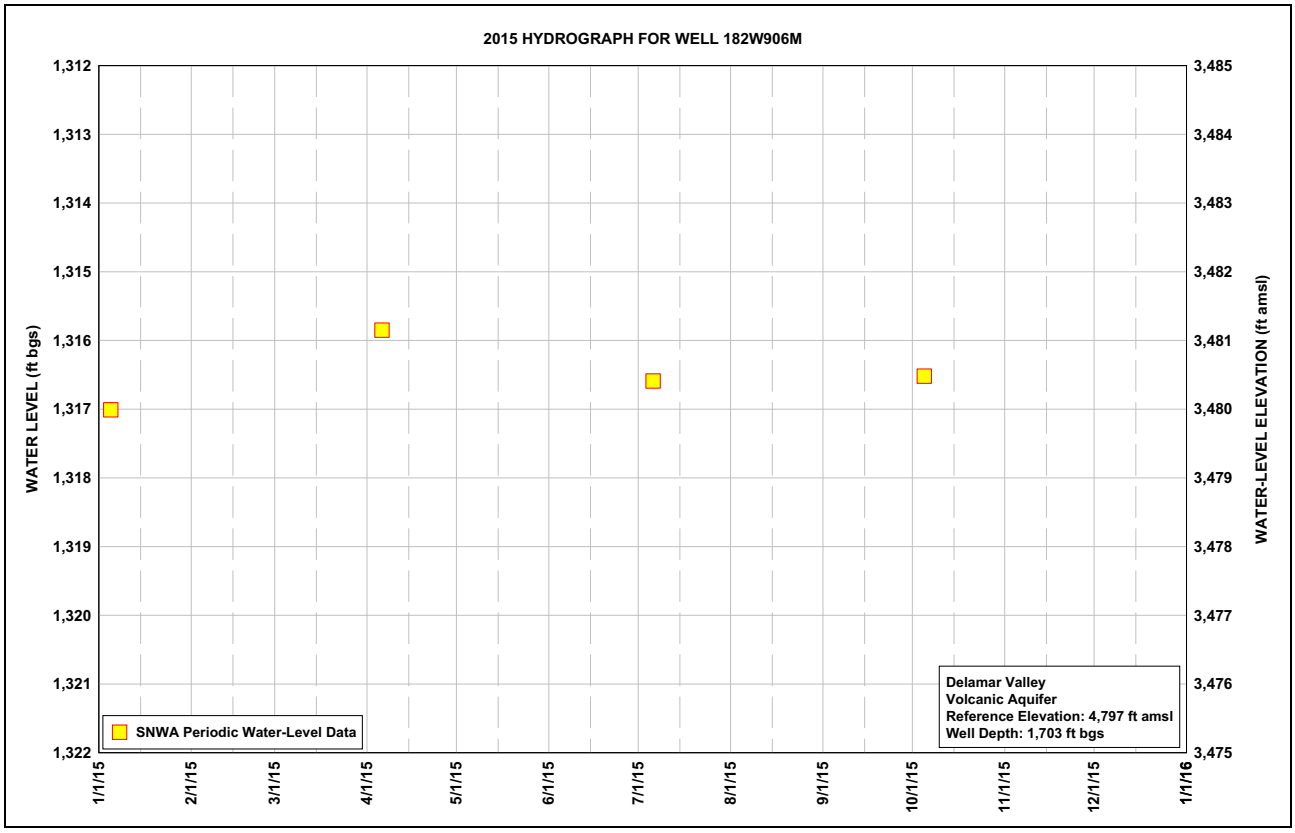
1/1/15
7/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Basin-Fill Aquifer
Reference Elevation: 6,163 ft amsl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WATER-LEVEL ELEVATION (ft amsl)
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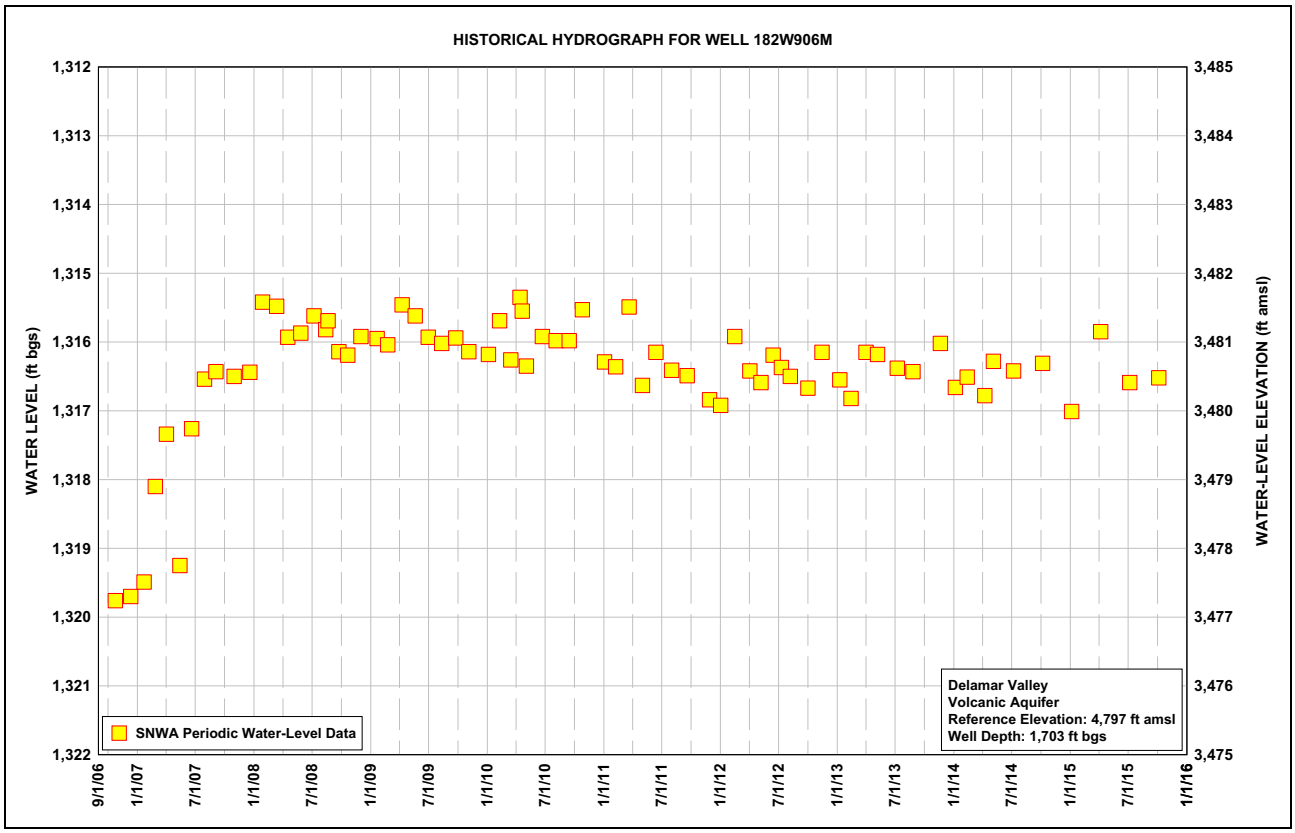
1,314
1,315
1,316
1,317
1,318
1,319
1,320
1,321
1,322
3,485
3,484
3,483
3,482
3,481
3,480
3,479
3,478
3,477
3,476
3,475
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Delamar Valley
Volcanic Aquifer
Reference Elevation: 4,797 ft amsl
Well Depth: 1,703 ft bgs


HISTORICAL HYDROGRAPH FOR WELL 182W906M
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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1,317
1,318
1,319
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1,322
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9/1/06
1/1/07
7/1/07
1/1/08
7/1/08
1/1/09
7/1/09
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7/1/10
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1/1/13
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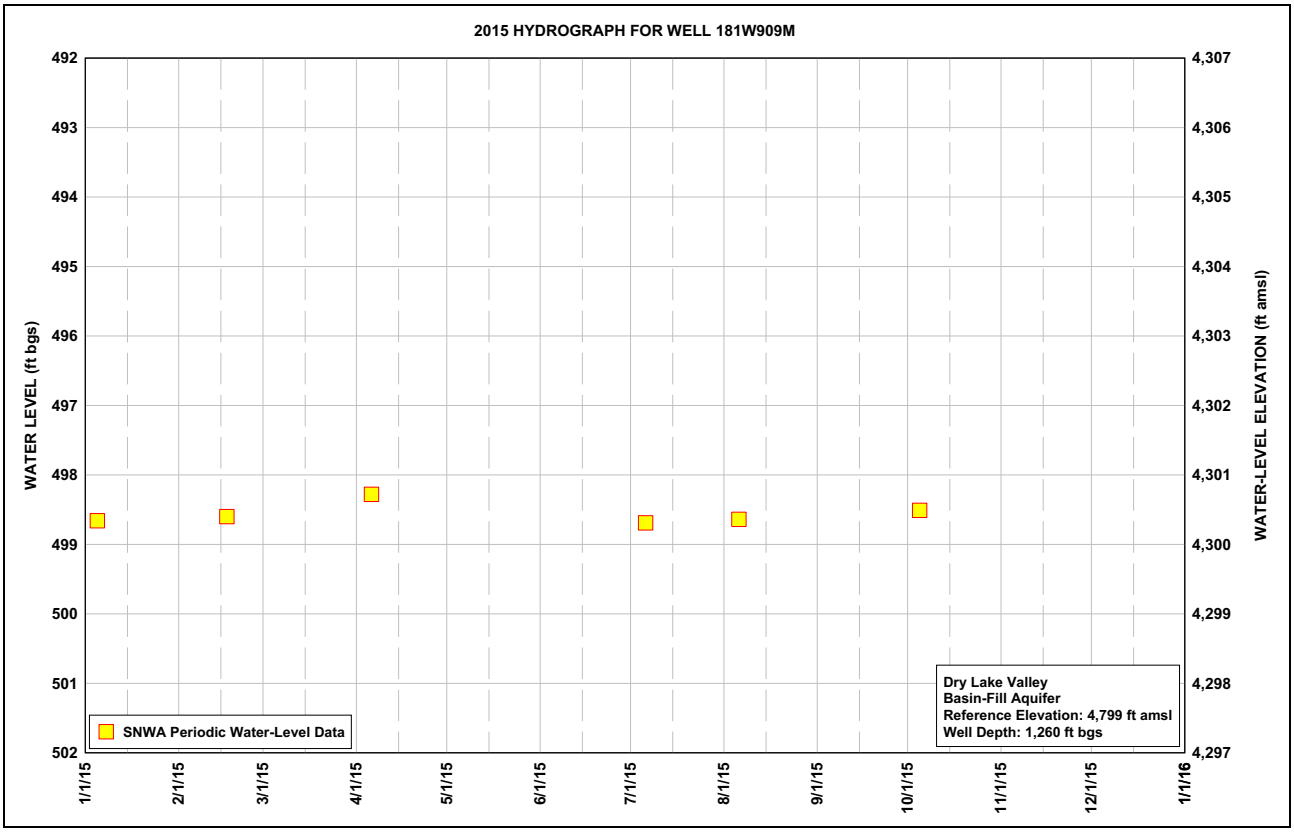
1/1/14
7/1/14
1/1/15
7/1/15
1/1/16
SNWA Periodic Water-Level Data
Delamar Valley
Volcanic Aquifer
Reference Elevation: 4,797 ft amsl
Well Depth: 1,703 ft bgs


2015 HYDROGRAPH FOR WELL 181W909M
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
492
493
494
495
496
497
498
499
500
501
502
4,307
4,306
4,305
4,304
4,303
4,302
4,301
4,300
4,299
4,298
4,297
1/1/15
2/1/15
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4/1/15
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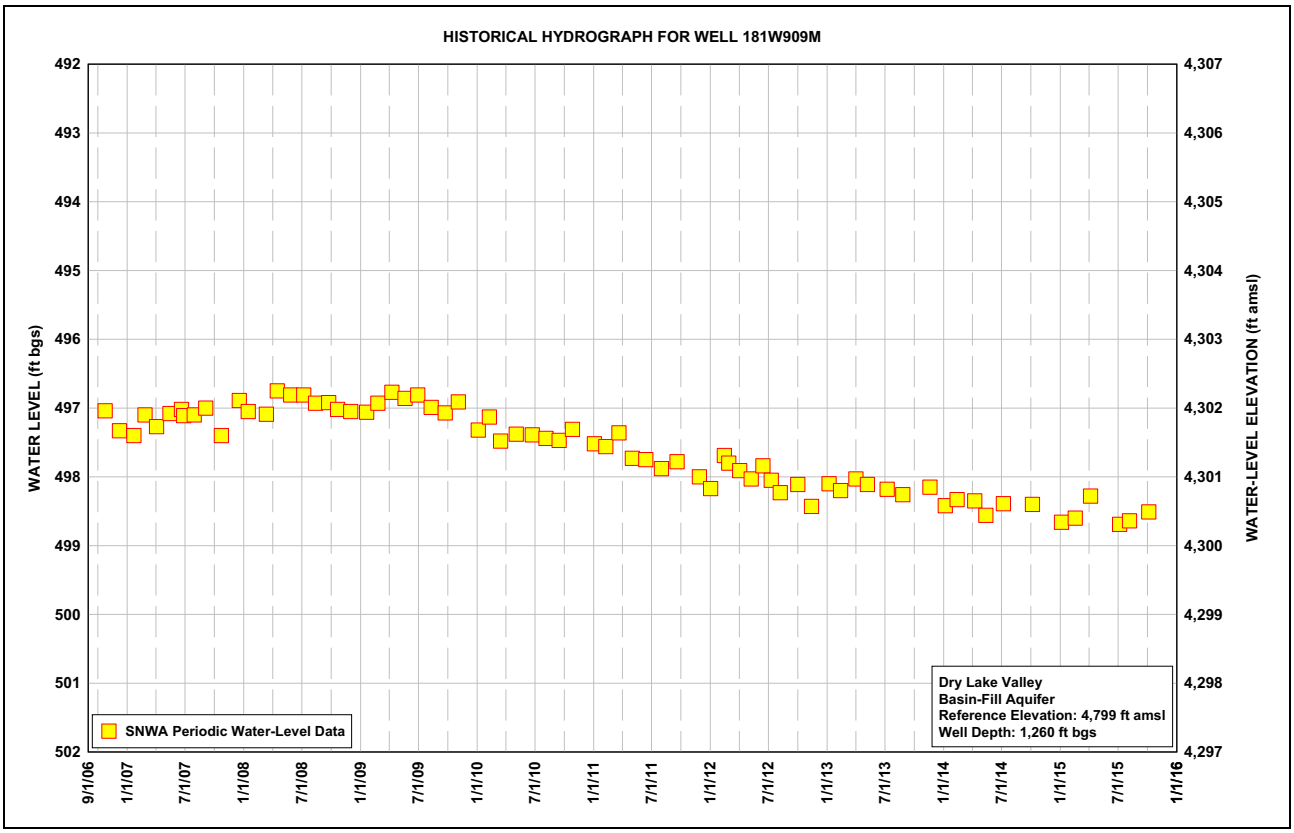
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Dry Lake Valley
Basin-Fill Aquifer
Reference Elevation: 4,799 ft amsl
Well Depth: 1,260 ft bgs


HISTORICAL HYDROGRAPH FOR WELL 181W909M
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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496
497
498
499
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501
502
4,307
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4,304
4,303
4,302
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4,300
4,299
4,298
4,297
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1/1/07
7/1/07
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7/1/08
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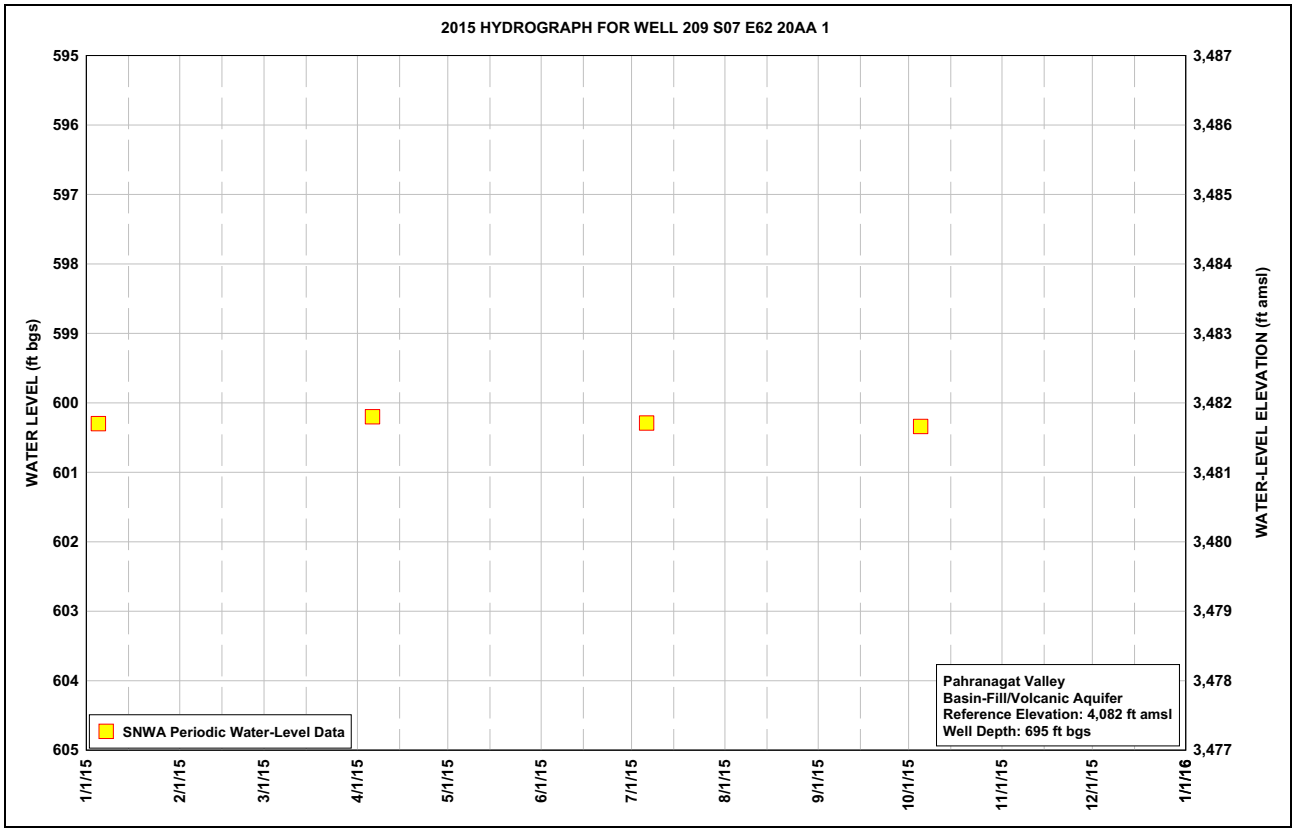
7/1/12
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
1/1/16
SNWA Periodic Water-Level Data
Dry Lake Valley
Basin-Fill Aquifer
Reference Elevation: 4,799 ft amsl
Well Depth: 1,260 ft bgs


2015 HYDROGRAPH FOR WELL 209 S07 E62 20AA 1
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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596
597
598
599
600
601
602
603
604
605
3,487
3,486
3,485
3,484
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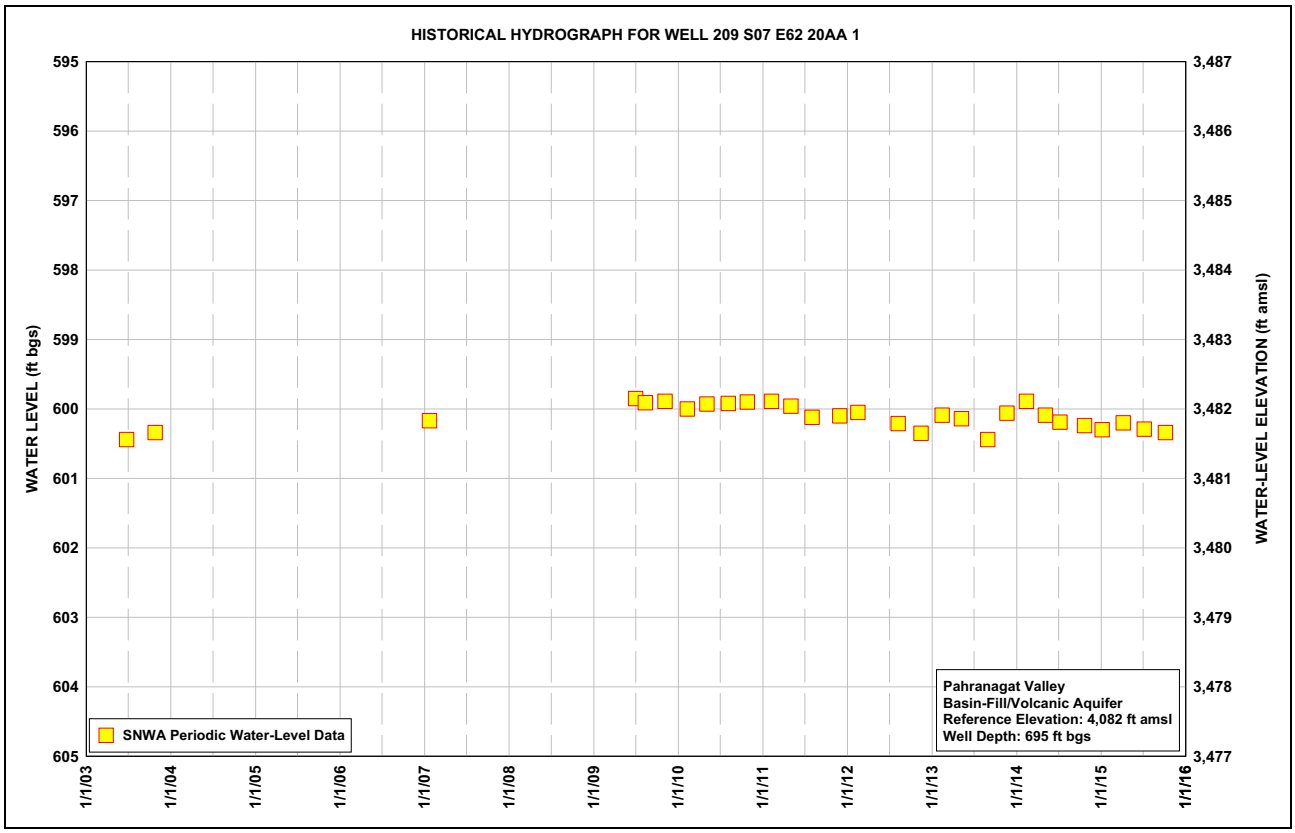
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Pahranagat Valley
Basin-Fill/Volcanic Aquifer
Reference Elevation: 4,082 ft amsl
Well Depth: 695 ft bgs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WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
595
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597
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599
600
601
602
603
604
605
3,487
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3,484
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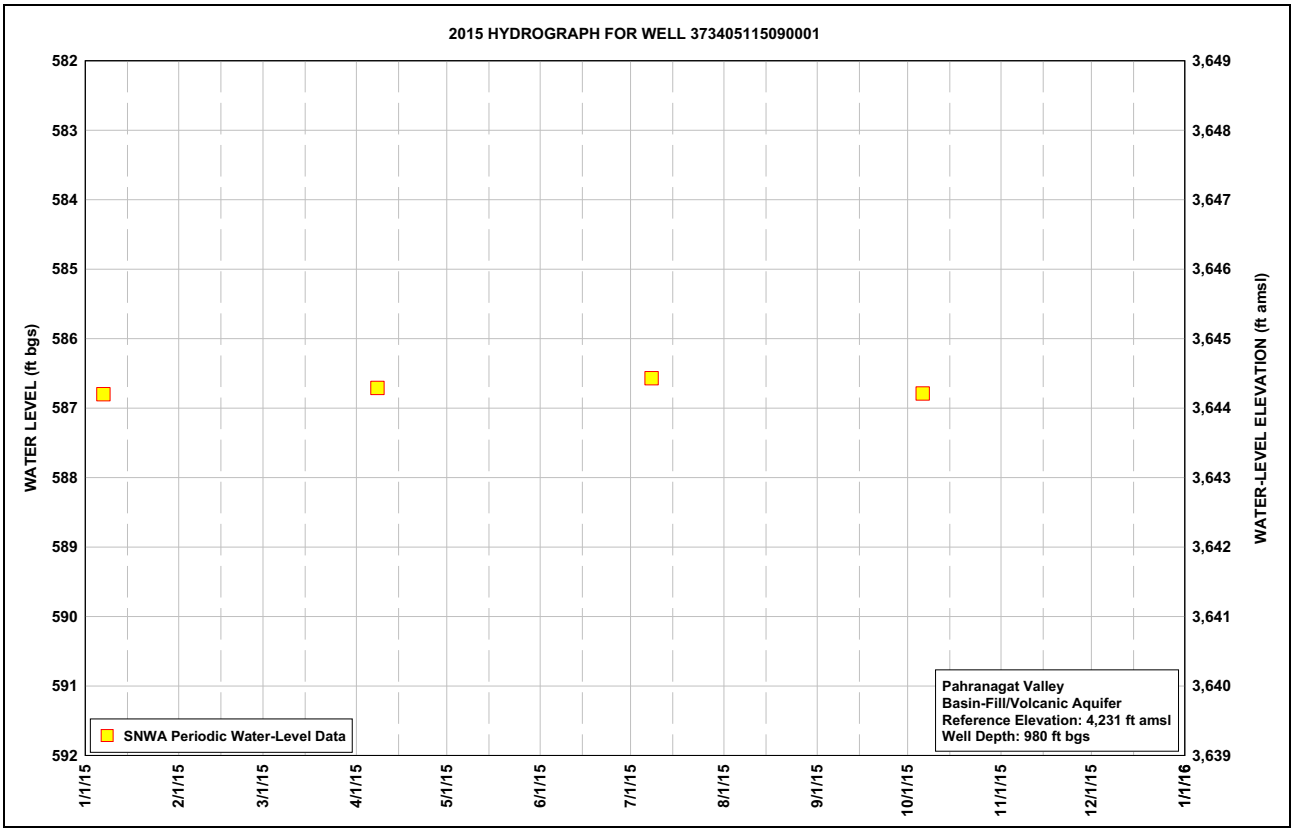
1/1/11
1/1/12
1/1/13
1/1/14
1/1/15
1/1/16
SNWA Periodic Water-Level Data
Pahranagat Valley
Basin-Fill/Volcanic Aquifer
Reference Elevation: 4,082 ft amsl
Well Depth: 695 ft bgs


2015 HYDROGRAPH FOR WELL 373405115090001
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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583
584
585
586
587
588
589
590
591
592
3,649
3,648
3,647
3,646
3,645
3,644
3,643
3,642
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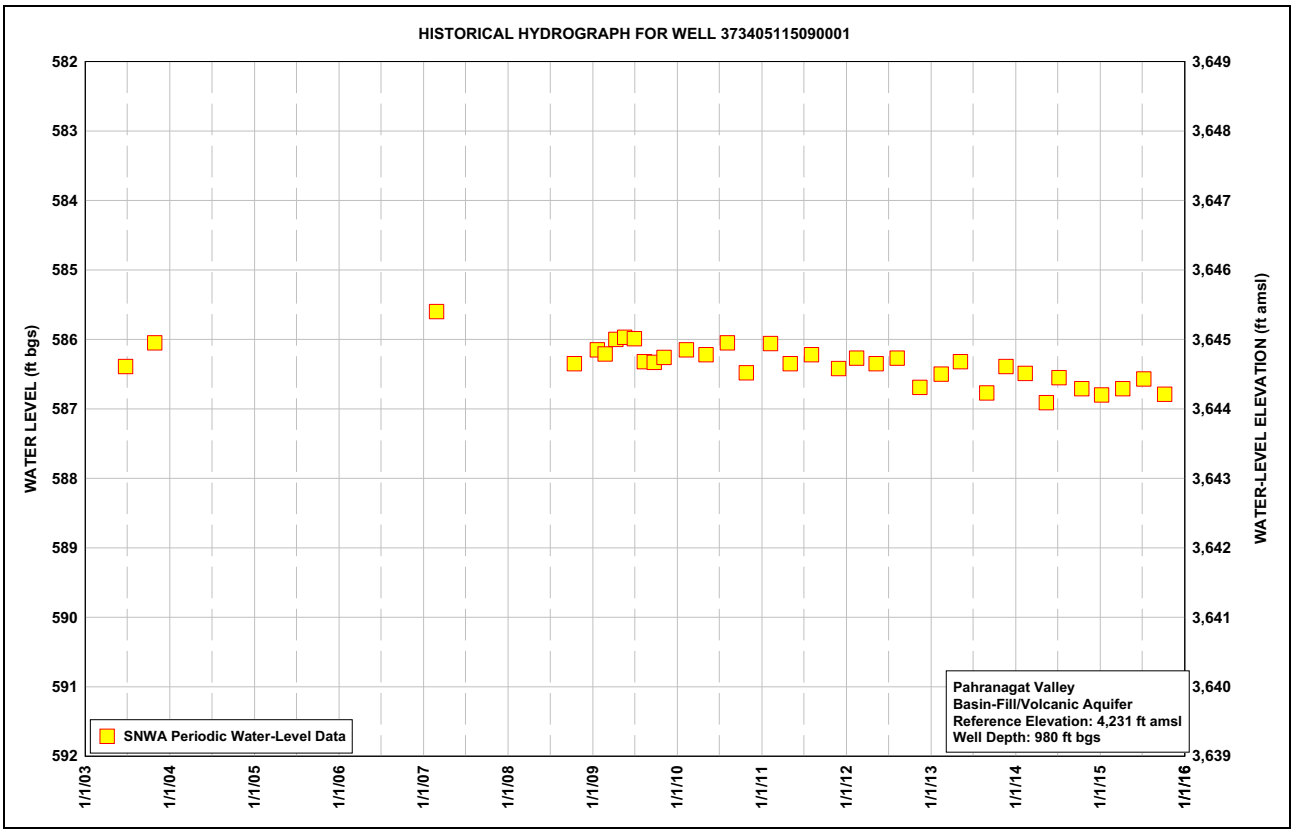
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Pahranagat Valley
Basin-Fill/Volcanic Aquifer
Reference Elevation: 4,231 ft amsl
Well Depth: 980 ft bgs


HISTORICAL HYDROGRAPH FOR WELL 373405115090001
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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584
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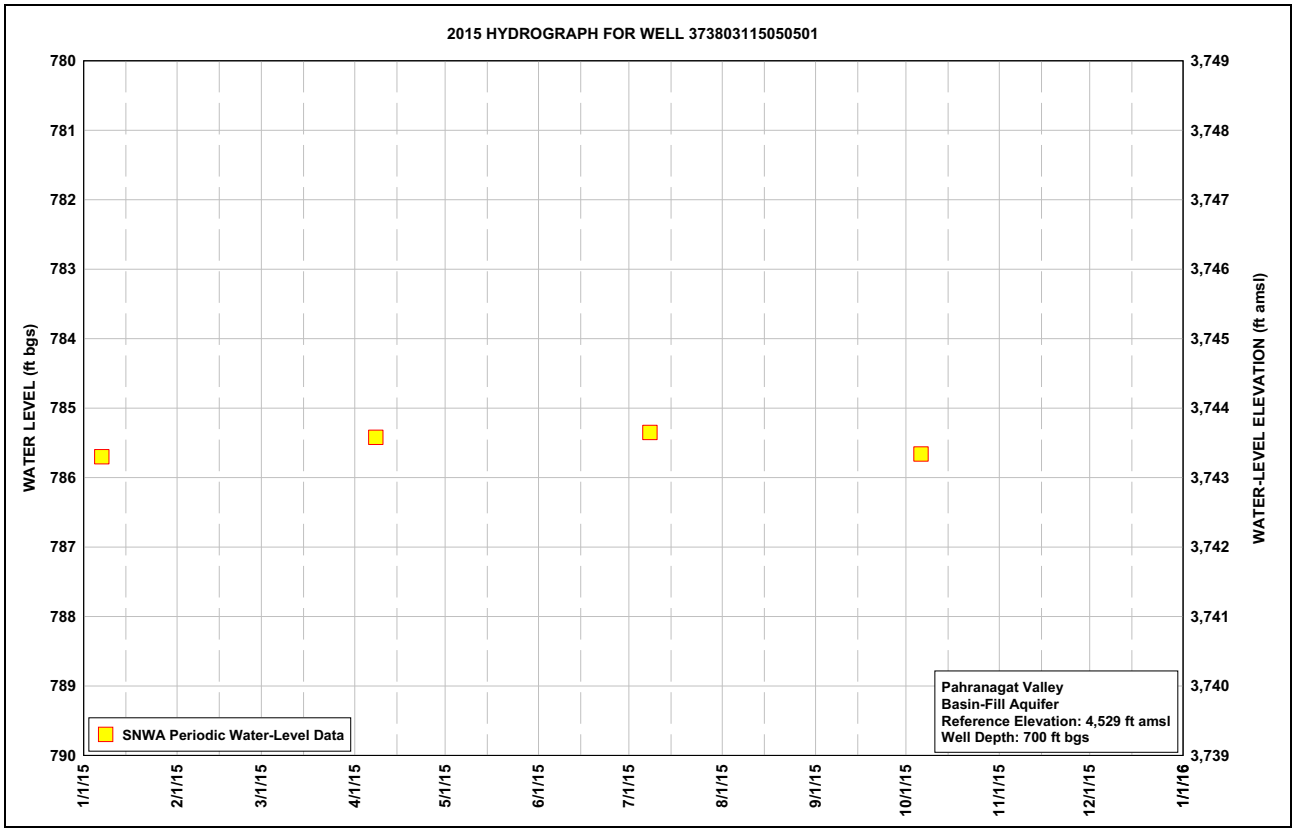
592
3,649
3,648
3,647
3,646
3,645
3,644
3,643
3,642
3,641
3,640
3,639
1/1/03
1/1/04
1/1/05
1/1/06
1/1/07
1/1/08
1/1/09
1/1/10
1/1/11
1/1/12
1/1/13
1/1/14
1/1/15
1/1/16
SNWA Periodic Water-Level Data
Pahranagat Valley
Basin-Fill/Volcanic Aquifer
Reference Elevation: 4,231 ft amsl
Well Depth: 980 ft bgs


2015 HYDROGRAPH FOR WELL 373803115050501
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
780
781
782
783
784
785
786
787
788
789
790
3,749
3,748
3,747
3,746
3,745
3,744
3,743
3,742
3,741
3,740
3,739
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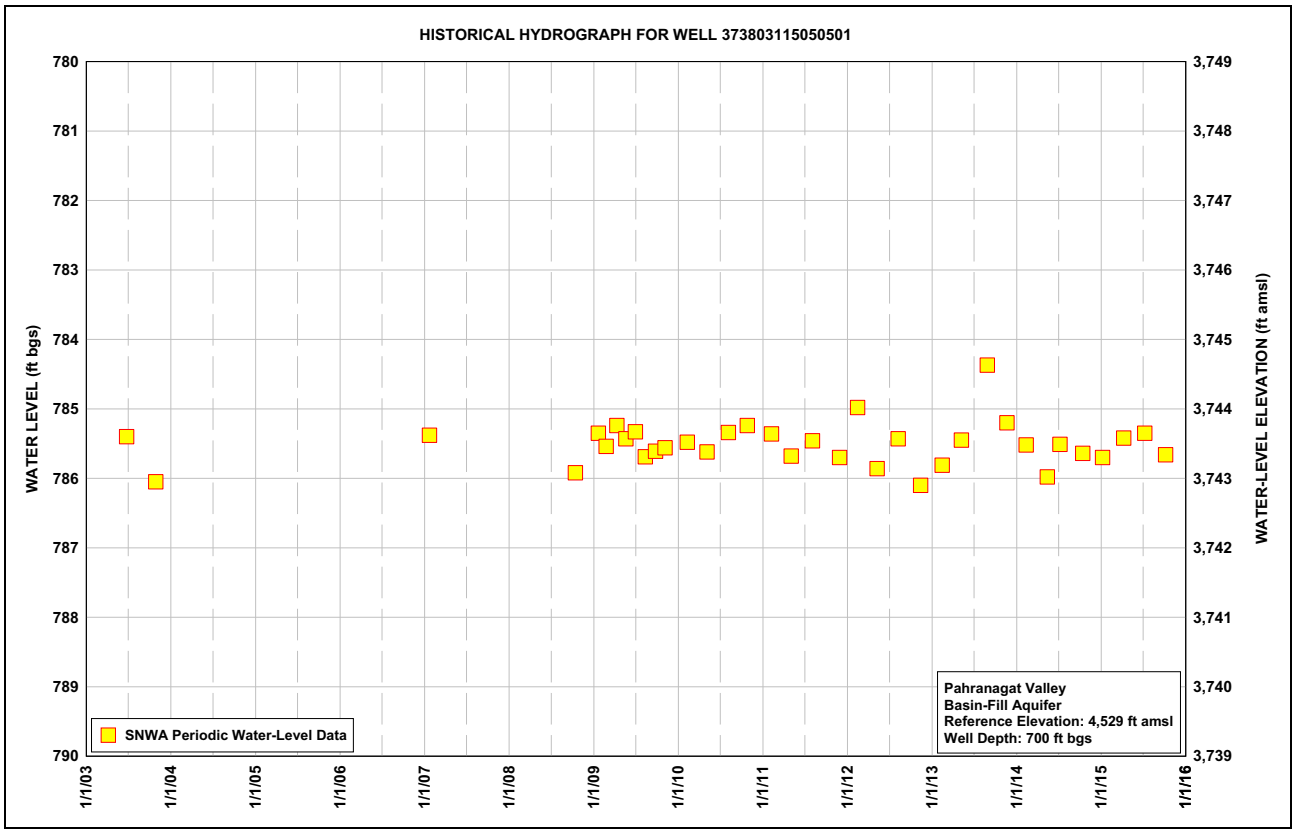
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Pahranagat Valley
Basin-Fill Aquifer
Reference Elevation: 4,529 ft amsl
Well Depth: 700 ft bgs


HISTORICAL HYDROGRAPH FOR WELL 373803115050501
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
780
781
782
783
784
785
786
787
788
789
790
3,749
3,748
3,747
3,746
3,745
3,744
3,743
3,742
3,741
3,740
3,739
1/1/03
1/1/04
1/1/05
1/1/06
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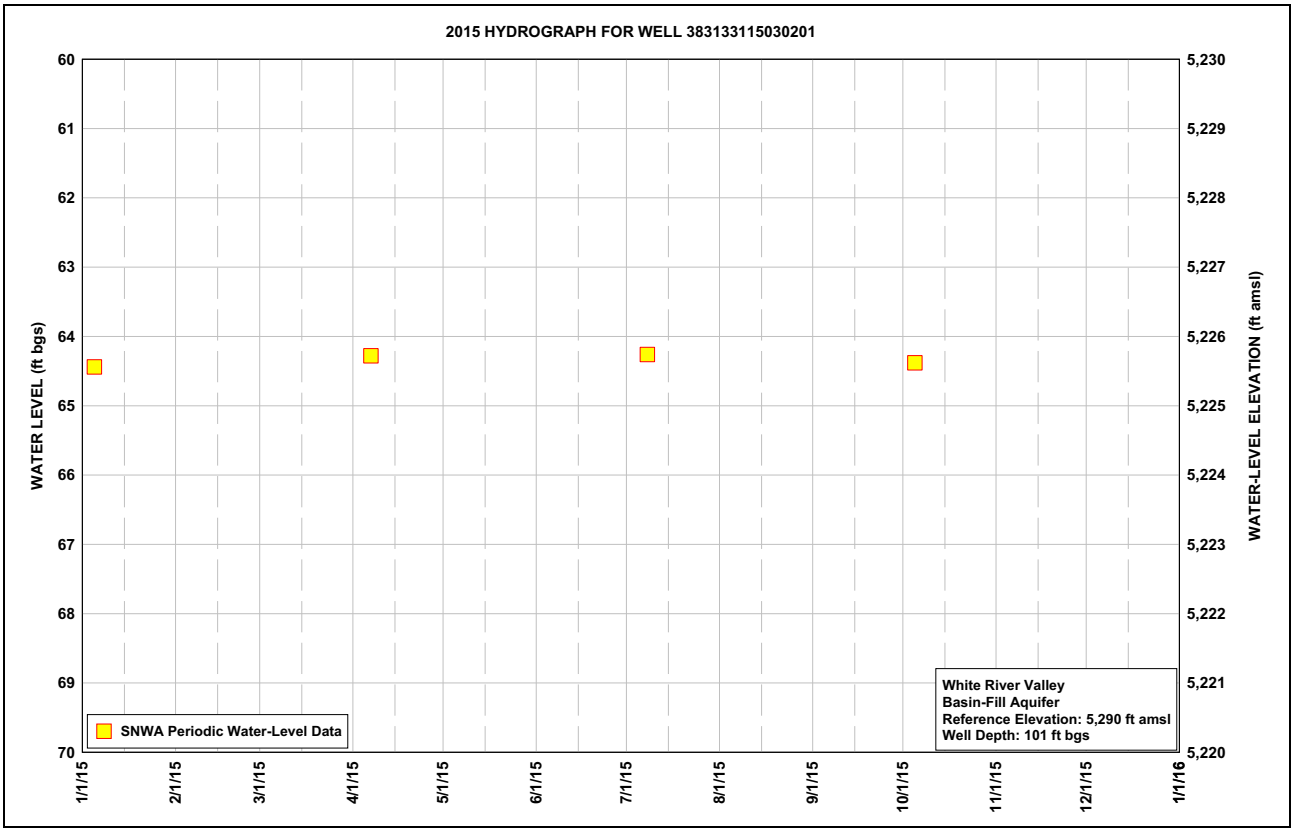
1/1/08
1/1/09
1/1/10
1/1/11
1/1/12
1/1/13
1/1/14
1/1/15
1/1/16
SNWA Periodic Water-Level Data
Pahranagat Valley
Basin-Fill Aquifer
Reference Elevation: 4,529 ft amsl
Well Depth: 700 ft bgs


2015 HYDROGRAPH FOR WELL 383133115030201
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
60
61
62
63
64
65
66
67
68
69
70
5,230
5,229
5,228
5,227
5,226
5,225
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5,223
5,222
5,221
5,220
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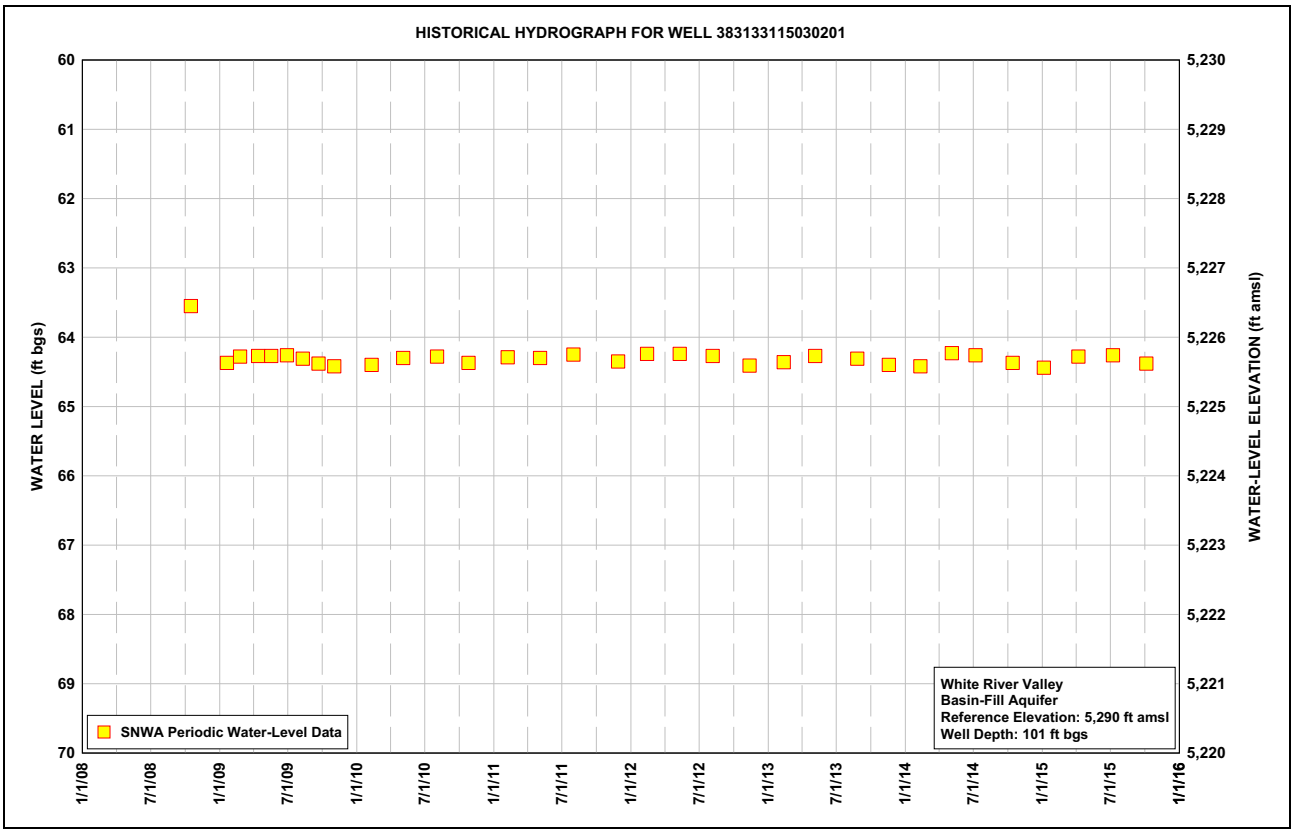
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
White River Valley
Basin-Fill Aquifer
Reference Elevation: 5,290 ft amsl
Well Depth: 101 ft bgs


HISTORICAL HYDROGRAPH FOR WELL 383133115030201
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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66
67
68
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70
5,230
5,229
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5,225
5,224
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5,222
5,221
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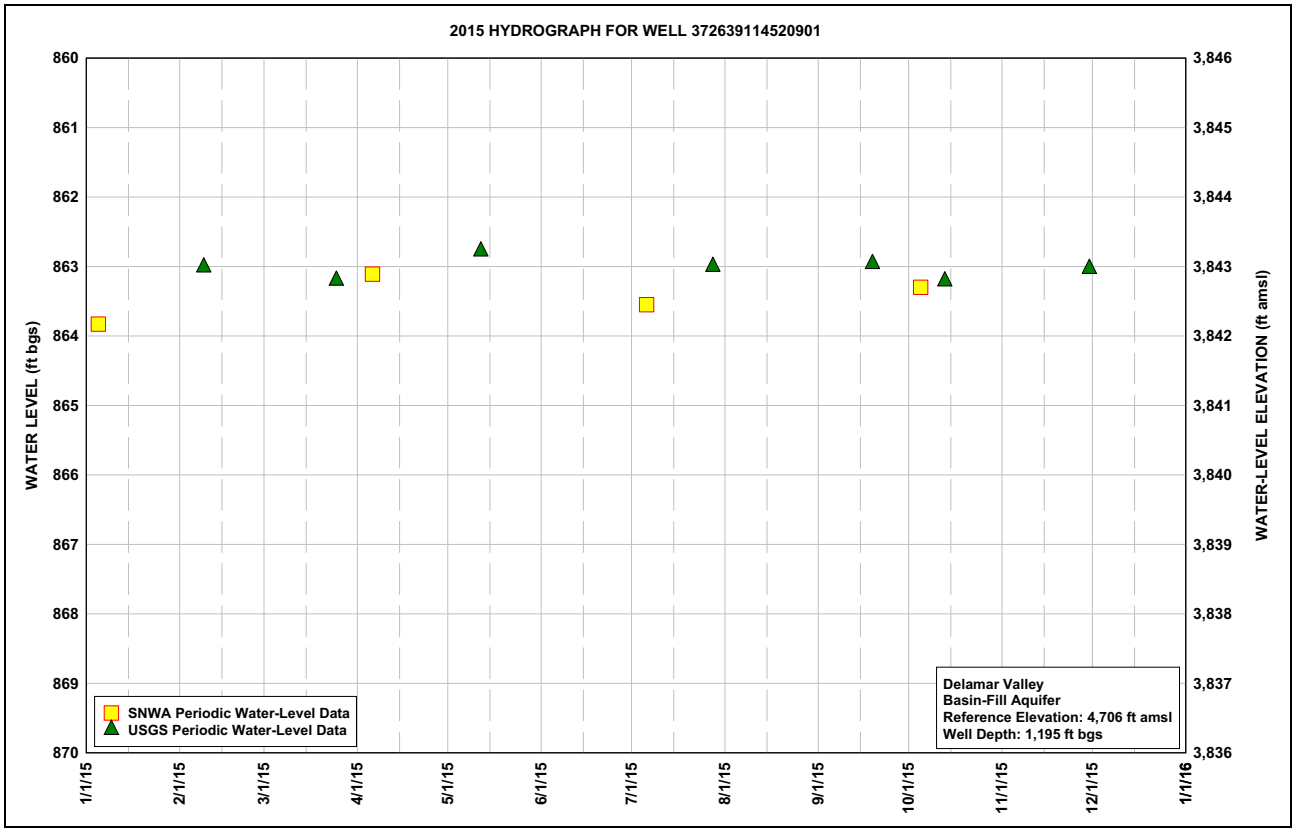
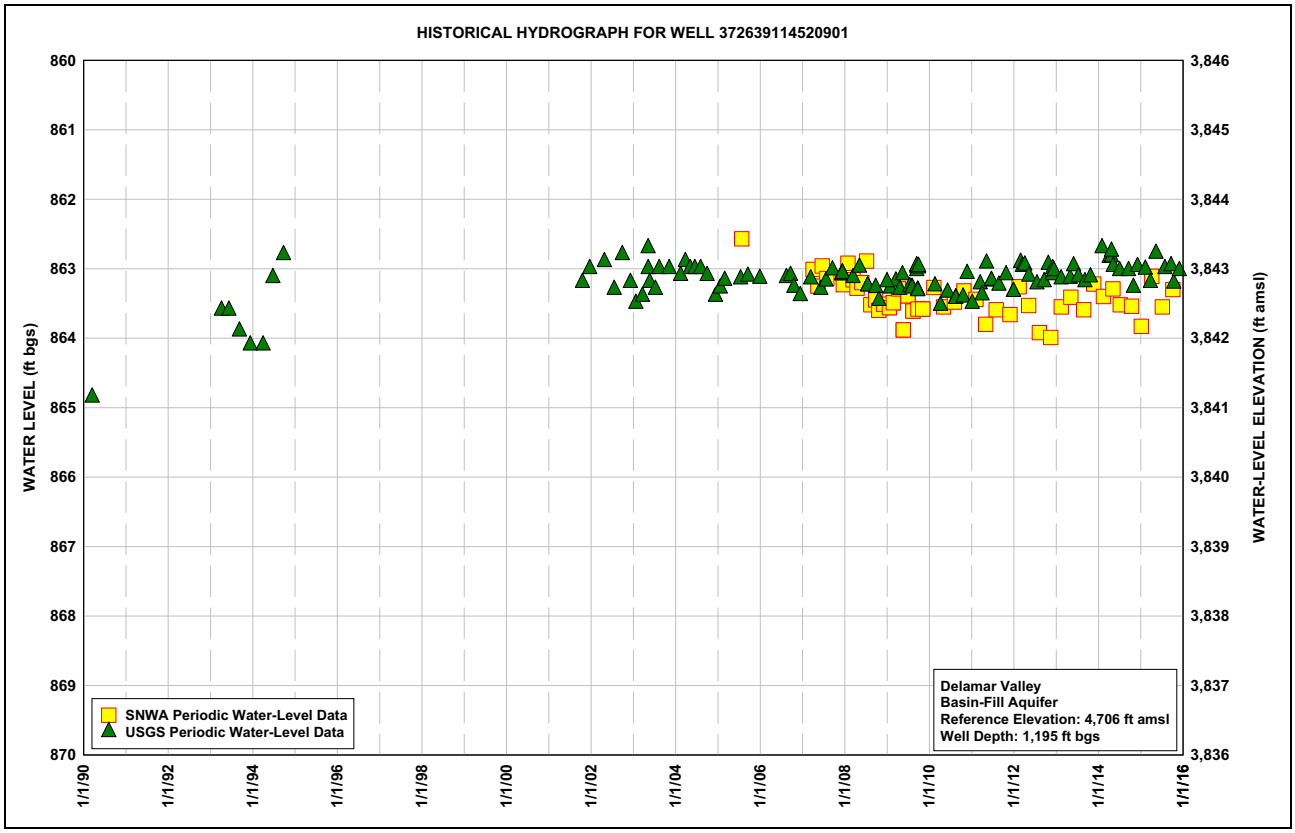
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
1/1/16
SNWA Periodic Water-Level Data
White River Valley
Basin-Fill Aquifer
Reference Elevation: 5,290 ft amsl
Well Depth: 101 ft bgs


2015 HYDROGRAPH FOR WELL 372639114520901
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
860
861
862
863
864
865
866
867
868
869
870
3,846
3,845
3,844
3,843
3,842
3,841
3,840
3,839
3,838
3,837
3,836
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
USGS Periodic Water-Level Data
Delamar Valley
Basin-Fill Aquifer
Reference Elevation: 4,706 ft amsl
Well Depth: 1,195 ft bgs


HISTORICAL HYDROGRAPH FOR WELL 372639114520901
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
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861
862
863
864
865
866
867
868
869
870
3,846
3,845
3,844
3,843
3,842
3,841
3,840
3,839
3,838
3,837
3,836
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1/1/04
1/1/06
1/1/08
1/1/10
1/1/12
1/1/14
1/1/16
SNWA Periodic Water-Level Data
USGS Periodic Water-Level Data
Delamar Valley
Basin-Fill Aquifer
Reference Elevation: 4,706 ft amsl
Well Depth: 1,195 ft bgs

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Appendix B

DDC3M Plan
Continuous Water-Level Data

B.1.0 MONITORING PROGRAM WELLS WITH CONTINUOUS TRANSDUCER DATA

Continuous data collection was performed in CY 2015 for the following monitor wells:

- Cave Valley Well 180W902M
- Cave Valley Well 180W501M
- Delamar Valley Well 182M-1
- Dry Lake Valley Well 181M-1
- Dry Lake Valley Well 380531114534201
- Pahranagat Valley Well 209M-1

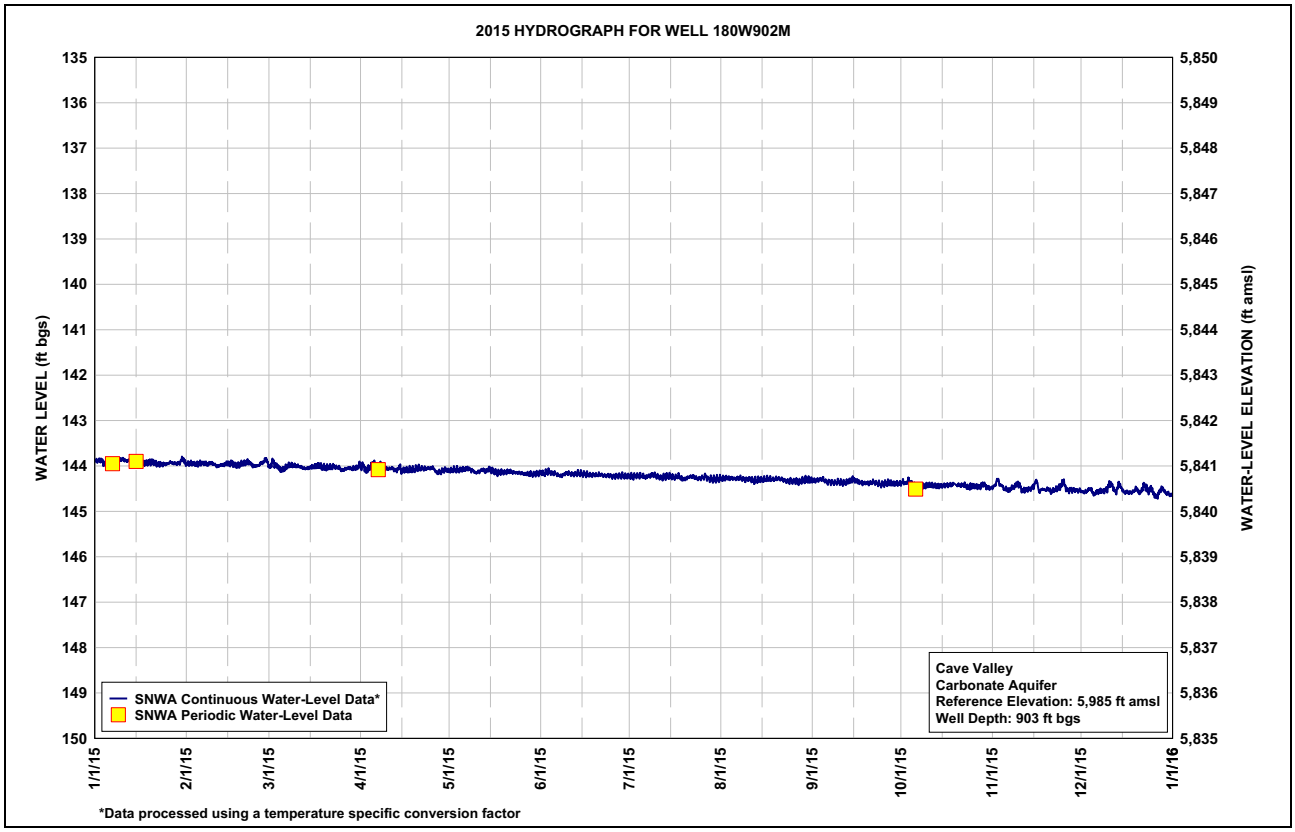
For these sites, two hydrographs are presented that include data collected in CY 2015 and during the historical period of record. Continuous data have been corrected for temperature and transducer cable stretch.

Table B-1
Cave Valley Well 180W902M, Calendar Year 2015
Water-Level Data, Daily-Mean Values

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	143.90	143.95	144.00	144.00	144.10	144.15	144.23	144.28	144.32	144.37	144.44	144.57
2	143.87	143.95	143.91	144.06	144.08	144.17	144.23	144.26	144.32	144.38	144.32	144.58
3	143.90	143.94	143.98	144.08	144.09	144.14	144.22	144.27	144.30	144.33	144.42	144.53
4	143.95	143.96	144.04	144.01	144.10	144.14	144.22	144.28	144.31	144.38	144.44	144.53
5	143.95	143.94	144.07	143.95	144.08	144.17	144.23	144.28	144.34	144.42	144.52	144.62
6	143.93	143.94	144.04	143.99	144.06	144.17	144.25	144.28	144.34	144.44	144.54	144.57
7	143.90	143.94	143.99	143.99	144.05	144.21	144.23	144.28	144.36	144.45	144.49	144.55
8	143.86	143.96	143.99	144.08	144.09	144.20	144.20	144.29	144.37	144.45	144.46	144.55
9	143.86	143.94	143.99	144.07	144.13	144.17	144.22	144.30	144.36	144.44	144.41	144.54
10	143.85	143.97	144.00	144.07	144.14	144.16	144.23	144.29	144.36	144.42	144.44	144.44
11	143.89	144.00	144.02	144.06	144.11	144.18	144.24	144.31	144.38	144.42	144.53	144.41
12	143.88	144.00	144.05	144.08	144.08	144.16	144.25	144.33	144.36	144.43	144.52	144.54
13	143.90	143.98	144.06	144.08	144.10	144.16	144.23	144.33	144.34	144.44	144.50	144.46
14	143.92	143.95	144.05	144.04	144.08	144.18	144.24	144.31	144.30	144.43	144.47	144.48
15	143.95	143.96	144.03	144.09	144.10	144.18	144.24	144.31	144.32	144.43	144.37	144.57
16	143.91	143.95	144.01	144.09	144.12	144.20	144.25	144.31	144.35	144.42	144.48	144.57
17	143.94	143.97	143.99	144.10	144.14	144.20	144.24	144.30	144.36	144.42	144.53	144.59
18	143.92	143.98	144.01	144.08	144.13	144.20	144.26	144.30	144.39	144.41	144.52	144.58
19	143.92	143.95	144.04	144.08	144.13	144.20	144.29	144.30	144.38	144.42	144.53	144.53
20	143.91	143.94	144.04	144.07	144.14	144.21	144.26	144.29	144.38	144.43	144.54	144.57
21	143.93	143.92	144.03	144.07	144.13	144.20	144.24	144.30	144.35	144.43	144.55	144.55
22	143.95	143.93	144.02	144.07	144.13	144.21	144.24	144.32	144.38	144.44	144.52	144.43
23	143.96	143.99	144.02	144.06	144.15	144.21	144.26	144.33	144.40	144.46	144.49	144.52
24	143.96	144.00	144.04	144.06	144.16	144.21	144.28	144.33	144.41	144.46	144.41	144.52
25	143.95	143.99	144.08	144.06	144.16	144.22	144.26	144.33	144.40	144.46	144.43	144.59
26	143.93	143.94	144.08	144.13	144.18	144.22	144.24	144.34	144.38	144.44	144.53	144.66
27	143.94	143.90	144.05	144.14	144.18	144.22	144.27	144.35	144.38	144.45	144.52	144.57
28	143.94	143.91	144.05	144.12	144.18	144.21	144.30	144.34	144.38	144.42	144.53	144.49
29	143.93	---	144.06	144.09	144.18	144.23	144.29	144.32	144.40	144.42	144.53	144.58
30	143.87	---	144.04	144.10	144.18	144.22	144.30	144.31	144.39	144.45	144.54	144.61
31	143.90	---	144.01	---	144.16	---	144.28	144.33	---	144.49	---	144.64
Max	143.96	144.00	144.08	144.14	144.18	144.23	144.30	144.35	144.41	144.49	144.55	144.66
Min	143.85	143.90	143.91	143.95	144.05	144.14	144.20	144.26	144.30	144.33	144.32	144.41

Year 2015 Statistics: **Year Max 144.66; Year Min 143.85**

Note: Water level in ft bgs


2015 HYDROGRAPH FOR WELL 180W902M
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
5,850
5,849
5,848
5,847
5,846
5,845
5,844
5,843
5,842
5,841
5,840
5,839
5,838
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5,836
5,835
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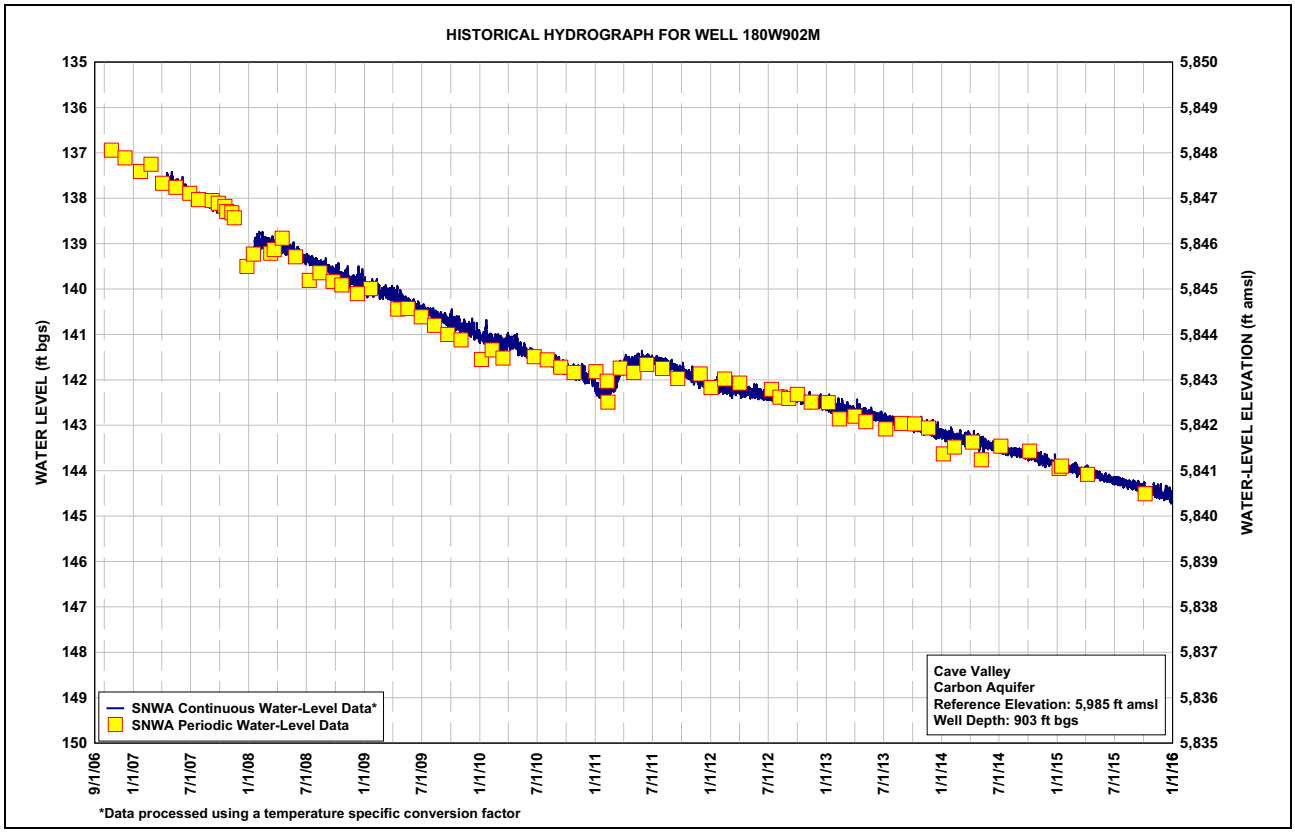
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 5,985 ft amsl
Well Depth: 903 ft bgs
*Data processed using a temperature specific conversion factor


HISTORICAL HYDROGRAPH FOR WELL 180W902M
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
5,850
5,849
5,848
5,847
5,846
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7/1/07
1/1/08
7/1/08
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7/1/09
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7/1/10
1/1/11
7/1/11
1/1/12
7/1/12
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Cave Valley
Carbon Aquifer
Reference Elevation: 5,985 ft amsl
Well Depth: 903 ft bgs
*Data processed using a temperature specific conversion factor

Table B-2
Cave Valley Well 180W501M, Calendar Year 2015
Water-Level Data, Daily-Mean Values

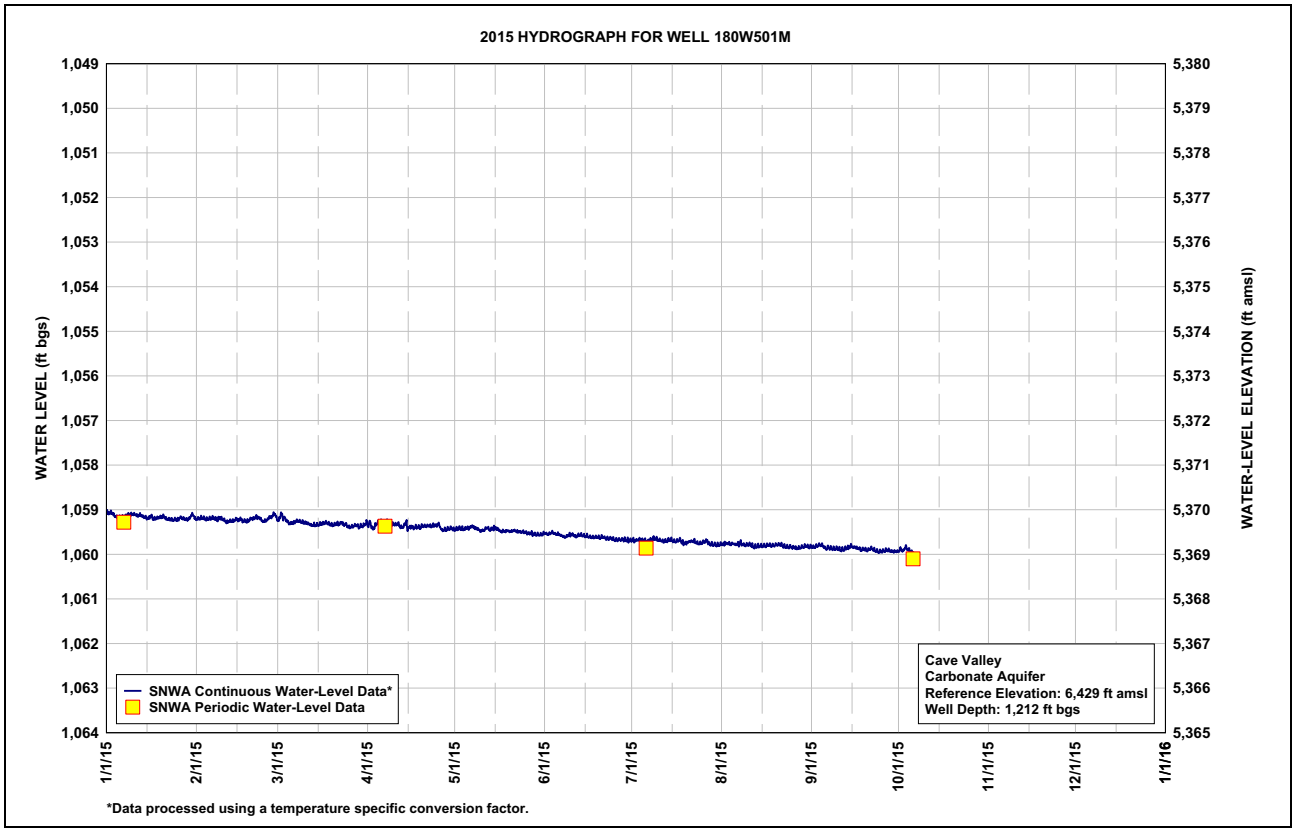
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1,059.08	1,059.21	1,059.21	1,059.31	1,059.45	1,059.54	1,059.69	1,059.77	1,059.84	---[a]	---[a]	---[a]
2	1,059.07	1,059.20	1,059.11	1,059.39	1,059.43	1,059.55	1,059.69	1,059.75	1,059.83	---[a]	---[a]	---[a]
3	1,059.10	1,059.20	1,059.19	1,059.38	1,059.43	1,059.52	1,059.67	1,059.76	1,059.81	---[a]	---[a]	---[a]
4	1,059.15	1,059.21	1,059.27	1,059.29	1,059.44	1,059.53	1,059.68	1,059.77	1,059.80	---[a]	---[a]	---[a]
5	1,059.16	1,059.21	1,059.31	1,059.26	1,059.41	1,059.55	1,059.69	1,059.77	1,059.84	---[a]	---[a]	---[a]
6	1,059.18	1,059.19	1,059.29	1,059.30	1,059.39	1,059.57	1,059.71	1,059.78	1,059.86	---[a]	---[a]	---[a]
7	1,059.15	1,059.20	1,059.27	1,059.27	1,059.38	1,059.60	1,059.68	1,059.76	1,059.87	---[a]	---[a]	---[a]
8	1,059.12	1,059.22	1,059.26	1,059.36	1,059.42	1,059.60	1,059.65	1,059.78	1,059.89	---[a]	---[a]	---[a]
9	1,059.11	1,059.19	1,059.28	1,059.34	1,059.45	1,059.58	1,059.66	1,059.80	1,059.89	---[a]	---[a]	---[a]
10	1,059.10	1,059.23	1,059.30	1,059.33	1,059.47	1,059.56	1,059.68	1,059.79	1,059.89	---[a]	---[a]	---[a]
11	1,059.12	1,059.28	1,059.32	1,059.33	1,059.43	1,059.59	1,059.70	1,059.80	1,059.91	---[a]	---[a]	---[a]
12	1,059.13	1,059.26	1,059.34	1,059.38	1,059.41	1,059.58	1,059.72	1,059.84	1,059.89	---[a]	---[a]	---[a]
13	1,059.14	1,059.25	1,059.35	1,059.37	1,059.45	1,059.58	1,059.70	1,059.83	1,059.86	---[a]	---[a]	---[a]
14	1,059.18	1,059.23	1,059.35	1,059.32	1,059.41	1,059.59	1,059.69	1,059.81	1,059.82	---[a]	---[a]	---[a]
15	1,059.19	1,059.23	1,059.34	1,059.40	1,059.42	1,059.60	1,059.71	1,059.83	1,059.84	---[a]	---[a]	---[a]
16	1,059.15	1,059.21	1,059.32	1,059.39	1,059.47	1,059.62	1,059.72	1,059.81	1,059.85	---[a]	---[a]	---[a]
17	1,059.20	1,059.26	1,059.30	1,059.40	1,059.49	1,059.63	1,059.70	1,059.80	1,059.87	---[a]	---[a]	---[a]
18	1,059.19	1,059.26	1,059.31	1,059.39	1,059.48	1,059.63	1,059.73	1,059.81	1,059.90	---[a]	---[a]	---[a]
19	1,059.17	1,059.22	1,059.35	1,059.39	1,059.48	1,059.62	1,059.76	1,059.80	1,059.90	---[a]	---[a]	---[a]
20	1,059.15	1,059.20	1,059.35	1,059.38	1,059.49	1,059.63	1,059.72	1,059.79	1,059.90	---[a]	---[a]	---[a]
21	1,059.19	1,059.18	1,059.32	1,059.37	1,059.47	1,059.62	1,059.71	1,059.79	1,059.89	---[a]	---[a]	---[a]
22	1,059.22	1,059.18	1,059.32	1,059.37	1,059.48	1,059.65	1,059.71	1,059.82	1,059.89	---[a]	---[a]	---[a]
23	1,059.22	1,059.24	1,059.32	1,059.36	1,059.49	1,059.65	1,059.74	1,059.85	1,059.93	---[a]	---[a]	---[a]
24	1,059.23	1,059.26	1,059.34	1,059.35	1,059.50	1,059.66	1,059.77	1,059.85	1,059.95	---[a]	---[a]	---[a]
25	1,059.22	1,059.22	1,059.39	1,059.33	1,059.51	1,059.68	1,059.74	1,059.84	1,059.93	---[a]	---[a]	---[a]
26	1,059.19	1,059.17	1,059.39	1,059.44	1,059.53	1,059.68	1,059.71	1,059.86	1,059.92	---[a]	---[a]	---[a]
27	1,059.20	1,059.12	1,059.37	1,059.45	1,059.54	1,059.68	1,059.75	1,059.87	1,059.91	---[a]	---[a]	---[a]
28	1,059.22	1,059.16	1,059.36	1,059.45	1,059.55	1,059.68	1,059.78	1,059.85	1,059.93	---[a]	---[a]	---[a]
29	1,059.19	---	1,059.38	1,059.43	1,059.57	1,059.69	1,059.79	1,059.84	1,059.94	---[a]	---[a]	---[a]
30	1,059.12	---	1,059.36	1,059.43	1,059.57	1,059.69	1,059.80	1,059.83	1,059.94	---[a]	---[a]	---[a]
31	1,059.18	---	1,059.32	---	1,059.55	---	1,059.79	1,059.85	---	---[a]	---	---[a]
Max	1,059.23	1,059.28	1,059.39	1,059.45	1,059.57	1,059.69	1,059.80	1,059.87	1,059.95	---[a]	---[a]	---[a]
Min	1,059.07	1,059.12	1,059.11	1,059.26	1,059.38	1,059.52	1,059.65	1,059.75	1,059.80	---[a]	---[a]	---[a]

Year 2015 Statistics: **Year Max ---[b]; Year Min ---[b]**

Note: Water level in ft bgs

[a]Site Inaccessible. Data currently unavailable.

[b]Annual statistics only reported for years when all valid and obtainable data are reported.


2015 HYDROGRAPH FOR WELL 180W501M
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
1,049
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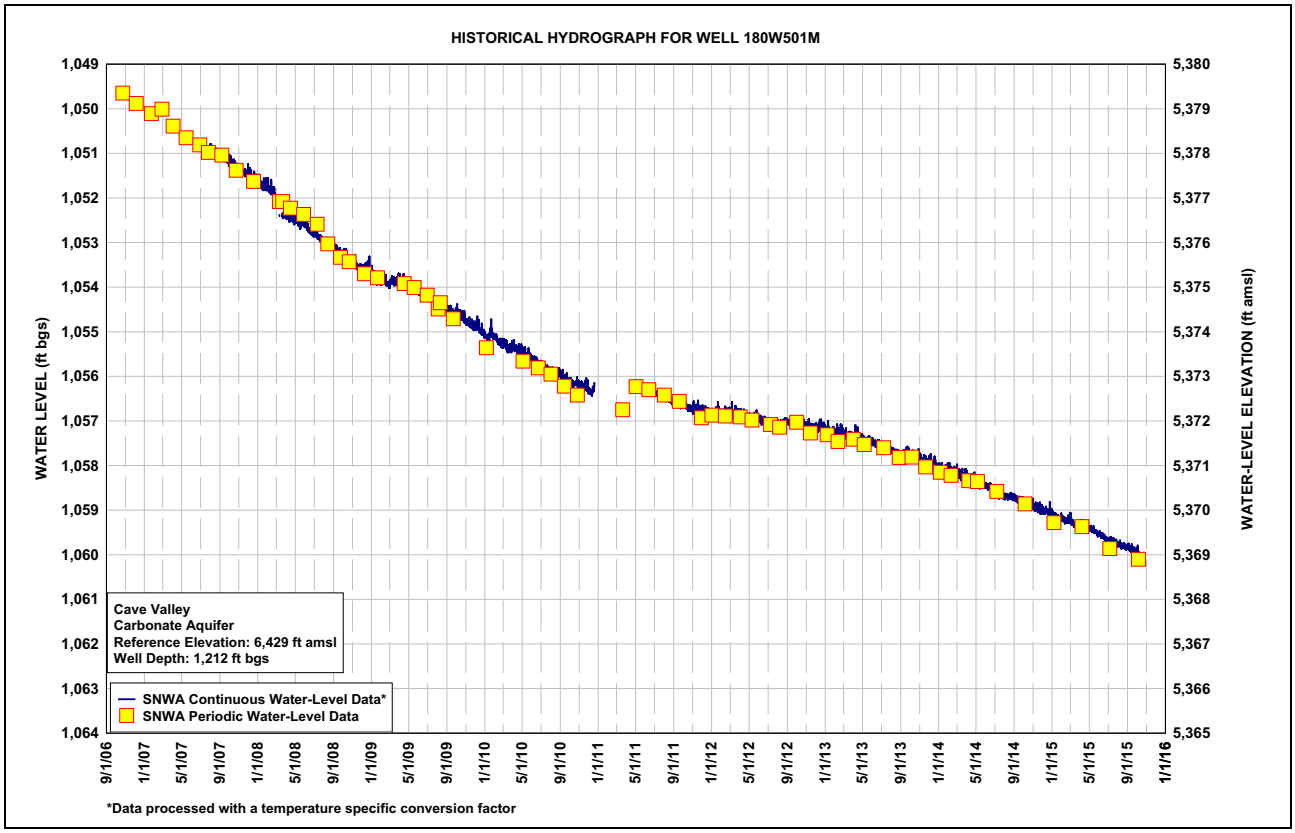
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 6,429 ft amsl
Well Depth: 1,212 ft bgs
*Data processed using a temperature specific conversion factor.


HISTORICAL HYDROGRAPH FOR WELL 180W501M
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
1,049
1,050
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5,365
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9/1/07
1/1/08
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9/1/08
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5/1/10
9/1/10
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9/1/11
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5/1/12
9/1/12
1/1/13
5/1/13
9/1/13
1/1/14
5/1/14
9/1/14
1/1/15
5/1/15
9/1/15
1/1/16
Cave Valley
Carbonate Aquifer
Reference Elevation: 6,429 ft amsl
Well Depth: 1,212 ft bgs
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
*Data processed with a temperature specific conversion factor

Table B-3
Delamar Valley Well 182M-1, Calendar Year 2015
Water-Level Data, Daily-Mean Values

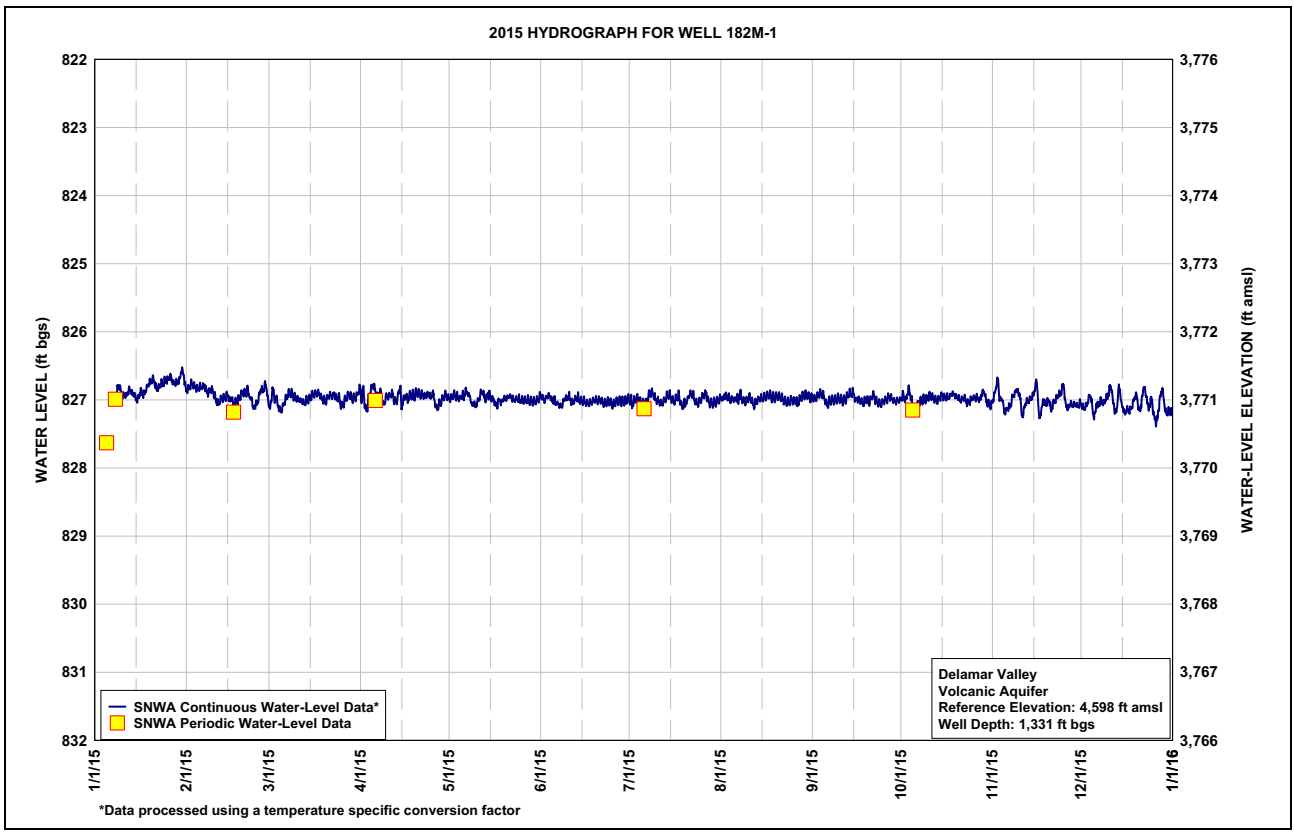
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	---[a]	826.86	827.08	826.92	826.98	826.96	827.03	826.99	826.98	826.97	826.96	827.10
2	---[a]	826.80	826.87	827.08	826.95	827.00	827.05	826.93	826.98	826.98	826.75	827.10
3	---[a]	826.79	826.99	827.09	826.96	826.95	827.00	826.97	826.93	826.89	826.97	827.00
4	---[a]	826.82	827.12	826.88	826.97	826.98	827.02	826.99	826.94	826.97	827.02	827.00
5	---[a]	826.83	827.14	826.81	826.96	827.03	827.03	826.99	827.02	827.08	827.17	827.20
6	---[a]	826.82	827.03	826.92	826.91	827.06	827.06	827.00	827.07	827.08	827.12	827.09
7	---[a]	826.83	826.93	826.91	826.92	827.09	826.96	826.97	827.01	827.03	827.03	827.04
8	826.80	826.89	826.92	827.03	827.04	827.06	826.91	827.00	827.01	827.02	826.92	827.03
9	826.81	826.86	826.96	826.98	827.07	826.99	826.97	827.03	827.00	827.00	826.87	826.98
10	826.91	826.93	826.99	826.95	827.05	826.97	827.01	826.99	827.00	826.97	826.98	826.88
11	826.92	827.03	827.00	826.92	826.96	827.03	827.05	827.01	827.02	826.95	827.20	826.89
12	826.88	827.02	827.02	827.00	826.90	827.01	827.05	827.07	827.00	826.99	827.04	827.16
13	826.88	826.97	827.03	827.01	826.97	826.98	826.99	827.01	826.94	827.01	827.01	826.98
14	826.93	826.95	827.01	826.87	826.91	827.02	826.95	826.99	826.91	826.97	826.95	826.99
15	826.99	826.97	826.96	827.01	826.98	827.03	827.00	826.98	826.99	826.95	826.81	827.15
16	826.90	827.00	826.92	826.96	827.05	827.05	827.02	826.96	826.99	826.96	827.04	827.15
17	826.92	827.07	826.91	826.97	827.08	827.05	826.97	826.94	827.02	826.96	827.19	827.14
18	826.85	827.03	826.94	826.95	827.01	827.03	827.05	826.96	827.04	826.92	827.03	827.08
19	826.77	826.95	827.00	826.95	826.99	827.00	827.10	826.97	827.01	826.94	827.04	826.96
20	826.72	826.89	827.03	826.91	826.98	827.01	827.03	826.95	827.04	826.97	827.06	827.12
21	826.77	826.91	826.95	826.93	826.96	827.01	826.94	826.97	826.94	827.00	827.07	827.04
22	826.84	826.96	826.94	826.94	826.98	827.05	826.94	827.01	827.00	826.98	826.99	826.84
23	826.78	827.09	826.94	826.94	827.00	827.05	827.03	827.04	827.04	827.04	826.94	827.04
24	826.75	827.08	826.99	826.94	827.00	827.03	827.06	827.02	827.06	827.02	826.87	827.05
25	826.72	826.98	827.06	826.94	827.01	827.06	827.00	827.00	827.01	826.97	826.98	827.18
26	826.69	826.87	827.04	827.09	827.03	827.04	826.92	827.03	826.99	826.97	827.11	827.29
27	826.73	826.82	826.97	827.09	827.03	827.03	826.98	827.02	826.96	826.99	827.07	827.09
28	826.75	826.94	826.94	827.02	827.03	827.02	827.05	826.97	827.00	826.91	827.09	826.89
29	826.72	---	826.99	826.96	827.03	827.04	827.06	826.93	827.02	826.93	827.08	827.13
30	826.59	---	826.96	826.95	827.03	827.02	827.04	826.94	827.00	827.05	827.08	827.19
31	826.75	---	826.89	---	826.99	---	827.01	826.98	---	827.08	---	827.18
Max	826.99[b]	827.09	827.14	827.09	827.08	827.09	827.10	827.07	827.07	827.08	827.20	827.29
Min	826.59[b]	826.79	826.87	826.81	826.90	826.95	826.91	826.93	826.91	826.89	826.75	826.84

Year 2015 Statistics: **Year Max 827.29; Year Min 826.59**

Note: Water level in ft bgs

[a]Data unavailable due to equipment malfunction

[b]Statistics calculated from partial month of daily-mean values


2015 HYDROGRAPH FOR WELL 182M-1
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
822
823
824
825
826
827
828
829
830
831
832
3,776
3,775
3,774
3,773
3,772
3,771
3,770
3,769
3,768
3,767
3,766
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Delamar Valley
Volcanic Aquifer
Reference Elevation: 4,598 ft amsl
Well Depth: 1,331 ft bgs
*Data processed using a temperature specific conversion factor

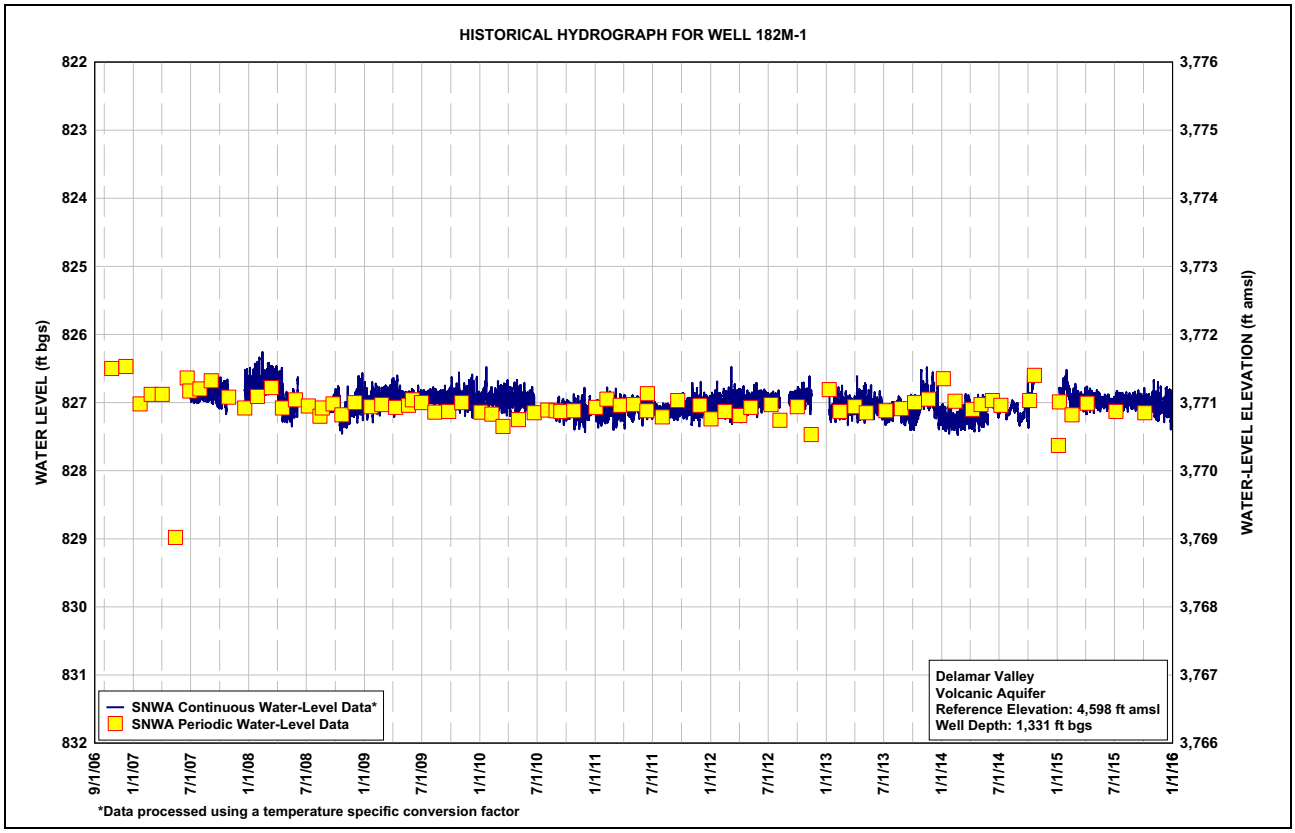
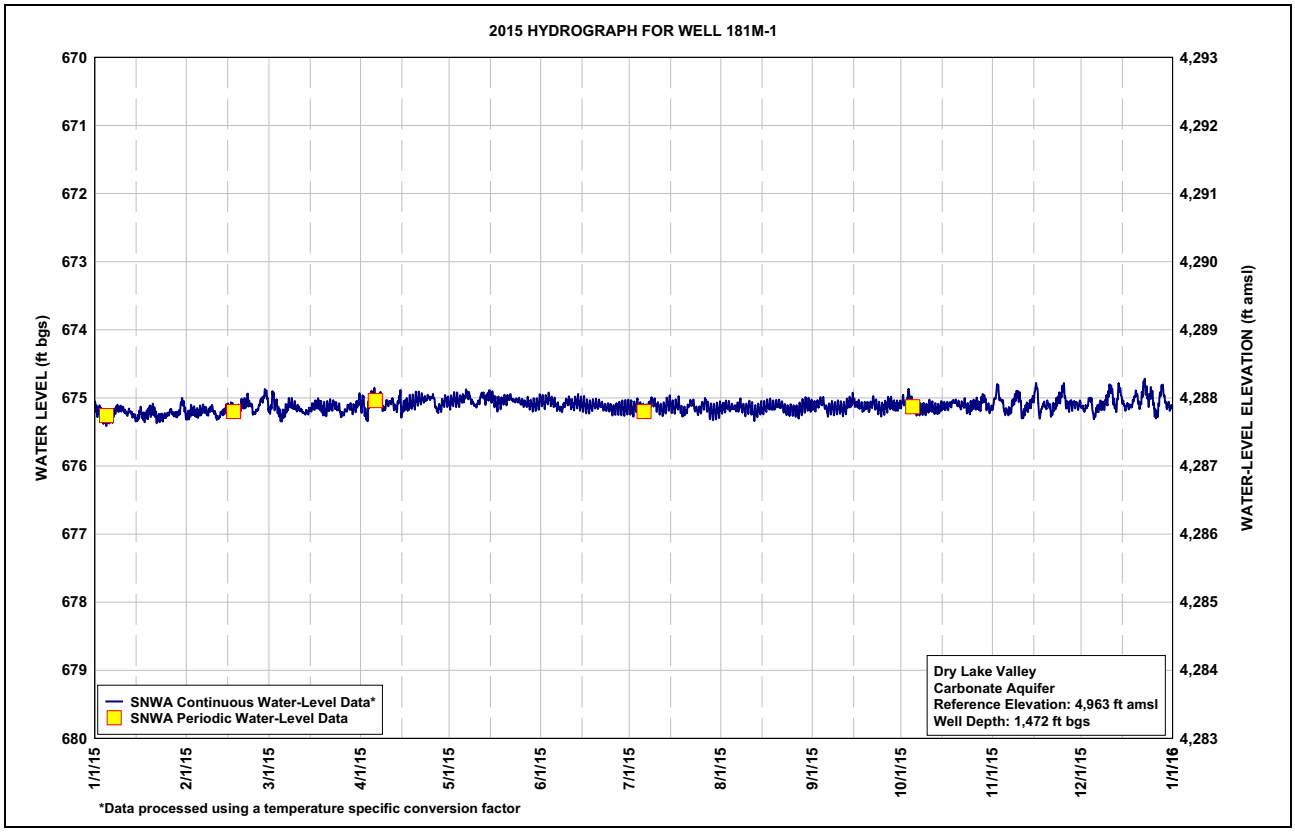

HISTORICAL HYDROGRAPH FOR WELL 182M-1
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
822
823
824
825
826
827
828
829
830
831
832
3,776
3,775
3,774
3,773
3,772
3,771
3,770
3,769
3,768
3,767
3,766
9/1/06
1/1/07
7/1/07
1/1/08
7/1/08
1/1/09
7/1/09
1/1/10
7/1/10
1/1/11
7/1/11
1/1/12
7/1/12
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Delamar Valley
Volcanic Aquifer
Reference Elevation: 4,598 ft amsl
Well Depth: 1,331 ft bgs
*Data processed using a temperature specific conversion factor

Table B-4
Dry Lake Valley Well 181M-1, Calendar Year 2015
Water-Level Data, Daily-Mean Values

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	675.16	675.26	675.16	675.07	675.08	675.04	675.15	675.16	675.14	675.07	675.06	675.14
2	675.19	675.20	674.97	675.19	675.04	675.06	675.17	675.12	675.13	675.07	674.83	675.15
3	675.22	675.19	675.09	675.23	675.03	675.02	675.13	675.13	675.06	674.96	675.02	675.05
4	675.32	675.21	675.21	675.04	675.04	675.03	675.12	675.16	675.07	675.03	675.05	675.05
5	675.31	675.21	675.27	674.95	675.01	675.08	675.17	675.15	675.13	675.15	675.20	675.26
6	675.29	675.17	675.20	675.02	674.99	675.11	675.21	675.16	675.17	675.18	675.20	675.17
7	675.24	675.17	675.12	675.03	674.95	675.14	675.10	675.12	675.14	675.19	675.14	675.12
8	675.15	675.21	675.10	675.13	675.04	675.14	675.03	675.15	675.15	675.19	675.03	675.11
9	675.16	675.16	675.13	675.15	675.10	675.08	675.08	675.16	675.15	675.17	674.95	675.05
10	675.16	675.21	675.15	675.08	675.10	675.06	675.12	675.14	675.14	675.14	675.04	674.93
11	675.22	675.29	675.17	675.05	675.02	675.10	675.16	675.16	675.16	675.13	675.24	674.90
12	675.21	675.26	675.21	675.13	674.96	675.08	675.17	675.22	675.14	675.16	675.14	675.11
13	675.22	675.21	675.22	675.11	675.01	675.06	675.12	675.20	675.08	675.17	675.11	674.99
14	675.27	675.16	675.20	675.01	674.96	675.08	675.09	675.17	675.04	675.14	675.04	674.94
15	675.30	675.15	675.16	675.15	674.98	675.11	675.12	675.17	675.07	675.12	674.88	675.10
16	675.20	675.13	675.12	675.08	675.04	675.12	675.15	675.14	675.09	675.12	675.05	675.11
17	675.27	675.23	675.08	675.11	675.08	675.13	675.10	675.12	675.12	675.10	675.18	675.13
18	675.25	675.20	675.11	675.07	675.06	675.12	675.16	675.15	675.16	675.06	675.10	675.06
19	675.20	675.13	675.17	675.08	675.04	675.10	675.24	675.15	675.14	675.06	675.11	674.97
20	675.17	675.08	675.18	675.02	675.03	675.13	675.18	675.11	675.14	675.11	675.14	675.07
21	675.23	675.07	675.11	675.03	675.01	675.11	675.11	675.12	675.05	675.12	675.19	675.01
22	675.29	675.10	675.11	675.02	675.02	675.14	675.09	675.16	675.10	675.10	675.10	674.80
23	675.27	675.21	675.10	675.02	675.05	675.14	675.17	675.18	675.16	675.16	675.02	674.96
24	675.27	675.21	675.15	675.00	675.05	675.13	675.19	675.17	675.17	675.14	674.92	674.96
25	675.25	675.14	675.23	674.99	675.06	675.15	675.14	675.17	675.14	675.11	674.98	675.08
26	675.19	675.03	675.23	675.13	675.09	675.15	675.08	675.20	675.11	675.09	675.10	675.22
27	675.23	674.97	675.17	675.16	675.08	675.14	675.11	675.19	675.08	675.11	675.07	675.06
28	675.25	675.01	675.13	675.11	675.10	675.15	675.19	675.14	675.11	675.02	675.09	674.84
29	675.22	---	675.17	675.05	675.11	675.17	675.20	675.11	675.12	675.04	675.09	675.05
30	675.08	---	675.13	675.05	675.11	675.16	675.19	675.11	675.11	675.13	675.10	675.12
31	675.16	---	675.05	---	675.06	---	675.18	675.14	---	675.17	---	675.15
Max	675.32	675.29	675.27	675.23	675.11	675.17	675.24	675.22	675.17	675.19	675.24	675.26
Min	675.08	674.97	674.97	674.95	674.95	675.02	675.03	675.11	675.04	674.96	674.83	674.80

Year 2015 Statistics: **Year Max 675.32; Year Min 674.80**

Note: Water level in ft bgs


2015 HYDROGRAPH FOR WELL 181M-1
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
670
671
672
673
674
675
676
677
678
679
680
4,293
4,292
4,291
4,290
4,289
4,288
4,287
4,286
4,285
4,284
4,283
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Dry Lake Valley
Carbonate Aquifer
Reference Elevation: 4,963 ft amsl
Well Depth: 1,472 ft bgs
*Data processed using a temperature specific conversion factor

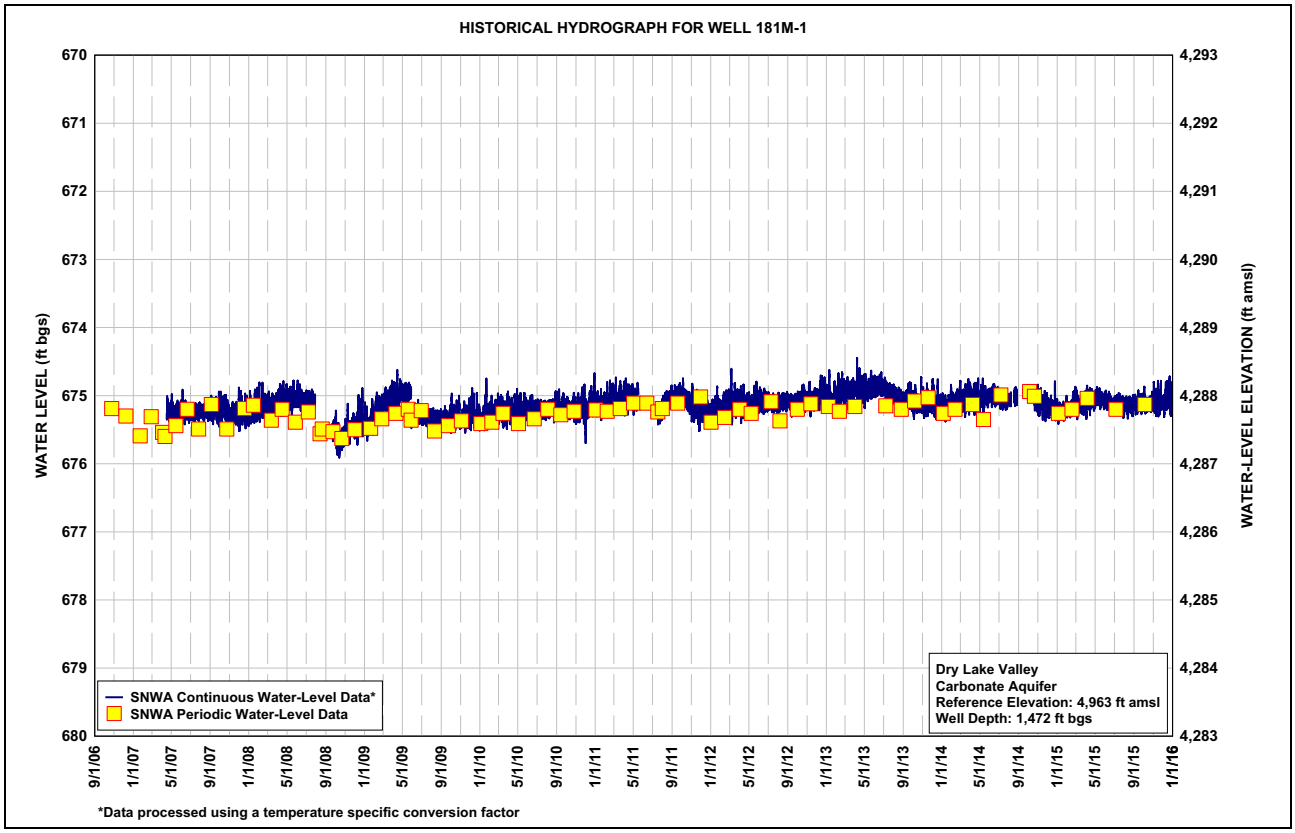

HISTORICAL HYDROGRAPH FOR WELL 181M-1
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
670
671
672
673
674
675
676
677
678
679
680
4,293
4,292
4,291
4,290
4,289
4,288
4,287
4,286
4,285
4,284
4,283
9/1/06
1/1/07
5/1/07
9/1/07
1/1/08
5/1/08
9/1/08
1/1/09
5/1/09
9/1/09
1/1/10
5/1/10
9/1/10
1/1/11
5/1/11
9/1/11
1/1/12
5/1/12
9/1/12
1/1/13
5/1/13
9/1/13
1/1/14
5/1/14
9/1/14
1/1/15
5/1/15
9/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Dry Lake Valley
Carbonate Aquifer
Reference Elevation: 4,963 ft amsl
Well Depth: 1,472 ft bgs
*Data processed using a temperature specific conversion factor

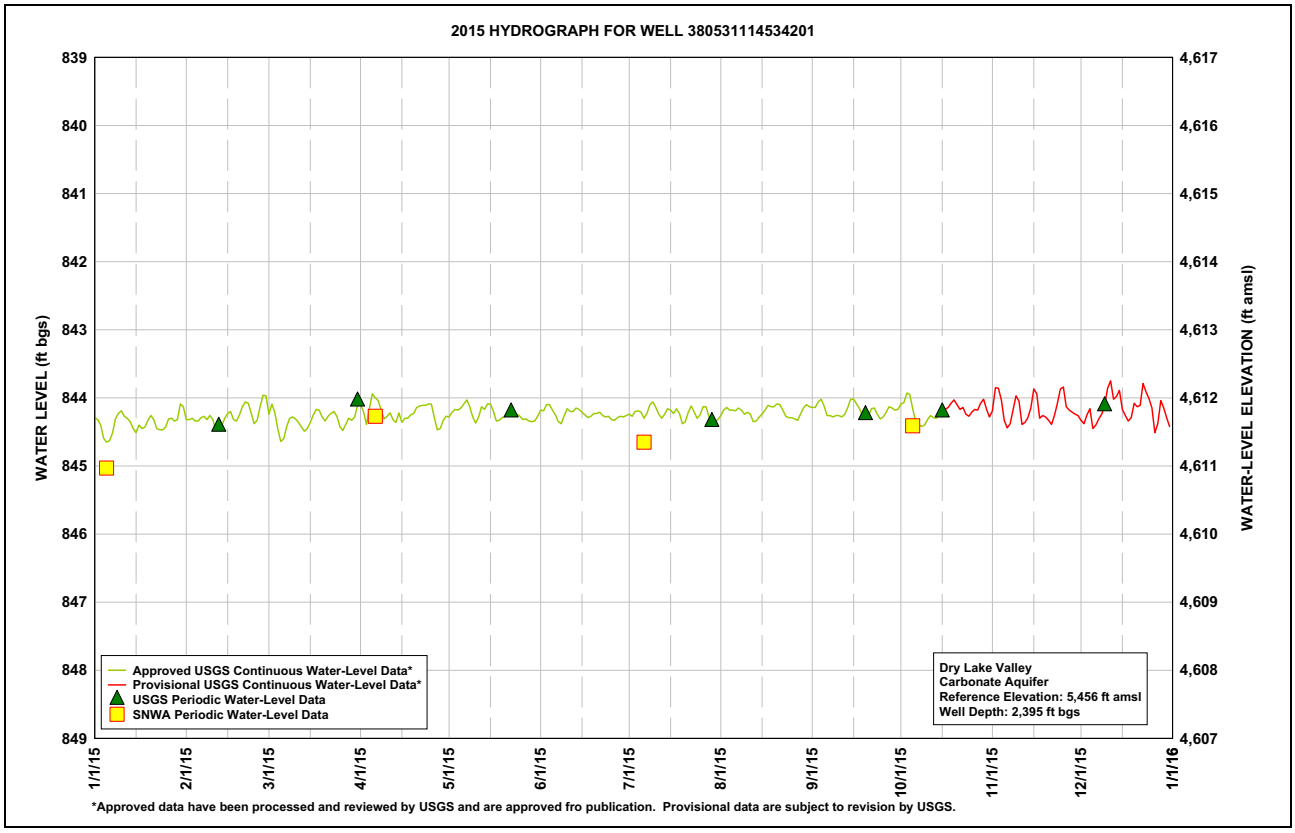
Table B-5
Dry Lake Valley Well 380531114534201, Calendar Year 2015
Water-Level Data, Daily-Mean Values

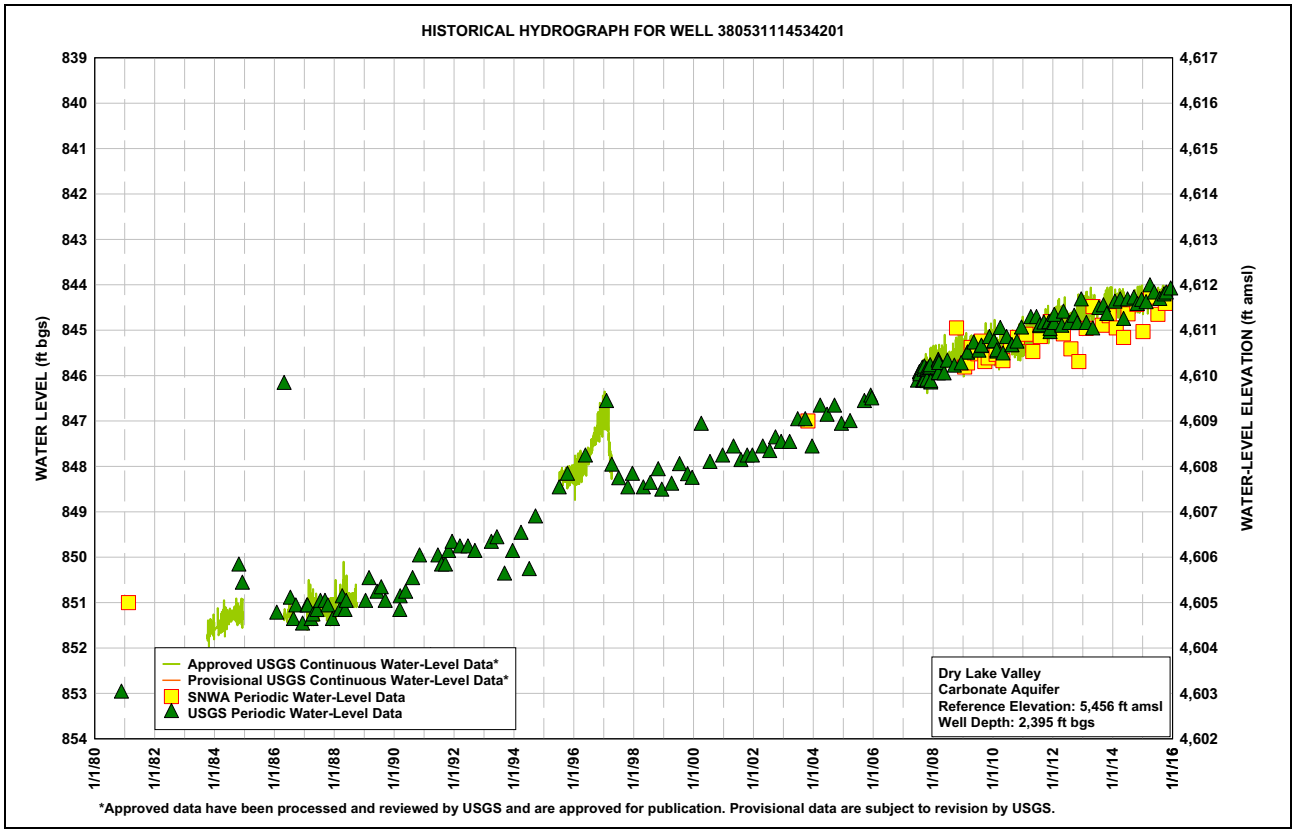
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV[a]	DEC[a]
1	844.29	844.32	844.24	844.10	844.28	844.18	844.24	844.26	844.14	844.09	844.19	844.33
2	844.32	844.32	844.09	844.2	844.21	844.19	844.27	844.18	844.14	844.07	843.85	844.38
3	844.40	844.30	844.22	844.39	844.17	844.10	844.20	844.14	844.06	843.93	843.86	844.25
4	844.59	844.34	844.46	844.16	844.18	844.10	844.19	844.18	844.02	843.95	844.03	844.16
5	844.65	844.34	844.64	843.94	844.15	844.18	844.21	844.18	844.12	844.16	844.33	844.45
6	844.63	844.29	844.60	844.00	844.09	844.25	844.30	844.19	844.26	844.34	844.44	844.40
7	844.52	844.27	844.42	844.04	844.03	844.35	844.23	844.15	844.26	844.39	844.38	844.31
8	844.31	844.32	844.30	844.18	844.13	844.38	844.10	844.18	844.28	844.42	844.17	844.24
9	844.23	844.26	844.28	844.31	844.28	844.26	844.06	844.24	844.26	844.40	843.97	844.11
10	844.19	844.32	844.31	844.27	844.37	844.16	844.14	844.21	844.26	844.32	844.05	843.86
11	844.27	844.47	844.36	844.22	844.28	844.20	844.24	844.24	844.28	844.26	844.39	843.75
12	844.30	844.48	844.43	844.32	844.13	844.20	844.30	844.35	844.24	844.29	844.36	844.02
13	844.35	844.41	844.49	844.36	844.17	844.15	844.24	844.34	844.14	844.30	844.29	843.98
14	844.45	844.30	844.45	844.22	844.09	844.17	844.16	844.28	844.02	844.26	844.15	843.89
15	844.51	844.23	844.36	844.36	844.09	844.21	844.18	844.24	844.02	844.20[a]	843.87	844.17
16	844.40	844.20	844.25	844.30	844.20	844.25	844.23	844.18	844.09	844.17[a]	843.94	844.26
17	844.45	844.32	844.17	844.30	844.34	844.29	844.16	844.11	844.16	844.14[a]	844.30	844.34
18	844.43	844.34	844.18	844.25	844.33	844.27	844.23	844.13	844.26	844.08[a]	844.26	844.29
19	844.33	844.25	844.28	844.23	844.29	844.23	844.38	844.13	844.24	844.03[a]	844.28	844.08
20	844.26	844.13	844.34	844.14	844.27	844.23	844.35	844.09	844.27	844.10[a]	844.33	844.13
21	844.32	844.06	844.27	844.12	844.19	844.21	844.21	844.10	844.16	844.17[a]	844.39	844.11
22	844.45	844.08	844.23	844.11	844.20	844.26	844.12	844.18	844.15	844.14[a]	844.26	843.79
23	844.47	844.23	844.20	844.11	844.24	844.28	844.21	844.27	844.24	844.24[a]	844.08	843.91
24	844.47	844.38	844.27	844.09	844.24	844.27	844.30	844.29	844.31	844.27[a]	843.87	844.01
25	844.43	844.33	844.42	844.09	844.27	844.32	844.25	844.29	844.28	844.21[a]	843.84	844.15
26	844.31	844.13	844.48	844.29	844.32	844.33	844.13	844.31	844.21	844.17[a]	844.13	844.51
27	844.30	843.96	844.39	844.47	844.31	844.29	844.13	844.33	844.13	844.18[a]	844.18	844.38
28	844.34	843.97	844.30	844.45	844.34	844.27	844.28	844.24	844.15	844.08[a]	844.21	844.04
29	844.32	---	844.33	844.33	844.35	844.28	844.34	844.15	844.18	844.02[a]	844.24	844.15
30	844.09	---	844.28	844.27	844.34	844.26	844.35	844.10	844.17	844.17[a]	844.26	844.29
31	844.13	---	844.11	---	844.27	---	844.32	844.13	---	844.28[a]	---	844.42
Max	844.65	844.48	844.64	844.47	844.37	844.38	844.38	844.35	844.31	844.42	844.44	844.51
Min	844.09	843.96	844.09	843.94	844.03	844.10	844.06	844.09	844.02	843.93	843.84	843.75

Year 2015 Statistics: Year Max: 844.65; Year Min 843.75

Note: Water level in ft bgs

[a]Provisional data provided by the USGS


2015 HYDROGRAPH FOR WELL 380531114534201
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
839
840
841
842
843
844
845
846
847
848
849
4,617
4,616
4,615
4,614
4,613
4,612
4,611
4,610
4,609
4,608
4,607
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
Approved USGS Continuous Water-Level Data*
Provisional USGS Continuous Water-Level Data*
USGS Periodic Water-Level Data
SNWA Periodic Water-Level Data
Dry Lake Valley
Carbonate Aquifer
Reference Elevation: 5,456 ft amsl
Well Depth: 2,395 ft bgs
*Approved data have been processed and reviewed by USGS and are approved fro publication. Provisional data are subject to revision by USGS.


HISTORICAL HYDROGRAPH FOR WELL 380531114534201
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
4,617
4,616
4,615
4,614
4,613
4,612
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4,610
4,609
4,608
4,607
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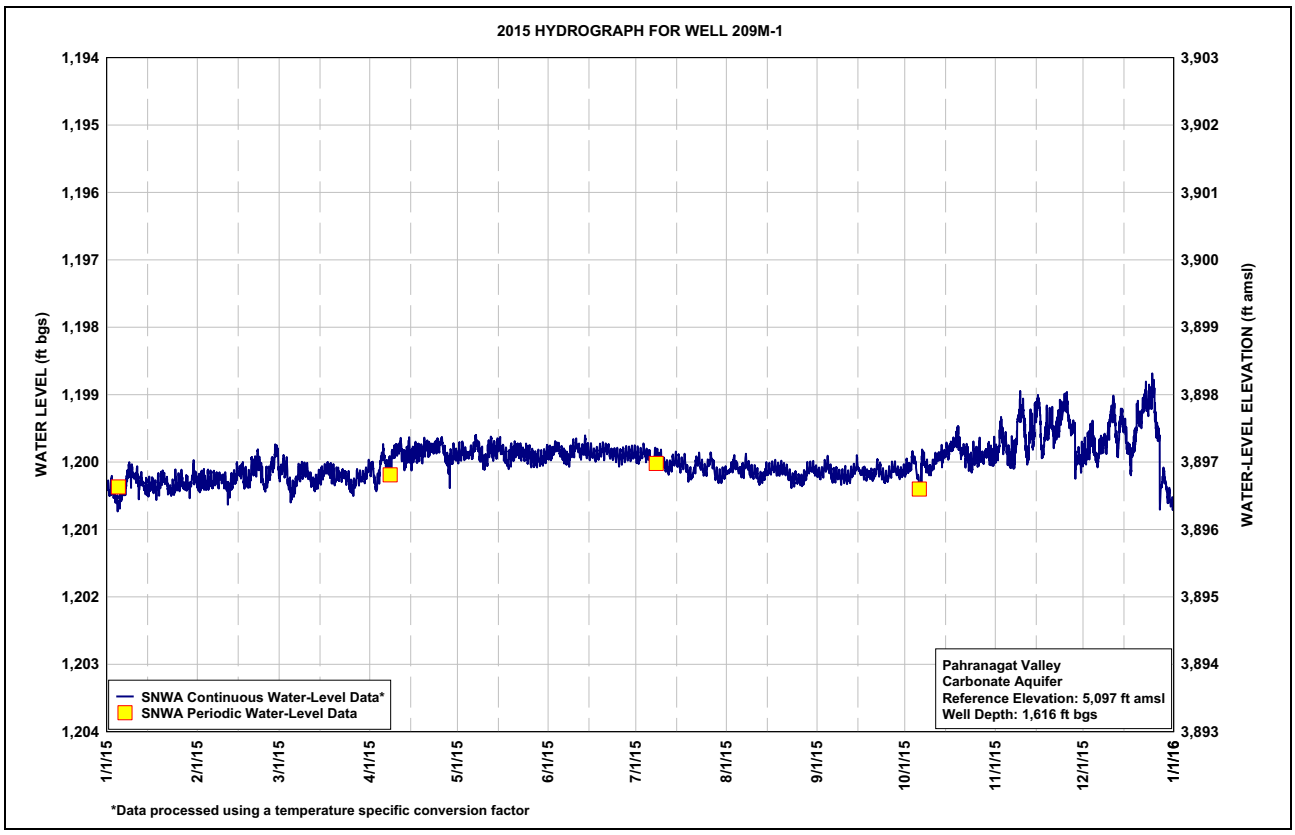
4,605
4,604
4,603
4,602
1/1/80
1/1/82
1/1/84
1/1/86
1/1/88
1/1/90
1/1/92
1/1/94
1/1/96
1/1/98
1/1/00
1/1/02
1/1/04
1/1/06
1/1/08
1/1/10
1/1/12
1/1/14
1/1/16
Approved USGS Continuous Water-Level Data*
Provisional USGS Continuous Water-Level Data*
SNWA Periodic Water-Level Data
USGS Periodic Water-Level Data
Dry Lake Valley
Carbonate Aquifer
Reference Elevation: 5,456 ft amsl
Well Depth: 2,395 ft bgs
*Approved data have been processed and reviewed by USGS and are approved for publication. Provisional data are subject to revision by USGS.

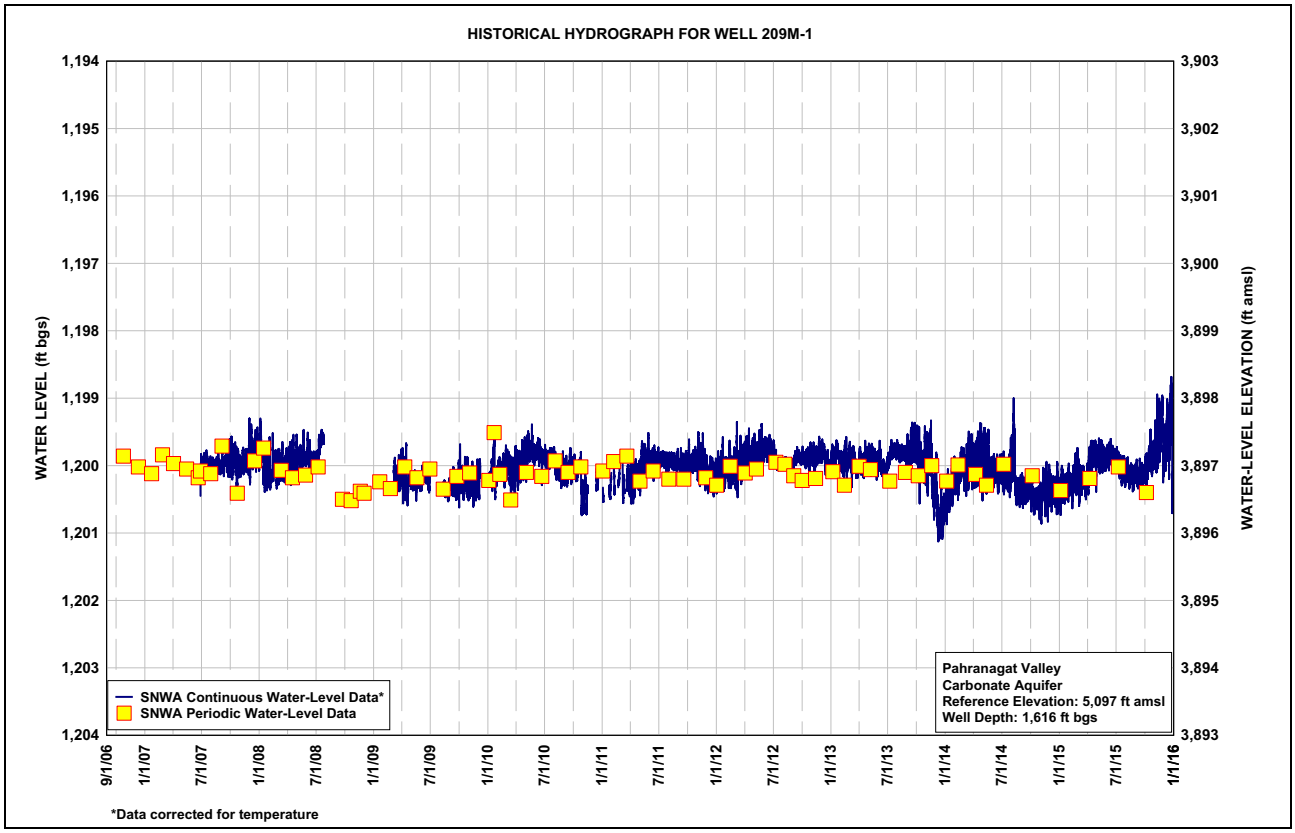
Table B-6
Pahranagat Valley Well 209M-1, Calendar Year 2015
Water-Level Data, Daily-Mean Values

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1,200.36	1,200.36	1,200.16	1,200.08	1,199.90	1,199.87	1,199.91	1,200.15	1,200.17	1,200.04	1,199.85	1,199.97
2	1,200.41	1,200.30	1,200.06	1,200.23	1,199.84	1,199.87	1,199.95	1,200.10	1,200.17	1,200.12	1,199.59	1,199.85
3	1,200.39	1,200.30	1,200.11	1,200.36	1,199.87	1,199.78	1,199.86	1,200.00	1,200.09	1,199.96	1,199.65	1,199.64
4	1,200.57	1,200.33	1,200.35	1,200.09	1,199.88	1,199.81	1,199.89	1,200.07	1,200.03	1,200.00	1,199.71	1,199.61
5	1,200.58	1,200.28	1,200.42	1,199.88	1,199.86	1,199.86	1,199.94	1,200.13	1,200.14	1,200.21	1,199.97	1,199.94
6	1,200.42	1,200.31	1,200.33	1,200.00	1,199.84	1,199.94	1,200.00	1,200.10	1,200.19	1,200.32	1,199.88	1,199.87
7	1,200.37	1,200.26	1,200.20	1,200.04	1,199.72	1,199.96	1,199.90	1,200.04	1,200.20	1,199.97	1,199.84	1,199.73
8	1,200.15	1,200.26	1,200.12	1,199.99	1,199.81	1,199.90	1,199.93	1,200.06	1,200.19	1,200.06	1,199.45	1,199.70
9	1,200.16	1,200.24	1,200.15	1,199.85	1,199.89	1,199.82	1,199.91	1,200.16	1,200.22	1,200.14	1,199.27	1,199.60
10	1,200.22	1,200.25	1,200.16	1,199.78	1,200.00	1,199.79	1,200.02	1,200.17	1,200.23	1,200.08	1,199.27	1,199.34
11	1,200.27	1,200.37	1,200.22	1,199.77	1,199.85	1,199.81	1,200.07	1,200.19	1,200.24	1,199.98	1,199.81	1,199.19
12	1,200.29	1,200.33	1,200.30	1,199.87	1,199.78	1,199.88	1,200.10	1,200.28	1,200.22	1,199.90	1,199.76	1,199.64
13	1,200.34	1,200.28	1,200.36	1,199.89	1,199.85	1,199.82	1,200.02	1,200.26	1,200.15	1,199.90	1,199.59	1,199.47
14	1,200.38	1,200.18	1,200.28	1,199.81	1,199.78	1,199.87	1,200.00	1,200.15	1,200.09	1,199.92	1,199.40	1,199.37
15	1,200.43	1,200.16	1,200.24	1,199.88	1,199.76	1,199.87	1,200.02	1,200.15	1,200.13	1,199.83	1,199.13	1,199.54
16	1,200.33	1,200.13	1,200.15	1,199.87	1,199.81	1,199.90	1,200.05	1,200.11	1,200.15	1,199.80	1,199.51	1,199.80
17	1,200.37	1,200.28	1,200.08	1,199.90	1,199.91	1,199.92	1,200.01	1,200.09	1,200.15	1,199.78	1,199.80	1,199.93
18	1,200.38	1,200.29	1,200.14	1,199.83	1,200.03	1,199.88	1,200.08	1,200.12	1,200.19	1,199.71	1,199.51	1,199.77
19	1,200.32	1,200.11	1,200.27	1,199.81	1,199.86	1,199.83	1,200.19	1,200.10	1,200.18	1,199.67	1,199.43	1,199.33
20	1,200.23	1,200.12	1,200.27	1,199.75	1,199.86	1,199.83	1,200.19	1,200.09	1,200.19	1,199.87	1,199.48	1,199.39
21	1,200.29	1,199.97	1,200.20	1,199.79	1,199.77	1,199.82	1,200.02	1,200.15	1,200.09	1,199.86	1,199.57	1,199.23
22	1,200.44	1,200.08	1,200.17	1,199.80	1,199.87	1,199.89	1,199.96	1,200.21	1,200.10	1,199.91	1,199.46	1,199.00
23	1,200.41	1,200.28	1,200.16	1,199.76	1,199.88	1,199.89	1,200.05	1,200.27	1,200.19	1,199.99	1,199.27	1,199.11
24	1,200.39	1,200.38	1,200.25	1,199.75	1,199.88	1,199.88	1,200.13	1,200.25	1,200.25	1,199.99	1,199.18	1,199.02
25	1,200.36	1,200.21	1,200.35	1,199.71	1,199.88	1,199.94	1,200.06	1,200.26	1,200.21	1,199.88	1,199.12	1,199.13
26	1,200.26	1,200.06	1,200.35	1,199.80	1,199.94	1,199.93	1,199.97	1,200.29	1,200.15	1,199.88	1,199.43	1,199.56
27	1,200.37	1,199.92	1,200.26	1,199.96	1,199.95	1,199.90	1,200.04	1,200.24	1,200.10	1,199.96	1,199.48	1,200.37
28	1,200.34	1,199.89	1,200.21	1,199.96	1,199.96	1,199.89	1,200.20	1,200.16	1,200.14	1,199.88	1,199.92	1,200.22
29	1,200.36	---	1,200.23	1,199.94	1,199.99	1,199.92	1,200.24	1,200.12	1,200.16	1,199.82	1,199.96	1,200.38
30	1,200.22	---	1,200.20	1,199.87	1,199.97	1,199.89	1,200.25	1,200.10	1,200.14	1,199.91	1,199.99	1,200.53
31	1,200.22	---	1,200.09	---	1,199.87	---	1,200.21	1,200.13	---	1,199.96	---	1,200.61
Max	1,200.58	1,200.38	1,200.42	1,200.36	1,200.03	1,199.96	1,200.25	1,200.29	1,200.25	1,200.32	1,199.99	1,200.61
Min	1,200.15	1,199.89	1,200.06	1,199.71	1,199.72	1,199.78	1,199.86	1,200.00	1,200.03	1,199.67	1,199.12	1,199.00

Year 2015 Statistics: 1,200.61; **Year Max ; Year Min 1199.00**

Note: Water level in ft bgs


2015 HYDROGRAPH FOR WELL 209M-1
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
1,194
1,195
1,196
1,197
1,198
1,199
1,200
1,201
1,202
1,203
1,204
3,903
3,902
3,901
3,900
3,899
3,898
3,897
3,896
3,895
3,894
3,893
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Pahranagat Valley
Carbonate Aquifer
Reference Elevation: 5,097 ft amsl
Well Depth: 1,616 ft bgs
*Data processed using a temperature specific conversion factor


HISTORICAL HYDROGRAPH FOR WELL 209M-1
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
1,194
1,195
1,196
1,197
1,198
1,199
1,200
1,201
1,202
1,203
1,204
3,903
3,902
3,901
3,900
3,899
3,898
3,897
3,896
3,895
3,894
3,893
9/1/06
1/1/07
7/1/07
1/1/08
7/1/08
1/1/09
7/1/09
1/1/10
7/1/10
1/1/11
7/1/11
1/1/12
7/1/12
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
1/1/16
SNWA Continuous Water-Level Data*
SNWA Periodic Water-Level Data
Pahranagat Valley
Carbonate Aquifer
Reference Elevation: 5,097 ft amsl
Well Depth: 1,616 ft bgs
*Data corrected for temperature

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Appendix C

DDC3M Plan
Periodic Water-Level Data

Table C-1
Periodic Water-Level Measurements Collected at SNWA Exploratory and Test Wells

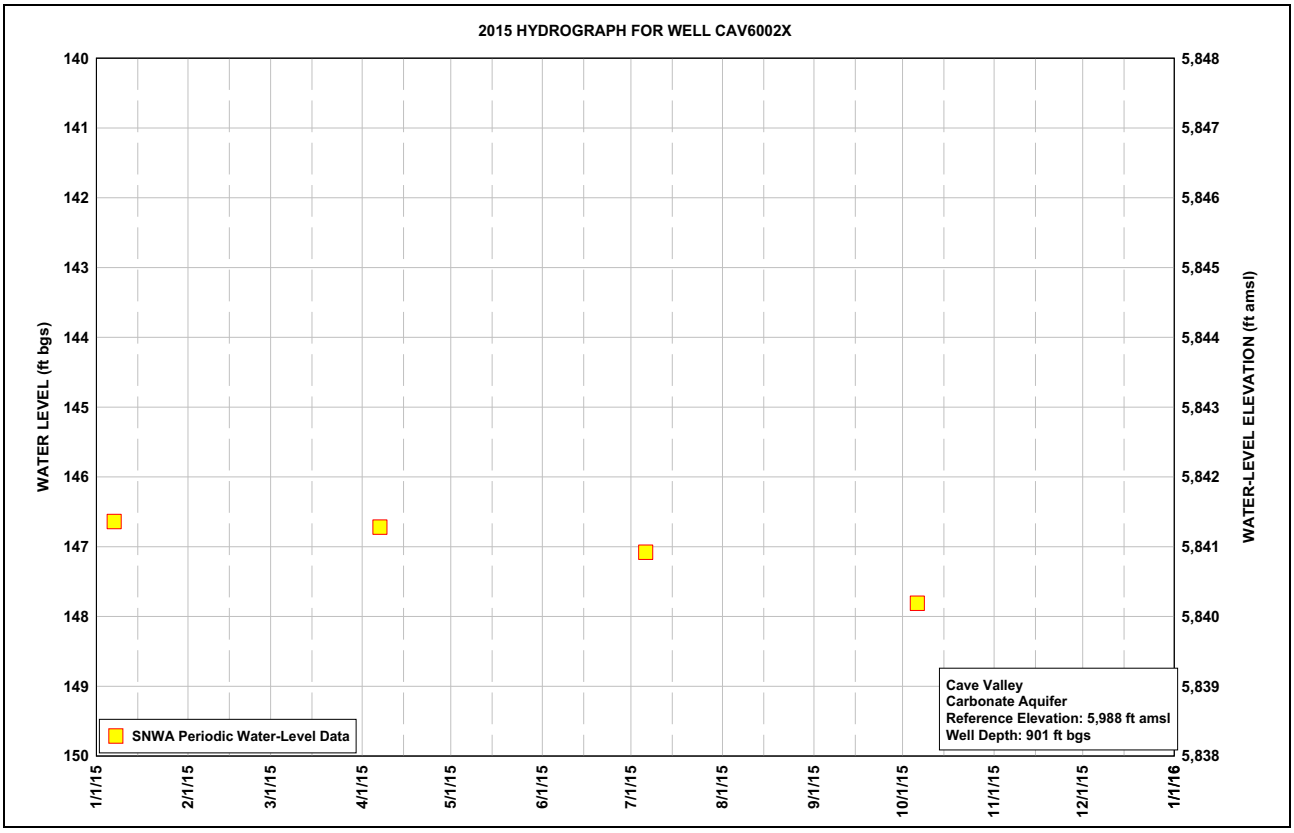
Site Number	Station Local Number[a]	Well Depth (ft bgs)	Surface[b] Elevation (ft amsl)	Water Level			
				Date	Depth to Water (ft bgs)	Well Status[c]	Measurement Method[d]
CAV6002X	180 N06 E64 19DABB1	901	5,987.97	1/7/2015	146.64	S	T
				4/7/2015	146.72	S	T
				7/6/2015	147.08	S	T
				10/6/2015	147.81	S	T
CAV6002M2	180 N06 E64 19ACDD1	885	5,982.81	1/7/2015	141.71	S	T
				4/7/2015	141.80	S	T
				7/6/2015	142.64	S	T
				10/6/2015	142.26	S	T

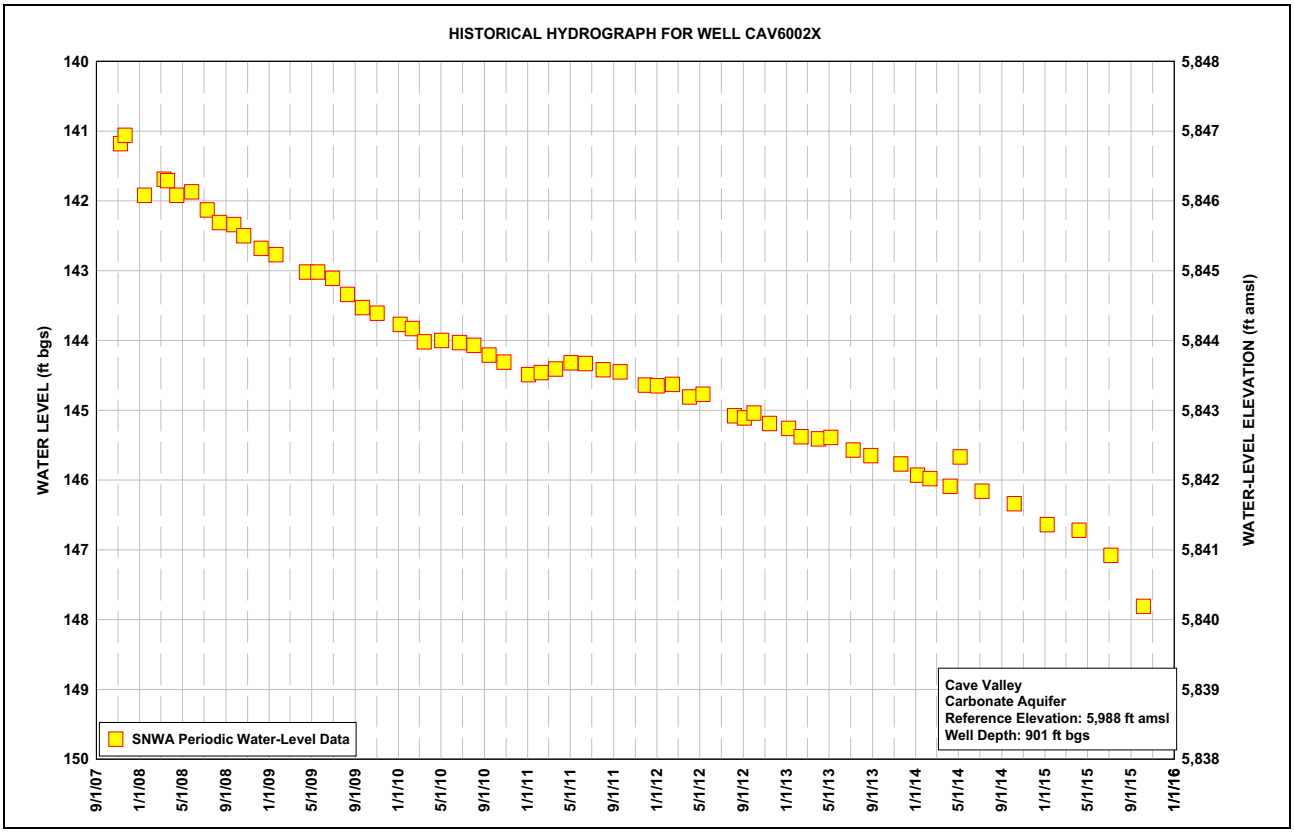
[a]Station Local Numbers provided by the Nevada Division of Water Resources.

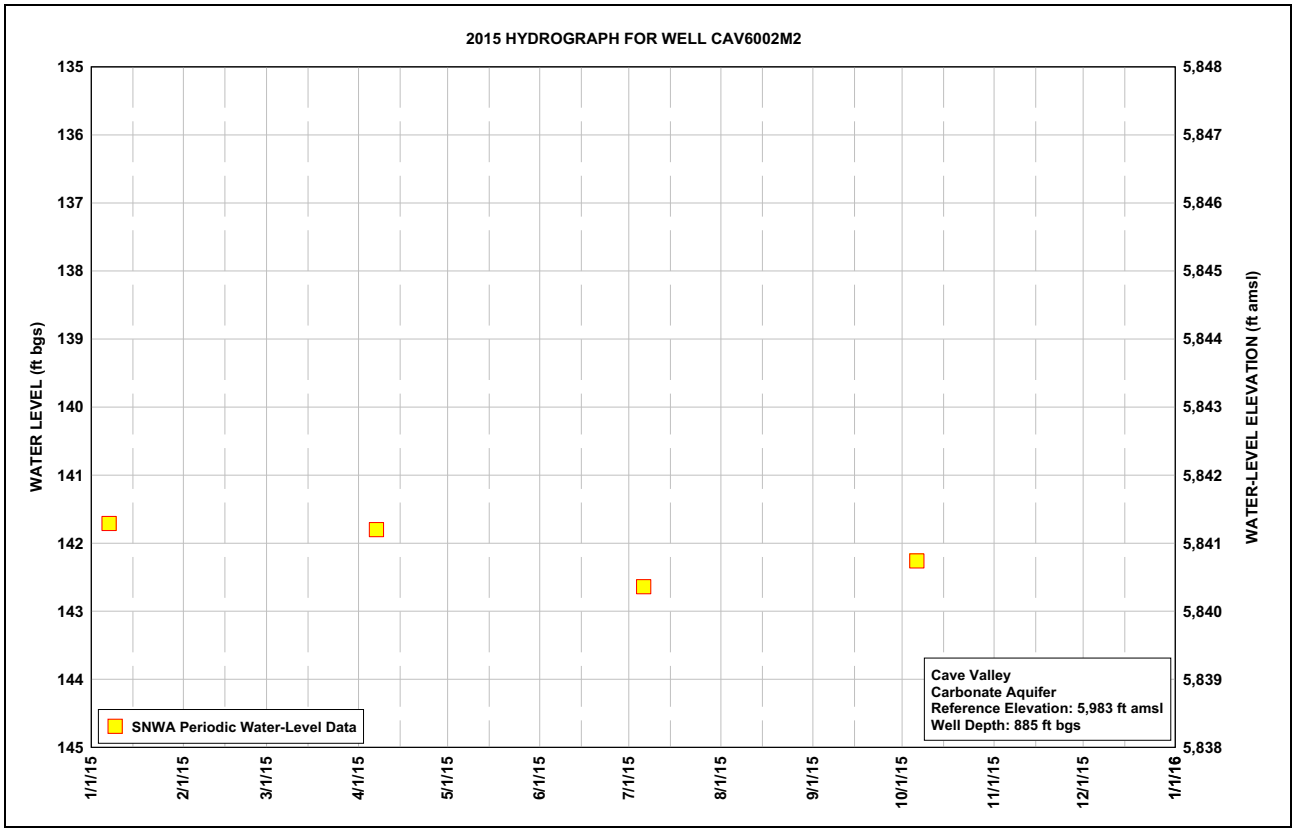
[b]Elevations are North American Vertical Datum of 1988 (NAVD88).

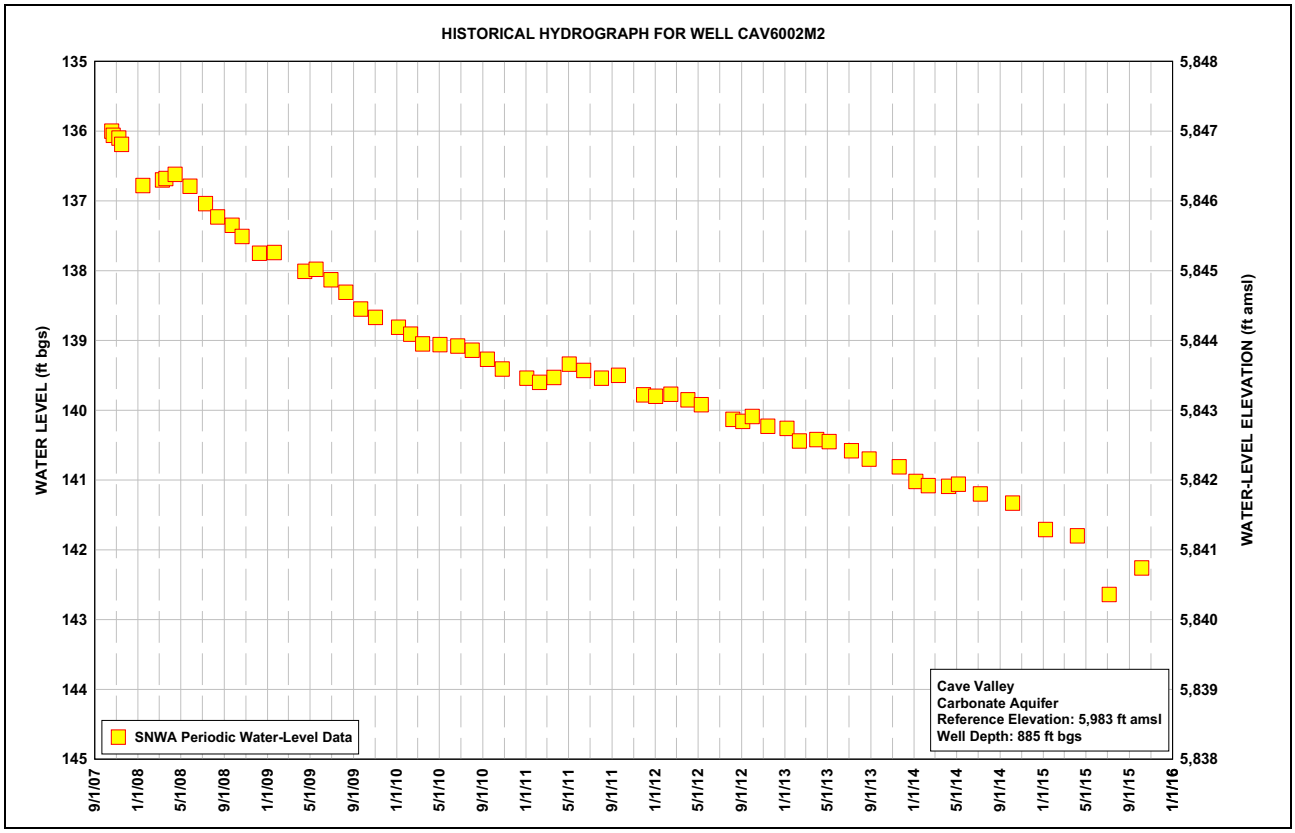
[c]S = Static conditions

[d]T = Electric tape measurement


2015 HYDROGRAPH FOR WELL CAV6002X
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
140
141
142
143
144
145
146
147
148
149
150
5,848
5,847
5,846
5,845
5,844
5,843
5,842
5,841
5,840
5,839
5,838
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 5,988 ft amsl
Well Depth: 901 ft bgs


HISTORICAL HYDROGRAPH FOR WELL CAV6002X
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
140
141
142
143
144
145
146
147
148
149
150
5,848
5,847
5,846
5,845
5,844
5,843
5,842
5,841
5,840
5,839
5,838
9/1/07
1/1/08
5/1/08
9/1/08
1/1/09
5/1/09
9/1/09
1/1/10
5/1/10
9/1/10
1/1/11
5/1/11
9/1/11
1/1/12
5/1/12
9/1/12
1/1/13
5/1/13
9/1/13
1/1/14
5/1/14
9/1/14
1/1/15
5/1/15
9/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 5,988 ft amsl
Well Depth: 901 ft bgs


2015 HYDROGRAPH FOR WELL CAV6002M2
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
135
136
137
138
139
140
141
142
143
144
145
5,848
5,847
5,846
5,845
5,844
5,843
5,842
5,841
5,840
5,839
5,838
1/1/15
2/1/15
3/1/15
4/1/15
5/1/15
6/1/15
7/1/15
8/1/15
9/1/15
10/1/15
11/1/15
12/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 5,983 ft amsl
Well Depth: 885 ft bgs


HISTORICAL HYDROGRAPH FOR WELL CAV6002M2
WATER LEVEL (ft bgs)
WATER-LEVEL ELEVATION (ft amsl)
135
136
137
138
139
140
141
142
143
144
145
5,848
5,847
5,846
5,845
5,844
5,843
5,842
5,841
5,840
5,839
5,838
9/1/07
1/1/08
5/1/08
9/1/08
1/1/09
5/1/09
9/1/09
1/1/10
5/1/10
9/1/10
1/1/11
5/1/11
9/1/11
1/1/12
5/1/12
9/1/12
1/1/13
5/1/13
9/1/13
1/1/14
5/1/14
9/1/14
1/1/15
5/1/15
9/1/15
1/1/16
SNWA Periodic Water-Level Data
Cave Valley
Carbonate Aquifer
Reference Elevation: 5,983 ft amsl
Well Depth: 885 ft bgs

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Appendix D

DDC3M Plan
Spring-Discharge Data

Table D-1
Spring Discharge Measurements
(Page 1 of 3)

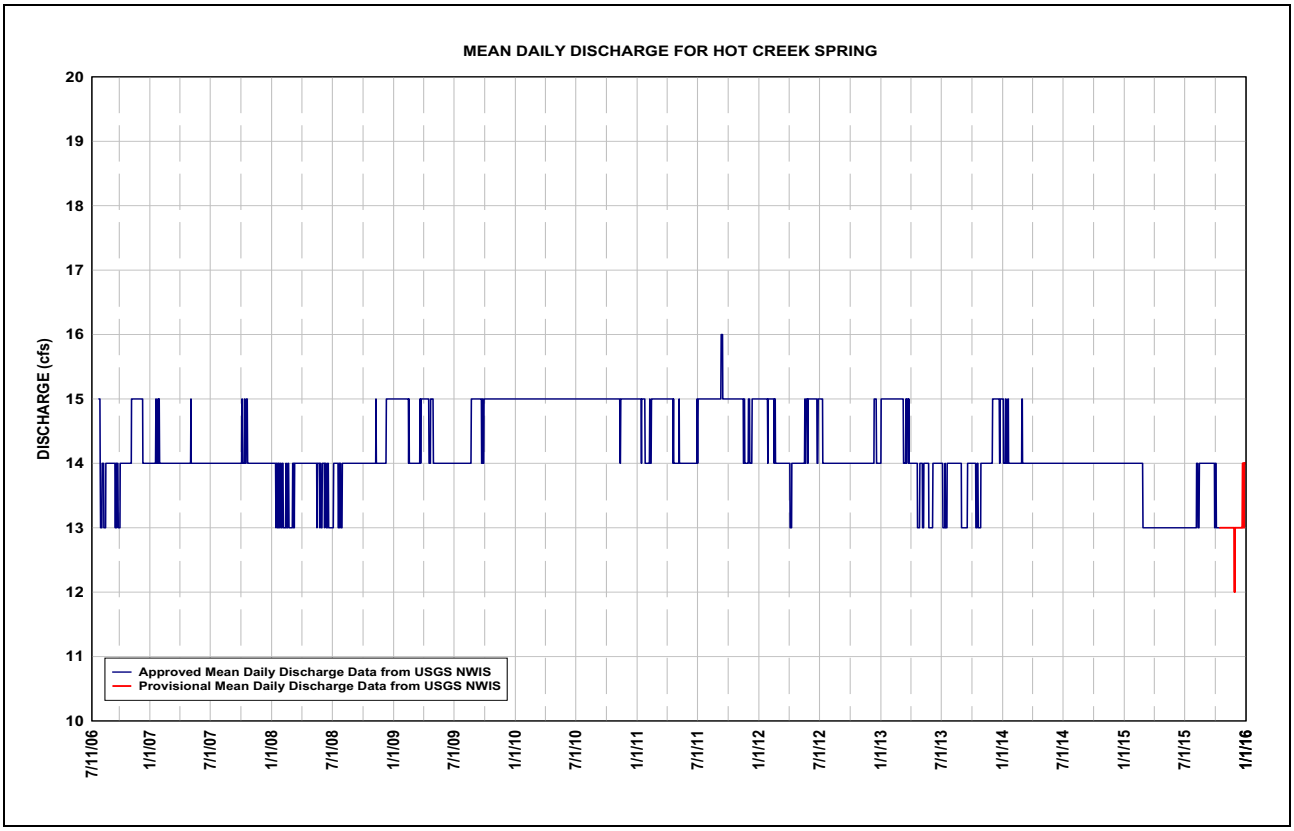
Station Name	Primary Name	Date	Discharge	Unit	Agency
Coyote Spring	1810401	5/18/2015	0.0	GPM	SNWA
		10/5/2015	1.3	GPM	SNWA
Hot Creek Spring near Sunnyside, NV	09415558	2/12/2015	13.7	CFS	USGS
		4/1/2015	12.2	CFS	USGS
		5/22/2015	13.0	CFS	USGS
		7/29/2015	13.0	CFS	USGS
		9/23/2015	13.3	CFS	USGS
		10/15/2015	12.7	CFS	USGS
		12/11/2015	13.2	CFS	USGS
Moorman Spring	2071101	4/29/2015	0.27	CFS	USGS
		4/29/2015	0.32	CFS	USGS
		9/20/2015	0.26	CFS	USGS
		9/20/2015	0.31	CFS	USGS
Flag Spring 3	2071301	2/4/2015	2.1	CFS	SNWA
		4/22/2015	1.9	CFS	SNWA
		4/28/2015	1.86	CFS	USGS
		4/28/2015	1.91	CFS	USGS
		6/17/2015	1.9	CFS	SNWA
		9/17/2015	2.0	CFS	SNWA
		9/21/2015	2.26	CFS	USGS
		9/21/2015	2.38	CFS	USGS
		11/10/2015	2.0	CFS	SNWA
		12/10/2015	2.3	CFS	SNWA
Flag Spring 2	2071302	2/4/2015	2.5	CFS	SNWA
		4/22/2015	2.4	CFS	SNWA
		4/22/2015	2.5	CFS	SNWA
		4/28/2015	2.83	CFS	USGS
		4/28/2015	3.04	CFS	USGS
		6/17/2015	2.4	CFS	SNWA
		6/17/2015	2.5	CFS	SNWA
		9/17/2015	2.3	CFS	SNWA
		9/17/2015	2.4	CFS	SNWA
		9/21/2015	2.75	CFS	USGS
		9/21/2015	3.12	CFS	USGS
		11/10/2015	2.3	CFS	SNWA
		12/10/2015	2.7	CFS	SNWA
		12/10/2015	2.7	CFS	SNWA

Table D-1
Spring Discharge Measurements
(Page 2 of 3)

Station Name	Primary Name	Date	Discharge	Unit	Agency
Flag Spring 1	2071303	2/4/2015	2.2	CFS	SNWA
		4/22/2015	1.8	CFS	SNWA
		4/28/2015	1.90	CFS	USGS
		4/28/2015	1.90	CFS	USGS
		6/17/2015	1.8	CFS	SNWA
		9/17/2015	1.7	CFS	SNWA
		9/21/2015	1.77	CFS	USGS
		9/21/2015	1.82	CFS	USGS
		11/10/2015	1.7	CFS	SNWA
		12/10/2015	1.8	CFS	SNWA
Hardy Springs	2071501	2/4/2015	0.33	CFS	SNWA
		4/8/2015	0.32	CFS	SNWA
		9/17/2015	0.43	CFS	SNWA
		11/10/2015	0.45	CFS	SNWA
		12/10/2015	0.38	CFS	SNWA
Crystal Springs near Hiko, NV	2090401	2/9/2015	12.6	CFS	USGS
		3/31/2015	12.7	CFS	USGS
		4/21/2015	3.33	CFS	USGS
		5/12/2015	12.2	CFS	USGS
		5/12/2015	12.2	CFS	USGS
		9/9/2015	12.0	CFS	USGS
		12/15/2015	12.2	CFS	USGS
Crystal Springs Diversion near Hiko, NV	09415589	2/9/2015	0.00	CFS	USGS
		3/31/2015	0.00	CFS	USGS
		4/21/2015	9.04	CFS	USGS
		4/21/2015	9.01	CFS	USGS
		5/12/2015	0.00	CFS	USGS
		8/28/2015	0.00	CFS	USGS
		9/9/2015	0.00	CFS	USGS
		10/27/2015	0.00	CFS	USGS
		12/15/2015	0.00	CFS	USGS
Ash Springs Creek below Diversion at HWY 93 at Ash Springs, NV	09415645	2/9/2015	16.2	CFS	USGS
		3/31/2015	16.7	CFS	USGS
		4/142015	12.6	CFS	USGS
		4/23/2015	16.4	CFS	USGS
		4/23/2015	16.4	CFS	USGS
		5/27/2015	17.9	CFS	USGS
		7/6/2015	16.8	CFS	USGS
		8/7/2015	18.4	CFS	USGS
		8/7/2015	17.3	CFS	USGS

Table D-1
Spring Discharge Measurements
(Page 3 of 3)

Station Name	Primary Name	Date	Discharge	Unit	Agency
Ash Springs below Diversion at HWY 93 at Ash Springs, NV (cont.)	09415645	9/30/2015	18.1	CFS	USGS
		10/27/2015	16.6	CFS	USGS
		11/23/2015	17.1	CFS	USGS
		11/23/2015	17.0	CFS	USGS
		12/10/2015	17.5	CFS	USGS
Ash Springs Creek Diversion Ditch below HWY 93 at Ash Springs, NV	094156395	2/9/2015	0.00	CFS	USGS
		3/31/2015	0.00	CFS	USGS
		4/14/2015	3.54	CFS	USGS
		4/14/2015	3.77	CFS	USGS
		4/23/2015	0.099	CFS	USGS
		4/23/2015	0.12	CFS	USGS
		5/29/2015	0.12	CFS	USGS
		7/6/2015	0.00	CFS	USGS
		8/7/2015	0.00	CFS	USGS
		9/15/2015	0.60	CFS	USGS
		9/15/2015	0.56	CFS	USGS
		9/30/2015	0.00	CFS	USGS
		10/27/2015	0.00	CFS	USGS
		12/10/2015	0.059	CFS	USGS
Cave Spring	1800101	5/19/2015	0.00	CFS	SNWA
		10/6/2015	0.00	CFS	SNWA
Littlefield Spring	1810301	5/18/2015	0.03	CFS	SNWA
		10/5/2015	0.03	CFS	SNWA
Grassy Spring	1820101	5/18/2015	0.04	GPM	SNWA
		10/5/2015	0.00	GPM	SNWA
Silver King Well	381624114540302	5/18/2015	0.001	CFS	SNWA
		10/6/2015	0.00	CFS	SNWA


MEAN DAILY DISCHARGE FOR HOT CREEK SPRING
DISCHARGE (cfs)
20
19
18
17
16
15
14
13
12
11
10
Approved Mean Daily Discharge Data from USGS NWIS
Provisional Mean Daily Discharge Data from USGS NWIS
7/11/06
1/1/07
7/1/07
1/1/08
7/1/08
1/1/09
7/1/09
1/1/10
7/1/10
1/1/11
7/1/11
1/1/12
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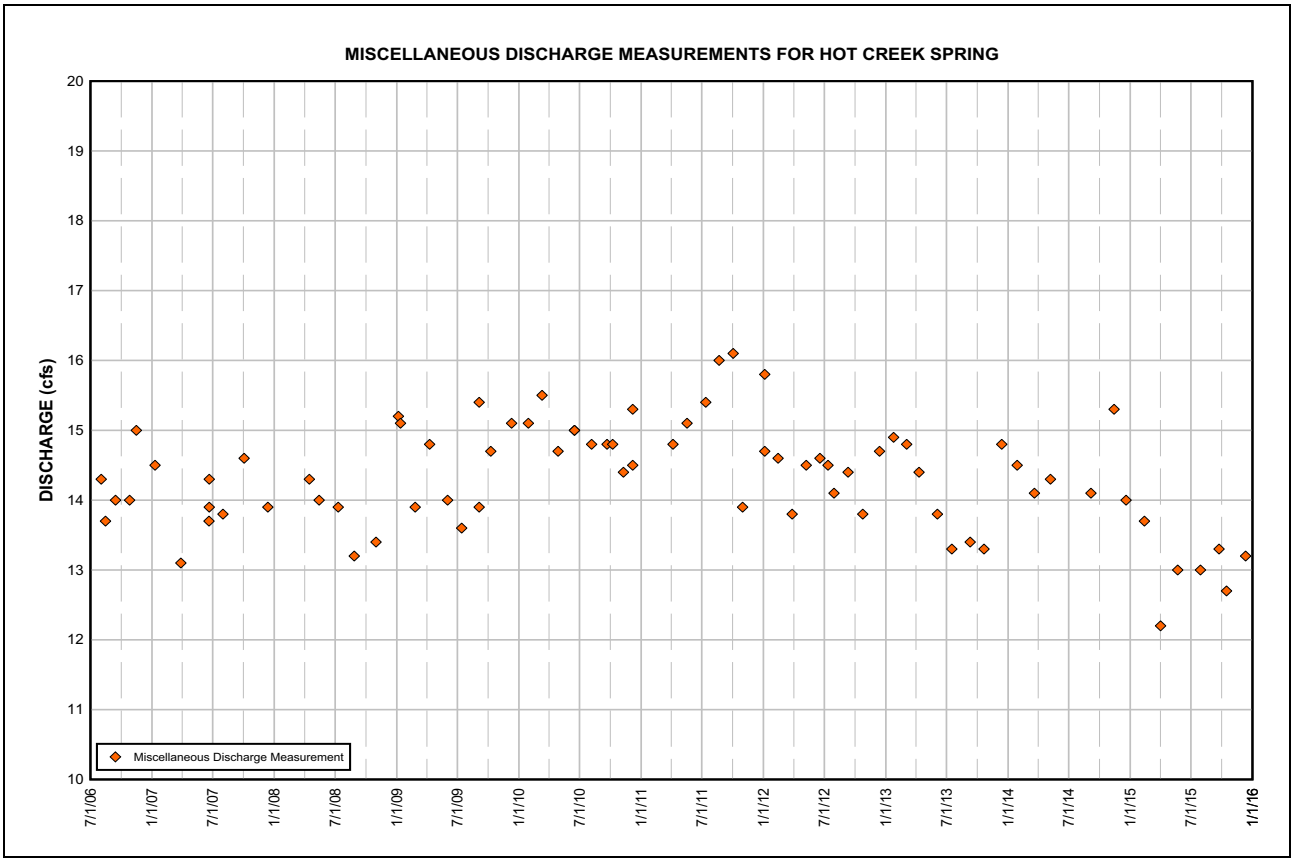
7/1/14
1/1/15
7/1/15
1/1/16


MISCELLANEOUS DISCHARGE MEASUREMENTS FOR HOT CREEK SPRING
DISCHARGE (cfs)
20
19
18
17
16
15
14
13
12
11
10
Miscellaneous Discharge Measurement
7/1/06
1/1/07
7/1/07
1/1/08
7/1/08
1/1/09
7/1/09
1/1/10
7/1/10
1/1/11
7/1/11
1/1/12
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7/1/14
1/1/15
7/1/15
1/1/16

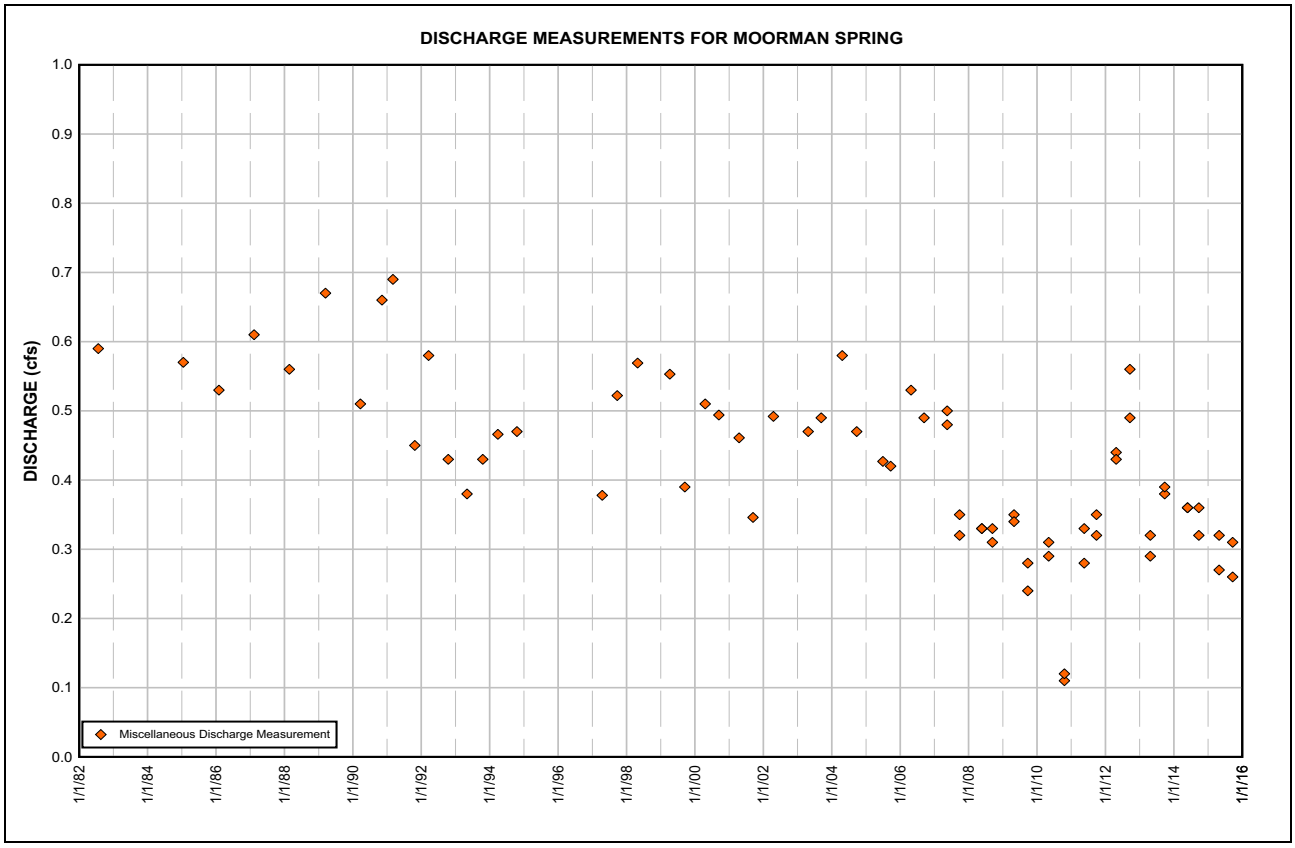

DISCHARGE MEASUREMENTS FOR MOORMAN SPRING
DISCHARGE (cfs)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Miscellaneous Discharge Measurement
1/1/82
1/1/84
1/1/86
1/1/88
1/1/90
1/1/92
1/1/94
1/1/96
1/1/98
1/1/00
1/1/02
1/1/04
1/1/06
1/1/08
1/1/10
1/1/12
1/1/14
1/1/16

Table D-2
Discharge Measurement Summary of Flag Springs Complex

Spring Name	Average Discharge[a] (cfs)	Minimum Discharge[a] (cfs)	Maximum Discharge[a] (cfs)	Standard Deviation[a] (cfs)	April 2015 Discharge[b] (cfs)	September 2015 Discharge[b] (cfs)
Flag Spring 1 (North)	2.33	1.54	3.49	0.39	1.90	1.80
Flag Spring 2 (Middle)	2.82	0.50	3.64	0.39	2.94	2.94
Flag Spring 3 (South)	2.11	1.22	3.66	0.42	1.89	2.32

[a]Period of record (1982-2015).
[b]2015 Discharge measurements are the average of two reported measurements.
Source: USGS (2016)

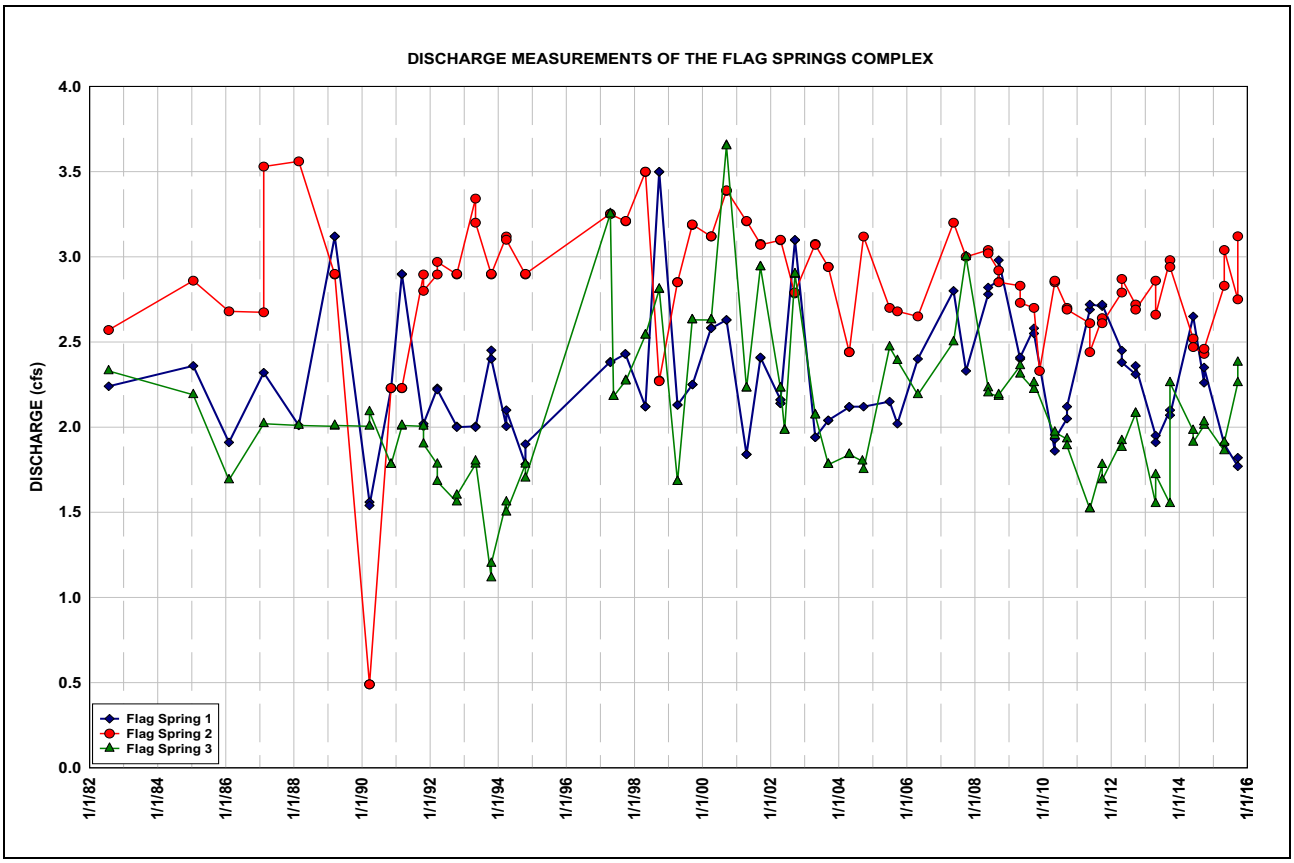


Table D-3
Discharge Measurement Summary of Hardy Springs

Spring Name	Average Discharge[a,b] (cfs)	Minimum Discharge[a,b] (cfs)	Maximum Discharge[a,b] (cfs)	Standard Deviation (cfs)	December 2015 Discharge[b] (cfs)
Hardy Springs	0.35	0.27	0.45	0.05	0.38

[a]Based on single measurements in 2004 and 2009 and multiple measurements per year from 2010 through 2015.
[b]Source: SNWA data

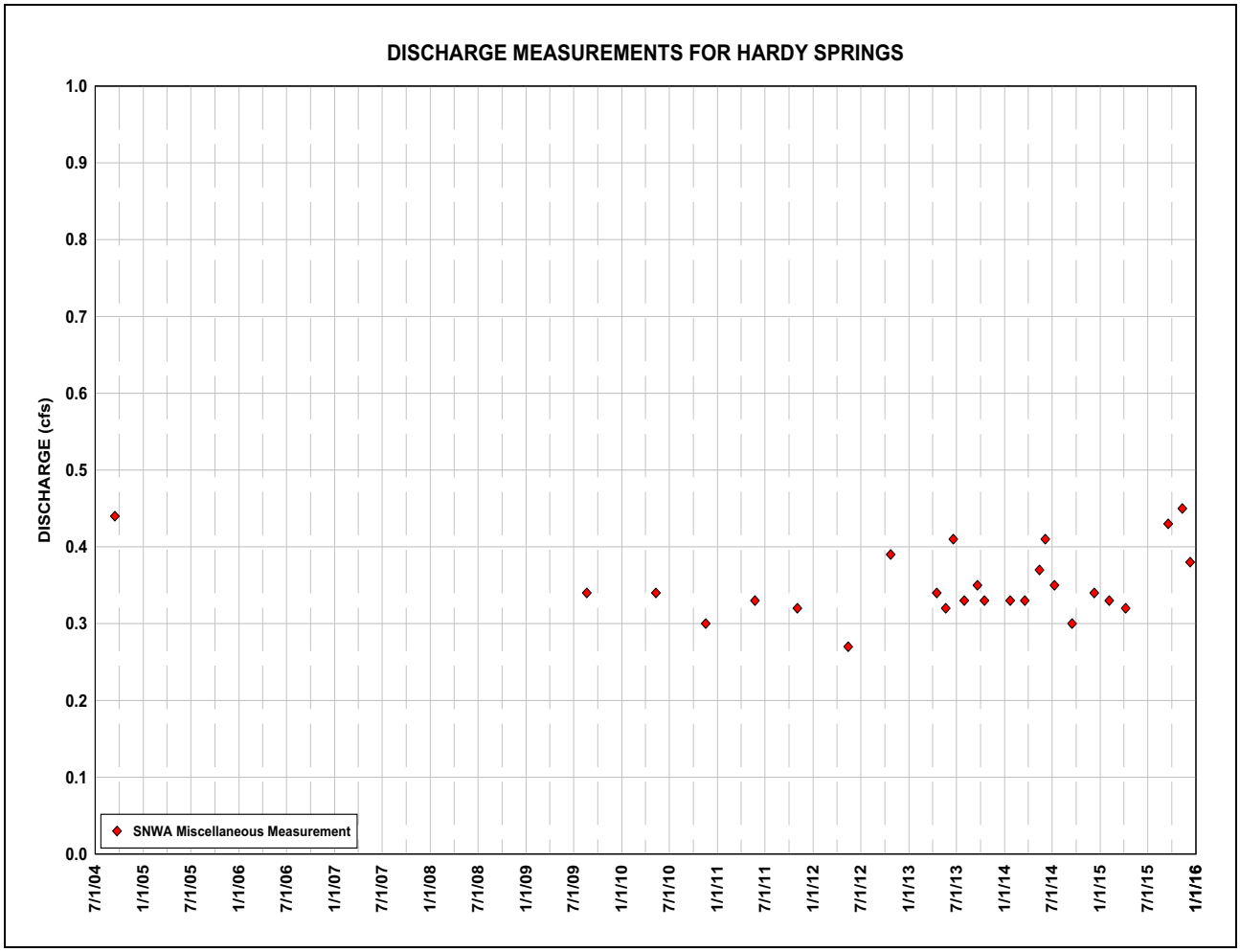


Table D-4
Annual Discharge at Crystal Springs

Water Year[a,b]	Crystal Springs (09415590)		Crystal Springs Diversion (09415589)			Total Combined Discharge (afy)
	Annual Discharge (afy)	Average Annual Discharge (cfs)	Annual Discharge (afy)	Average Annual Discharge (cfs)	Days Diverted	
2005	8,110	11.2	1,230	1.70	78	9,340
2006	8,190	11.3	923	1.28	67	9,113
2007	8,230	11.4	998	1.38	67	9,228
2008	8,100	11.2	1,020	1.40	80	9,120
2009	8,090	11.2	987	1.36	74	9,077
2010	8,120	11.2	743	1.03	52	8,863
2011	7,860	10.9	1,100	1.52	78	8,960
2012	8,160	11.2	710	0.98	50	8,870
2013	7,960	11.0	800	1.11	56	8,760
2014	7,814	10.8	1,117	1.54	117	8,931
2015	7,564	10.4	1,013	1.40	111	8,577
Average for the period of record[c]	8,018	11.1	967	1.33	75	8,985

[a]Water years 1990, 1991, 1992, 1993, and 1999 are excluded as explained in the text.
[b]Data are from USGS Water Resources Data - Nevada water years 2005 through 2015 (USGS, 2016).
[c]These values are extrapolated from the Crystal Springs gaging station records published by USGS (USGS, 2016).

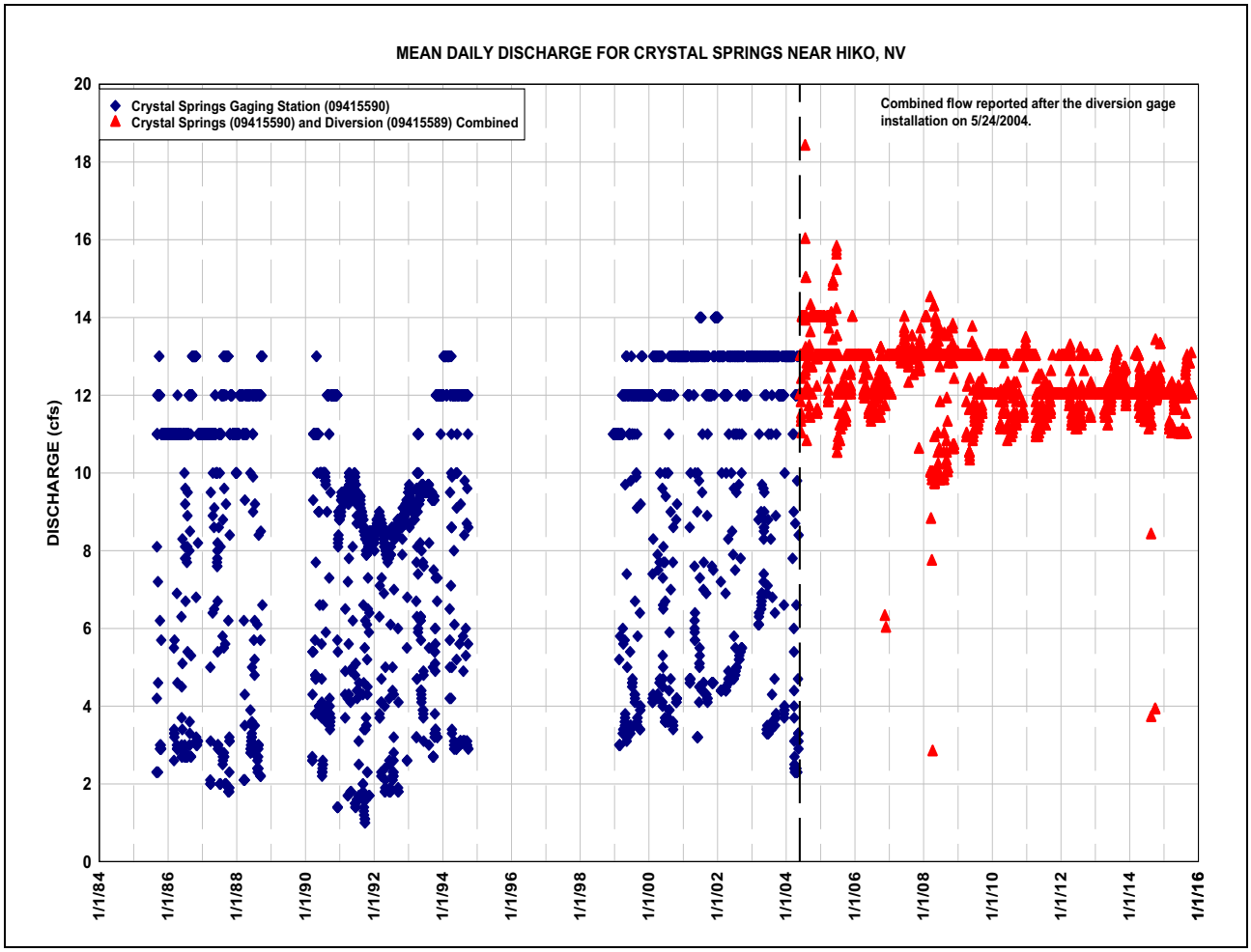
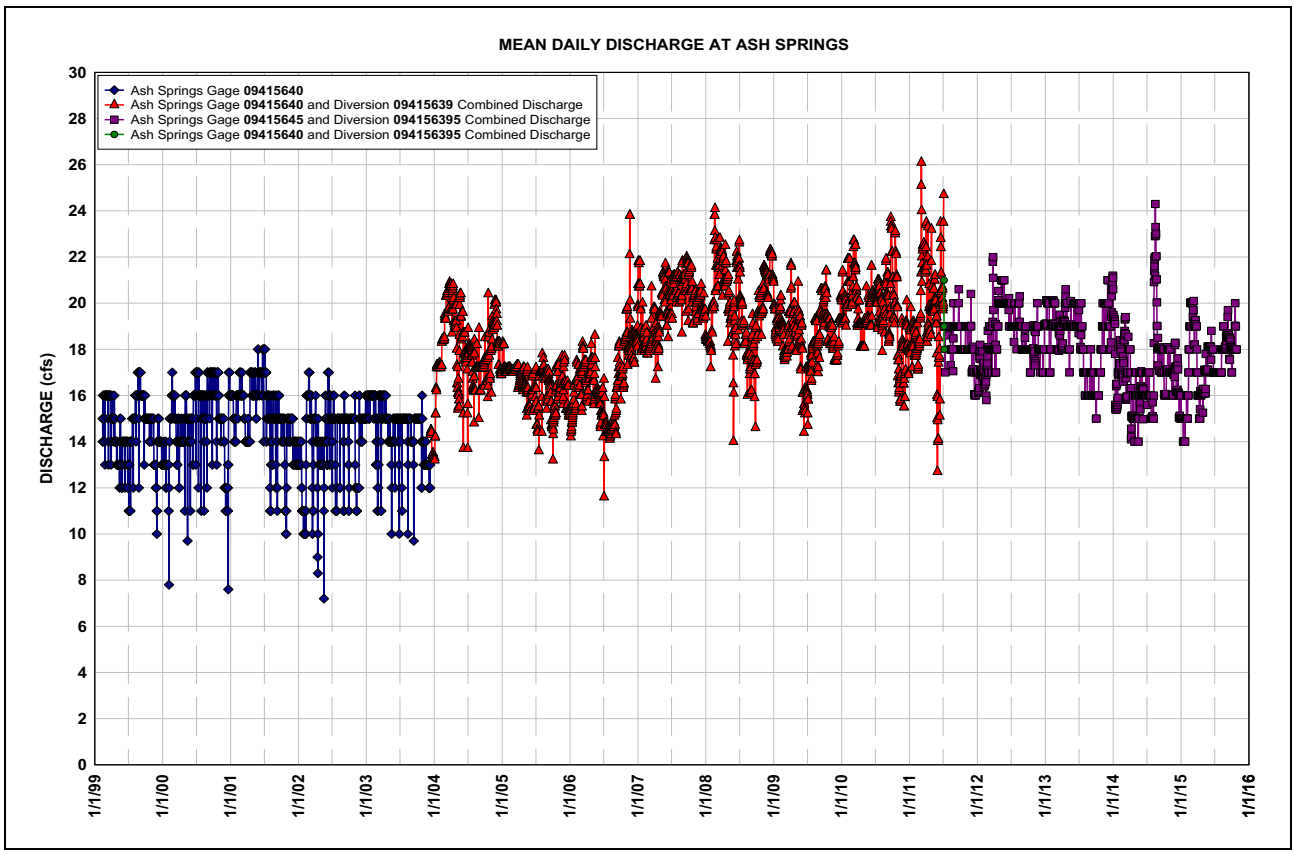

MEAN DAILY DISCHARGE FOR CRYSTAL SPRINGS NEAR HIKO, NV
Crystal Springs Gaging Station (09415590)
Crystal Springs (09415590) and Diversion (09415589) Combined
Combined flow reported after the diversion gage installation on 5/24/2004.
DISCHARGE (cfs)
0
2
4
6
8
10
12
14
16
18
20
1/1/84
1/1/86
1/1/88
1/1/90
1/1/92
1/1/94
1/1/96
1/1/98
1/1/00
1/1/02
1/1/04
1/1/06
1/1/08
1/1/10
1/1/12
1/1/14
1/1/16

Table D-5
Annual Discharge at Ash Springs

Water Year[a,b]	Ash Springs[c] (09415640 and 09415645)		Ash Springs Diversion[d] (09415639 and 094156395)			Total Combined Discharge (afy)
	Annual Discharge (afy)	Average Annual Discharge (cfs)	Annual Discharge (afy)	Average Annual Discharge (cfs)	Days Diverted	
2005	10,080	13.9	2,190	3.03	365	12,270
2006	8,780	12.1	2,810	3.88	365	11,590
2007	11,570	16.0	2,480	3.43	365	14,050
2008	11,740	16.2	2,600	3.58	366	14,340
2009	11,900	16.4	1,860	2.57	365	13,760
2010	12,710	17.6	1,570	2.17	365	14,280
2011	12,260	16.9	1,560	2.16	282	13,820
2012	12,970	17.9	430	0.59	70	13,420
2013	13,010	18.0	126	0.17	24	13,136
2014	11,892	16.4	511	0.706	112	12,403
2015	12,249	16.9	152	0.211	34	12,401
Average for the period of record[e]	11,742	16.2	1,481	2.05	247	13,225

[a]Data from USGS Water Resources Data-Nevada water years 2005 through 2015 (USGS, 2016).
[b]Period of record for Ash Springs Diversion (09415639) is December 12, 2003 to July 7, 2011. The 2004 water year is incomplete.
[c]Mean daily values for new site (09415645) used from July 8, 2011 to present.
[d]Mean daily values for new site (094156395) used from July 5, 2011 to present.
[e]These values are extrapolated from the Ash Springs gaging station records published by USGS (USGS, 2016).


MEAN DAILY DISCHARGE AT ASH SPRINGS
Ash Springs Gage 09415640
Ash Springs Gage 09415640 and Diversion 09415639 Combined Discharge
Ash Springs Gage 09415645 and Diversion 094156395 Combined Discharge
Ash Springs Gage 09415640 and Diversion 094156395 Combined Discharge
DISCHARGE (cfs)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
1/1/99
1/1/00
1/1/01
1/1/02
1/1/03
1/1/04
1/1/05
1/1/06
1/1/07
1/1/08
1/1/09
1/1/10
1/1/11
1/1/12
1/1/13
1/1/14
1/1/15
1/1/16

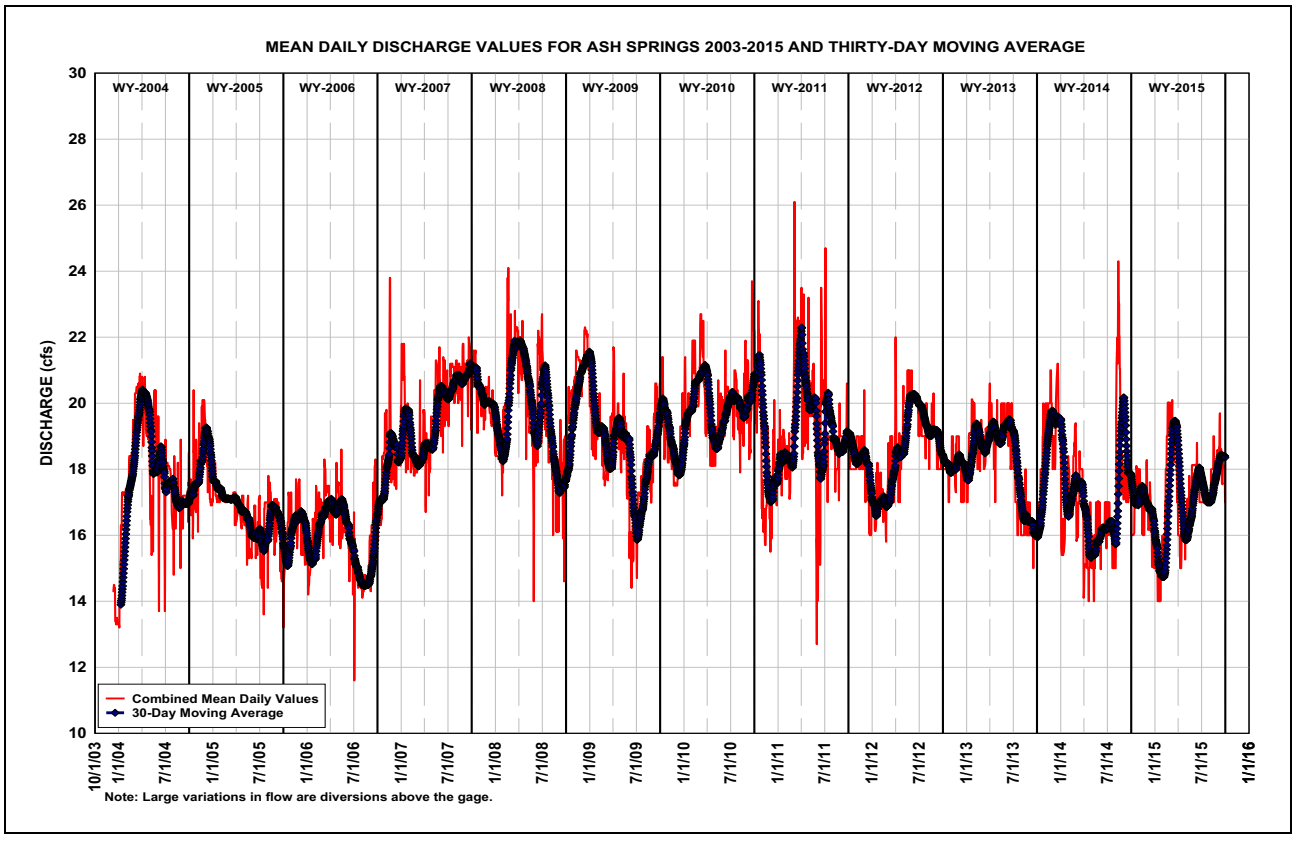

MEAN DAILY DISCHARGE VALUES FOR ASH SPRINGS 2003-2015 AND THIRTY-DAY MOVING AVERAGE
WY-2004
WY-2005
WY-2006
WY-2007
WY-2008
WY-2009
WY-2010
WY-2011
WY-2012
WY-2013
WY-2014
WY-2015
DISCHARGE (cfs)
10
12
14
16
18
20
22
24
26
28
30
Combined Mean Daily Values
30-Day Moving Average
10/1/03
1/1/04
7/1/04
1/1/05
7/1/05
1/1/06
7/1/06
1/1/07
7/1/07
1/1/08
7/1/08
1/1/09
7/1/09
1/1/10
7/1/10
1/1/11
7/1/11
1/1/12
7/1/12
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
1/1/16
Note: Large variations in flow are diversions above the gage.

Table D-6
Station Number 2090102 - Hiko Spring at Hiko, NV, Water Year 2015
Mean Daily Discharge Values

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	5.4	7.2	6.1	6.3	6.5	5.9	7.0	6.1	6.1	0.0	7.0	6.8
2	5.6	7.0	6.1	6.3	6.6	6.0	7.0	6.0	6.1	0.0	7.1	0.0
3	6.0	6.4	5.6	5.7	6.3	6.4	0.0	5.6	5.8	6.1	7.1	0.0
4	6.2	6.2	6.0	4.9	5.7	6.5	0.0	5.5	0.0	6.2	7.1	5.7
5	6.2	6.1	6.2	5.7	5.7	6.5	0.0	6.1	0.0	5.9	6.9	6.0
6	6.2	5.5	6.3	6.3	6.2	6.7	0.0	6.2	7.3	6.1	6.7	5.6
7	0.0	5.6	6.3	6.3	6.3	6.1	5.9	6.3	7.3	6.2	7.4	6.0
8	0.0	5.5	6.2	6.3	6.3	6.4	5.5	6.2	6.4	6.2	0.0	6.1
9	0.0	5.7	6.3	6.1	6.3	6.1	5.6	6.3	6.1	6.2	0.0	6.2
10	5.9	6.2	6.2	5.7	6.3	6.1	6.0	6.6	5.4	6.2	6.1	6.2
11	6.2	0.0	6.2	5.8	6.8	4.8	6.1	6.0	6.0	6.9	6.1	6.2
12	7.4	0.0	6.2	6.2	6.9	0.0	6.0	5.9	6.2	0.0	5.6	0.0
13	6.1	0.0	6.2	6.3	6.1	5.9	6.0	6.7	6.3	0.0	6.2	0.0
14	5.8	0.0	6.2	6.3	0.0	5.5	6.4	7.8	6.3	0.0	6.3	0.0
15	6.2	0.0	6.2	6.3	0.0	5.6	7.4	6.9	6.3	0.0	6.2	0.0
16	6.3	0.0	6.2	6.7	6.1	6.2	7.2	5.4	7.0	6.0	6.1	6.6
17	6.3	0.0	6.2	6.3	5.6	0.0	7.5	5.9	0.0	6.1	6.1	5.8
18	6.3	0.0	6.2	6.2	5.9	0.0	0.0	6.1	7.5	6.0	0.0	5.3
19	6.1	0.0	5.8	5.8	6.4	0.0	6.9	6.3	0.0	6.1	0.0	5.5
20	6.8	0.0	5.8	5.8	6.4	6.2	6.0	6.3	0.0	6.1	0.0	5.8
21	6.8	5.9	6.2	6.0	6.4	0.0	6.4	6.3	4.9	6.1	0.0	5.9
22	5.8	6.2	6.2	6.5	6.4	5.7	6.0	0.0	5.2	6.1	6.7	5.9
23	6.1	6.2	6.2	6.5	6.2	6.1	6.0	0.0	5.3	6.1	6.3	5.9
24	6.1	6.2	6.2	6.5	5.7	6.0	6.2	0.0	5.7	6.3	6.0	6.1
25	6.0	6.3	6.2	6.5	5.7	6.0	6.2	0.0	5.9	5.7	6.0	6.9
26	5.4	6.4	6.2	6.5	0.0	6.0	6.2	6.5	6.0	0.0	6.2	7.1
27	6.0	6.4	6.4	6.5	0.0	0.0	7.1	6.0	5.9	0.0	6.2	7.1
28	6.2	6.4	6.4	6.5	6.3	5.5	0.0	5.7	5.9	0.0	6.2	0.0
29	6.3	6.1	6.4	6.5	--	6.0	0.0	5.6	7.3	6.3	6.2	6.0
30	6.3	6.2	6.4	6.6	--	6.2	0.0	6.0	6.9	6.0	6.2	6.2
31	6.3	--	6.3	6.6	--	6.2	--	6.2	--	6.3	7.1	--
Total	172	124	192	193	149	151	141	166	155	135	161	141
Min	0.0	0.0	5.6	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max	7.4	7.2	6.4	6.7	6.9	6.7	7.5	7.8	7.5	6.9	7.4	7.1
Mean	5.56	4.12	6.19	6.23	5.32	4.86	4.70	5.37	5.17	4.36	5.20	4.70
Ac-ft	341	245	380	382	295	298	278	329	307	268	319	279

Note: Values are in cfs unless noted otherwise. e = Estimated day.

LOCATION: UTM NAD 1983 Zone 11N (meters), Northing 4,162,554 m, Easting 656,915 m, in SW1/4 NE1/4 SW1/4 sec.14, T. 4S., R. 60E, Lincoln County, 0.5 mi southwest of the orifice.

DRAINAGE AREA: Indeterminate.

PERIOD OF RECORD: June 2009 to current year.

GAGE: Ultra-sonic flow meter. Elevation of the gage is 3,868 ft amsl NAVD88.

REMARKS: Records are good. Discharge records are affected by both upstream and downstream agricultural diversions.

Annual Statistics	
Min:	0.0
Max:	7.8
Annual Total (Acre-ft):	3,721
Annual Mean (cfs):	5.15

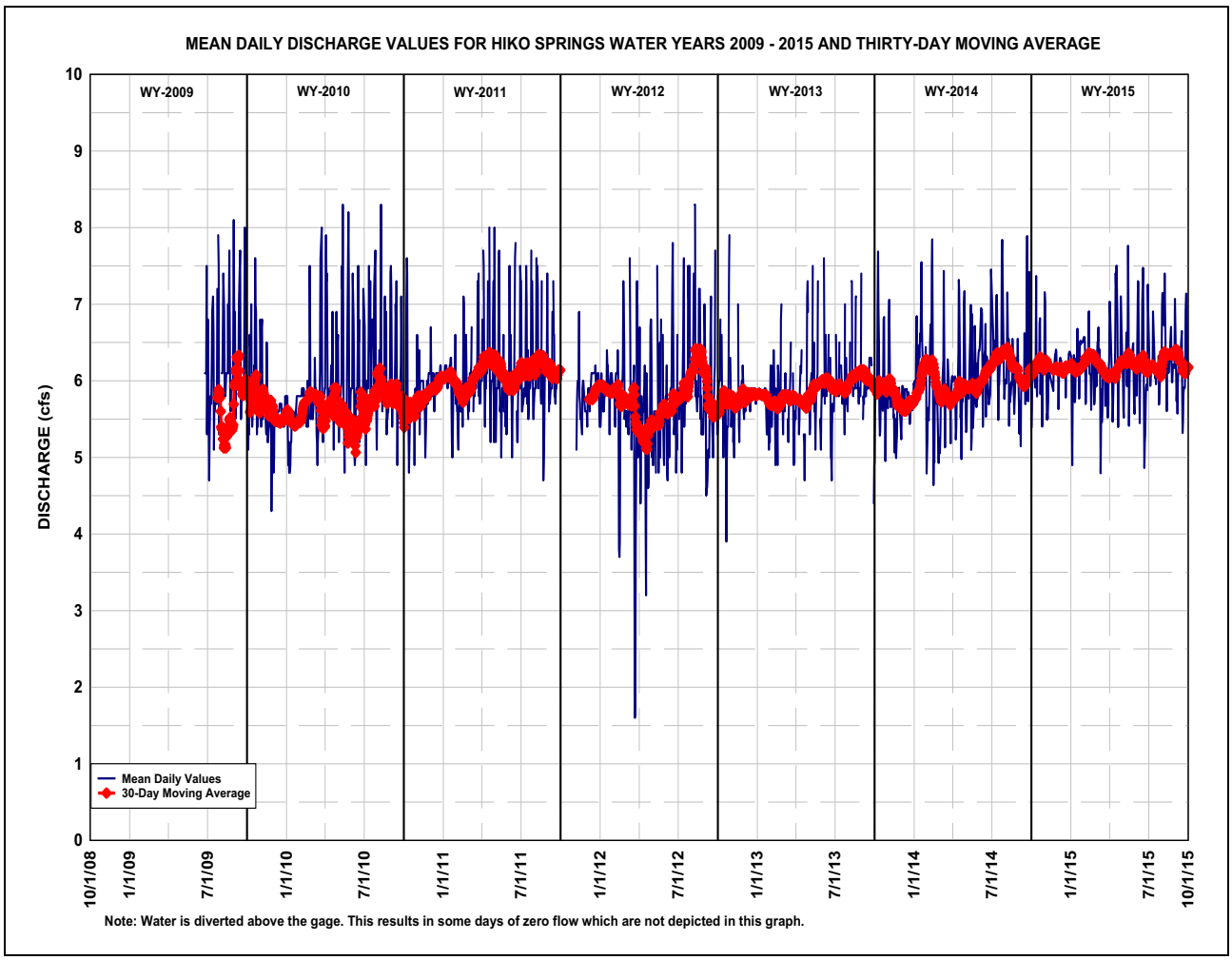

MEAN DAILY DISCHARGE VALUES FOR HIKO SPRINGS WATER YEARS 2009 - 2015 AND THIRTY-DAY MOVING AVERAGE
DISCHARGE (cfs)
WY-2009
WY-2010
WY-2011
WY-2012
WY-2013
WY-2014
WY-2015
Mean Daily Values
30-Day Moving Average
10/1/08
1/1/09
7/1/09
1/1/10
7/1/10
1/1/11
7/1/11
1/1/12
7/1/12
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
10/1/15
Note: Water is diverted above the gage. This results in some days of zero flow which are not depicted in this graph.

Table D-7
Station Number 2071302 - Flag Spring 2 near Sunnyside, NV, Water Year 2015
Mean Daily Discharge Values

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
2	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
3	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
4	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
5	2.5	2.5	2.5	2.5	2.5	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
6	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
7	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
8	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
9	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
10	2.5	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
11	2.5	2.5	2.5	2.6	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
12	2.5	2.5	2.5	2.6	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
13	2.5	2.5	2.5	2.6	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
14	2.5	2.5	2.5	2.6	2.6e	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
15	2.5	2.5	2.5	2.6	2.6e	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
16	2.5	2.5	2.5	2.6	2.6e	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
17	2.5	2.5	2.5	2.6	2.6e	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
18	2.5	2.5	2.5	2.6	2.6e	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
19	2.5	2.5	2.5	2.6	2.6e	2.6e	2.5e	2.5	2.5	2.4	2.4	2.3
20	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5e	2.5	2.5	2.4	2.4	2.3
21	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5e	2.5	2.5	2.4	2.4	2.3
22	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5e	2.5	2.4	2.4	2.4	2.3
23	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.5	2.4	2.4	2.3
24	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.4	2.3
25	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.4	2.3
26	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.4	2.3
27	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.4	2.3
28	2.5	2.5	2.5	2.6	2.6e	2.5e	2.5	2.5	2.4	2.4	2.4	2.3
29	2.5	2.5	2.5	2.6	--	2.5e	2.5	2.5	2.4	2.4	2.4	2.3
30	2.5	2.5	2.5	2.6	--	2.5e	2.5	2.5	2.4	2.4	2.3	2.3
31	2.5	--	2.5	2.6	--	2.5e	--	2.5	--	2.4	2.3	--
Total	78	75	78	80	73	79	75	78	74	74	74	69
Min	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.3
Max	2.5	2.5	2.5	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.3
Mean	2.50	2.50	2.50	2.57	2.60	2.56	2.50	2.50	2.47	2.40	2.39	2.30
Ac-ft	153	149	153	158	144	157	149	153	147	147	147	137

Note: Values are in cfs unless noted otherwise. e= Estimated day.

LOCATION: UTM NAD 1983 Zone 11N (meters), Northing 4,254,570 m, Easting 672,576 m, in SW1/4 SW1/4 NW1/4 sec. 33 T. 7N., R. 62E., Nye County.

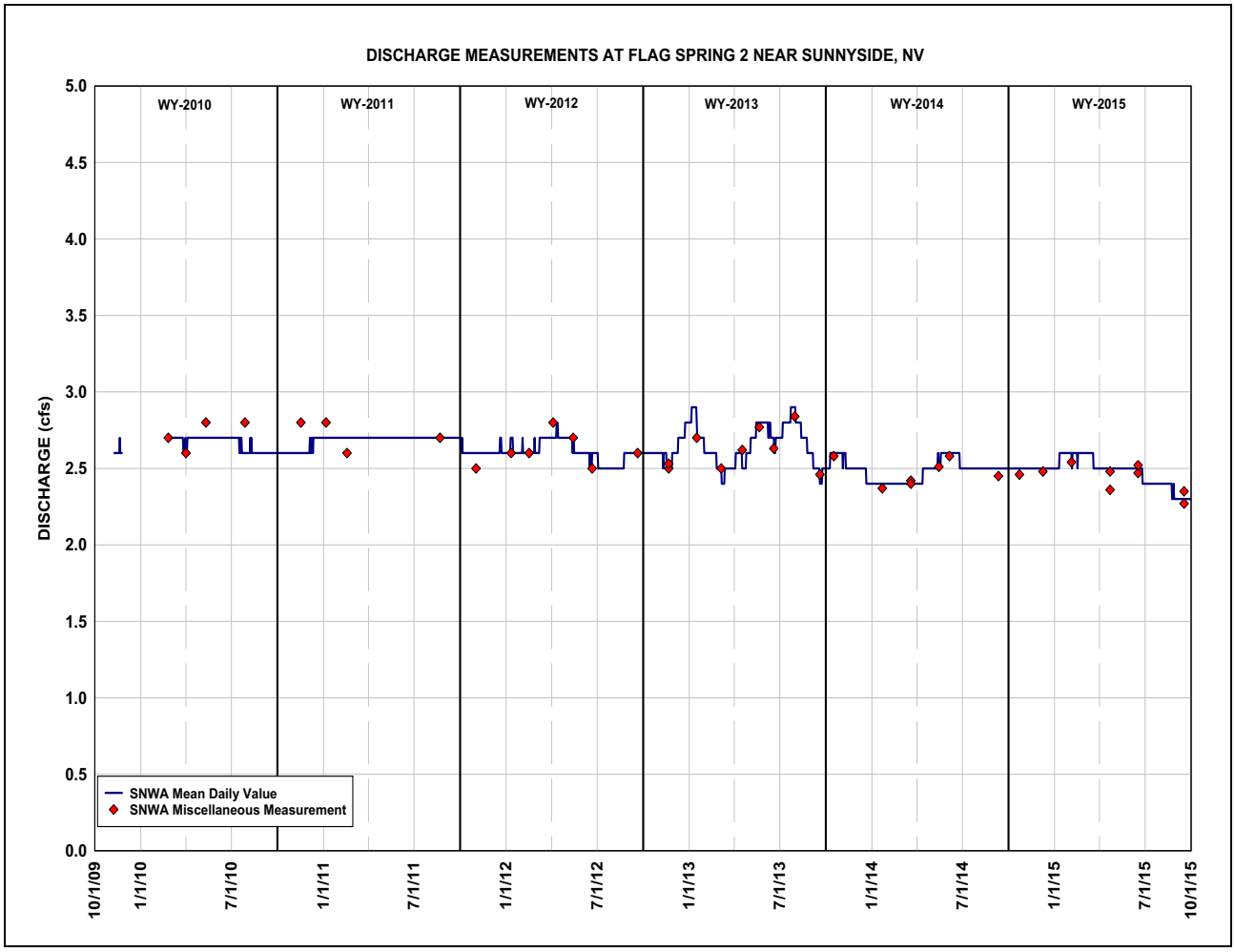
DRAINAGE AREA: Indeterminate.

PERIOD OF RECORD: November 2009 to current year.

GAGE: Bubbler/Pressure sensor. Elevation of the gage is estimated at 5,285 ft amsl NAVD88.

REMARKS: Records are rated as good except for estimated days which are rated as poor.

Annual Statistics	
Min:	2.3
Max:	2.6
Annual Total (Acre-ft):	1,794
Annual Mean (cfs):	2.48


DISCHARGE MEASUREMENTS AT FLAG SPRING 2 NEAR SUNNYSIDE, NV
DISCHARGE (cfs)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
WY-2010
WY-2011
WY-2012
WY-2013
WY-2014
WY-2015
SNWA Mean Daily Value
SNWA Miscellaneous Measurement
10/1/09
1/1/10
7/1/10
1/1/11
7/1/11
1/1/12
7/1/12
1/1/13
7/1/13
1/1/14
7/1/14
1/1/15
7/1/15
10/1/15

References

U.S. Geological Survey, 2016, National water information system (NWIS Web), [Internet], [accessed February 2016], available from http://waterdata.usgs.gov/nwis.

USGS, see U.S. Geological Survey.

Appendix E

DDC3M Plan
2015 Springs Site Photos

E.1.0 INTRODUCTION

This appendix presents photos taken in CY 2015 during the biannual field visits to document DDC spring conditions. Many of the DDC springs are controlled by collector systems and have been modified from their natural condition. Others, such as Littlefield and Cave Springs, remain in their natural condition.

Figure E-1
Maynard Spring, May 2015

Figure E-2
Maynard Spring, October 2015

Figure E-3
Cave Spring, May 2015

Figure E-4
Cave Spring, October 2015

Figure E-5
Parker Station, May 2015

Figure E-6
Parker Station, October 2015

Figure E-7
Parker Station Flume, May 2015

Figure E-8
Lewis Well, May 2015

Figure E-9
Lewis Well, October 2015

Figure E-10
Lewis Well Spring Collector Line Access Discharge, October 2015

Figure E-11
Silver King Well, May 2015

Figure E-12
Silver King Well, October 2015

Figure E-13
Coyote Spring, May 2015

Figure E-14
Coyote Spring, October 2015

Figure E-15
Big Mud Spring, May 2015

Figure E-16
Big Mud Spring, October 2015

Figure E-17
Littlefield Spring, May 2015

Figure E-18
Littlefield Spring, October 2015

Figure E-19
Grassy Spring, May 2015

Figure E-20
Grassy Spring, October 2015

Appendix F

Data provided by the U.S. Fish and Wildlife Service

Table F-1
USFWS North Maynard Spring Piezometers (2" PVC, open-end) June 2015 Installation & Measurements

Date	Time	Pipe ID	Description	UTM Easting (11N/NAD 83)	UTM Northing (11N/NAD 83)	Distance from Top of Casing to Land Surface*1 (ft)	Depth to Water Inside Piezometer from Top of Casing*2 (ft)	Depth to Water Outside Piezometer from Top of Casing*3 (ft)	Total Length of 2" PVC Piezometer (ft)	Comments
6/11/2015	15:38	MS 1.1	New USFWS 2" standpipe in the south edge of the spring	674,347.678	4,117,967.104	---	5.56	1.95	10.0	Installed 6/9/2015; 2" PVC pipe driven ~7.7 ft into the ground along the southern edge of the North Maynard spring pool in standing water (within the spring pool).
9/24/2015	15:50						4.98	2.22		
6/11/2015	15:53	MS 2.1	New USFWS 2" standpipe in the NW edge of the spring	674,340.666	4,117,967.368	---	4.99	1.75	9.6	Installed 6/9/2015; 2" PVC pipe driven ~7.3 ft into the ground along the northwestern edge of the North Maynard spring pool in standing water (within the spring pool), ~3 ft away from an existing 1" standpipe.
9/24/2015	16:04						4.67	Dry		
6/11/2015	15:48	M 2	Old, existing 1" standpipe in the NW edge of the spring (previously monitored by SNWA?)	674,340.137	4,117,966.442	---	1.52	1.61	---	Existing standpipe.
9/24/2015	15:58						1.83	Dry		
6/11/2015	15:58	M 3	Old, existing 1" standpipe in the NE edge of the spring (previously monitored by SNWA?)	674,343.047	4,117,973.586	---	0.88	1.03	---	Existing standpipe.
9/24/2015	16:07						1.34	Dry		

*1 Piezometers located in standing water (spring pool) on 6/11/2015, time of installation of new USFWS piezometers MS 1.1 and MS 2.1. No elevation above sea level currently available (e.g., for nearby land surface) that can be used to convert depth to water measurements to elevations. Actual survey needed.
*2 Distance from top of casing to water inside piezometer.
*3 Useful for estimating the vertical gradient between the bottom of piezometer (full depth of installation of the PVC standpipe) and bottm of spring pool.

Figure F-1
MS 1.1 Macro

Figure F-2
MS 1.1 Perspective

Figure F-3
MS 2.1 and M 2

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Appendix G

Precipitation-Station Data

Table G-1
2015 Regional Precipitation Data
(Page 1 of 2)

Blue Eagle Ranch Hanks (RP1730201)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.67	0.04	0.20	0.77	0.95	0.23	0.31	0.47	0.04	1.32	1.33	0.21	6.54
Period of Record Statistics (1978 to Present)													
Mean	0.68	0.65	0.85	0.89	0.90	0.37	0.52	0.72	0.68	0.87	0.69	0.51	8.34
Min	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.41
Max	1.66	1.97	2.43	2.93	3.43	1.52	2.94	3.92	3.95	4.23	2.53	1.54	15.11
No. Yrs	37	36	37	37	37	38	38	38	38	38	37	38	33
McGill (RP1790202)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.17	0.15	0.37	0.58	2.43	0.17	0.15	0.65	0.70	1.87	1.16	1.31	9.71
Period of Record Statistics (1892 to Present)													
Mean	0.60	0.64	0.74	0.96	1.04	0.74	0.67	0.79	0.69	0.81	0.56	0.62	8.85
Min	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76
Max	4.58	2.38	2.54	3.19	3.33	4.30	3.03	3.25	5.57	3.38	1.90	3.05	16.21
No. Yrs	104	105	108	107	106	107	105	106	105	105	106	105	88
Spring Valley State Park (RP2010201)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.32m	0.15d	0.69f	1.17g	3.38	1.28	1.72e	2.13	0.03	1.93	1.85	0.60d	13.07c
Period of Record Statistics (1974 to Present)													
Mean	1.02	1.16	1.40	0.93	1.19	0.42	0.96	1.35	0.97	1.18	0.72	0.82	12.13
Min	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.06
Max	4.21	5.24	4.38	3.92	3.70	2.14	3.68	5.41	14.97	4.95	3.43	6.62	23.48
No. Yrs	32	34	37	33	35	40	37	41	37	33	37	35	16
Pioche (RP2020201)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.80	0.22	0.94	0.40	3.47	0.60	1.83	0.78	0.00	1.75	0.50	1.58	12.87
Period of Record Statistics (1888 to Present)													
Mean	1.50	1.39	1.60	1.02	0.96	0.38	1.01	1.39	0.97	1.04	0.96	1.32	13.54
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.81
Max	6.74	6.02	5.22	4.63	4.30	2.75	4.99	5.01	3.87	8.19	4.79	10.24	27.29
No. Yrs	78	80	77	82	79	78	79	79	78	76	76	74	60
Caliente (RP2050201)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.72b	0.60	0.49a	0.39a	2.84c	1.00	2.64a	0.76	0.20	2.59	1.26b	1.04	14.53
Period of Record Statistics (1903 to Present)													
Mean	0.82	0.94	1.00	0.68	0.57	0.34	0.83	0.90	0.61	0.75	0.67	0.67	8.77
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84
Max	3.47	3.98	4.59	3.71	2.84	2.18	5.36	4.18	3.14	5.12	3.38	3.76	18.73
No. Yrs	90	91	89	92	90	91	90	92	91	88	92	90	69

Table G-1
2015 Regional Precipitation Data
(Page 2 of 2)

Sunnyside (RP2070201)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.60	0.00	0.04	0.08	2.18	0.30	0.49	0.18	0.18	1.68	0.60	0.50	6.83
Period of Record Statistics (1891 to Present)													
Mean	0.67	0.77	0.94	0.77	0.81	0.46	0.77	0.83	0.89	0.88	0.54	0.64	8.96
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.73
Max	2.64	3.55	4.82	2.81	3.23	2.79	4.37	3.89	3.69	3.76	4.19	2.80	17.65
No. Yrs	53	54	55	54	54	54	55	55	52	52	53	47	29
Lund (RP2070202)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.28	0.25	0.27	0.54	2.19	0.07	0.59d	0.46	0.14	1.87	0.87	0.48	8.01
Period of Record Statistics (1957 to Present)													
Mean	0.77	0.82	0.96	0.95	0.94	0.78	0.67	0.89	0.81	0.91	0.68	0.74	9.92
Min	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.99
Max	4.13	2.22	3.44	3.44	3.45	5.37	3.05	4.58	5.01	3.66	2.62	2.91	16.82
No. Yrs	56	57	54	58	57	58	57	57	58	58	59	58	47
Hiko (RP2090201)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.58	0.32	0.40	0.27	1.38	0.16	0.58a	0.38	0.00	2.85	0.24	0.20	7.36
Period of Record Statistics (1989 to Present)													
Mean	0.73	1.05	0.79	0.51	0.41	0.30	0.47	0.53	0.54	0.76	0.41	0.79	7.28
Min	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45
Max	2.94	4.13	4.45	1.56	1.69	1.66	1.65	2.52	2.89	3.38	1.91	4.02	13.68
No. Yrs	24	25	26	25	26	26	26	26	27	27	27	27	23
Paharanagat Wildlife Refuge (RP2090202)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	0.53a	0.38a	0.57k	---z	---z	---z	---z	---z	---z	---z	---z	---z	0.91j
Period of Record Statistics (1964 to Present)													
Mean	0.68	0.71	0.73	0.61	0.37	0.19	0.48	0.63	0.36	0.53	0.48	0.43	6.19
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.23
Max	3.21	3.22	3.03	4.04	1.59	1.20	4.22	3.60	2.30	3.18	2.48	1.91	12.11
No. Yrs	44	43	45	43	43	47	46	46	47	46	45	45	33
Ward Mountain (RP2070301)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	1.2	0.8	0.8	1.3	4.3	0.7	1.2	0.4	0.4	3.3	2.5	3.2	20.1
Period of Record Statistics (1980 to Present)													
Mean	2.46	2.75	2.62	2.36	2.33	0.89	1.05	1.39	1.56	2.03	1.88	2.21	23.52
Min	0.2	0.4	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	12.8
Max	6.1	9.5	8.1	5.7	7.0	3.9	5.0	4.6	7.9	6.6	7.9	10.7	39.7
No. Yrs.	35	35	35	35	35	35	35	36	36	36	36	36	35

Note: a = 1 day missing, b = 2 days missing, c = 3 days missing, etc.., z = 26 or more days missing; Long-term means based on summation of period of record monthly mean row values.

Table G-2
2015 High-Altitude Precipitation Data

Source	Station Number	Station Name	2015 Precipitation (in.)	Period of Record Statistics				
				Time Period	Mean	Min	Max	No. Yrs.
NDWR	RP1830101	Mount Wilson (NDWR)	18.55	1954 - 2015	16.58	7.50	28.30	59

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SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

March 29, 2016

Jason King, P.E., State Engineer
Nevada Division of Water Resources
901 S. Stewart Street, Suite 2002
Carson City, Nevada 89701

Dear Mr. King:

SUBJECT: SUBMITTAL OF ANNUAL MONITORING REPORTS FOR SELECTED SNWA AND LVVWD PERMITS IN SOUTHERN AND EASTERN NEVADA

The enclosed reports are submitted in satisfaction of hydrologic monitoring and reporting requirements associated with water-right permits held by the Southern Nevada Water Authority (SNWA) and Las Vegas Valley Water District (LVVWD) in eastern and southern Nevada. The reports and associated permits included in this submittal are described below:

2015 Annual SNWA Monitoring Report for Coyote Spring, Garnet, and Hidden Valleys, Clark and Lincoln Counties, Nevada (Hydrographic Areas 210, 216 and 217) for Permit Numbers 54073, 54074, 68822, 77291-77306, 70429, 70430, 74094, 74095, 79001-79010 and 83490. The report also includes data collected at monitoring sites located in adjacent hydrographic basins.

2015 Spring Valley Hydrologic Monitoring, Management, and Mitigation Plan Status and Data Report (Hydrographic Area 184) in satisfaction of reporting requirements set forth in the hydrologic monitoring plan approved by the Nevada State Engineer (NSE) associated with Ruling 6164.

2015 Delamar, Dry Lake and Cave Valleys Hydrologic Monitoring, Management, and Mitigation Plan Status and Data Report (Hydrographic Areas 180, 181 and 182) in satisfaction of reporting requirements set forth in the hydrologic monitoring plan approved by the NSE associated with Rulings 6165 through 6167.

2015 Annual Monitoring Report for LVVWD Groundwater Permits in Ivanpah Valley, Nevada (Hydrographic Area 164A) for Permits Numbers 17691, 21997, 51133, 51543, 51544, 52733-52735, 54983, 76210, 81346, 83076 and 83077. A CD containing electronic files of water-level data in the format requested by your office is included in the report.

Electronic files containing the 2015 hydrologic and groundwater-production data collected under the various monitoring programs associated with these permits have previously been submitted to your office in the required format.

If you have any questions concerning these reports, please contact Andrew Burns at (702) 862-3772.

Sincerely,

Zane L. Marshall
Director, Resources & Facilities

ZLM:AB:JP:lmv

Enclosures (4)

c: Adam Sullivan, Hydrology Section Chief, Nevada Division of Water Resources
Matt Dillion, Water Resource Specialist, NDWR Nevada Division of Water Resources
John Guillory, Supervising Engineer, Nevada Division of Water Resources

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March 29, 2016

Bill Hansen, Chief Water Rights Branch
National Park Service, WRD
1201 Oak Ridge Drive, Suite 250
Ft. Collins, Colorado 80525

William Dunkelberger, Forest Supervisor
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1200 Franklin Way
Sparks, Nevada 89431

Michael Senn, Nevada State Supervisor
U.S. Fish and Wildlife Service
1340 Financial Boulevard, Suite 234
Reno, Nevada 89502

Michael Herder, Ely District Manager
Bureau of Land Management
702 N. Industrial Way
HC 33 Box 3350
Ely, Nevada 89301

Cathy Wilson, Area Director
Bureau of Indian Affairs, Western Region
2600 N. Central Avenue, MS#460
Phoenix, Arizona 85004

Dear Stipulation Executive Committee Members:

SUBJECT: SUBMITTAL OF THE 2015 SPRING VALLEY AND DDC VALLEYS HYDROLOGIC MONITORING, MANAGEMENT, AND MITIGATION PLAN STATUS AND DATA REPORTS

The Southern Nevada Water Authority (SNWA) hereby submits the subject reports to the Stipulation Executive Committee (EC). These reports are submitted in satisfaction of reporting requirements set forth in hydrologic monitoring plans associated with Exhibit A of the Stipulation for Withdrawal of Protests for both Spring Valley and Delamar, Dry Lake, and Cave (DDC) valleys.

These reports provide the EC and Technical Review Panel with hydrologic data for calendar year 2015 and a status update of monitoring activities performed by SNWA. Copies of the reports and electronic data submittal have also been posted on the Spring Valley and DDC valleys data-exchange website.

If you have any questions regarding these reports, please contact Andrew Burns at (702) 862-3772.

Sincerely,

Zane L. Marshall
Director, Resources & Facilities

ZLM:AB:JP:lmv

Enclosures (2)

c: Andy Gault, Bureau of Land Management
Sarah Peterson, Bureau of Land Management
Ray Roessel, Bureau of Indian Affairs, Western Region
Sue Braumiller, U.S. Fish and Wildlife Service
Joe Gurrieri, U.S. Forest Service
Gary Karst, National Park Service
Jose Noriega, U.S. Forest Service
Andrew Burns, Southern Nevada Water Authority
James Prieur, Southern Nevada Water Authority