TRUCKEE MEADOWS WATER AUTHORITY

2016-2035

WATER RESOURCE PLAN

APPENDIX 3

APPENDIX 3-1

Aquifer Storage and Recovery

Reports

TRUCKEE MEADOWS WATER AUTHORITY

REPORT ON AQUIFER STORAGE AND RECOVERY
WEST LEMMON VALLEY HYDROGRAPHIC BASIN

JANUARY 1 THROUGH JUNE 30, 2015

NDEP PERMIT #UNEV99209

and

NDWR PERMIT #R-15

July 2015

CERTIFICATION

The information contained in this report is true and correct according to the best belief and knowledge of the undersigned.

Certified by

John A. Erwin

Director Natural Resources-Planning & Management

Truckee Meadows Water Authority

Truckee Meadows Water Authority

1355 Capital Boulevard

Reno, Nevada 89502

www.tmwa.com

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1.0 SUMMARY

Truckee Meadows Water Authority's (TMWA) Aquifer Storage and Recovery program (ASR) activities in the West Lemmon Valley Basin are performed under Nevada Department of Environmental Protection (NDEP) Permit Number UNEV99209 issued August 28, 2008, and Division of Water Resources (NDWR) Permit No. R-15 issued November 19, 2008. TMWA's ASR program in the West Lemmon Valley Basin has grown from 32 acre-feet of treated surface water injected in 2000 to 4,649 acre-feet cumulative total at the end of June, 2015 as shown in the table below.

Table 1. Injection History, West Lemmon Valley Basin (in acre-feet)

Year	Silver Knolls	Army Air Guard	Silver Lake	Total
2000		32		32
2001		242	149	391
2002		205	88	293
2003		180	83	263
2004		157	84	241
2005		137	93	230
2006		163	146	309
2007		136	136	272
2008	32	118	172	322
2009	19	106	191	316
2010	131	150	192	472
2011	130	100	89	319
2012	118	81	63	263
2013	53	38	28	119
2014	114	86	76	276
Jun-15	184	184	163	531
TOTAL	781	2,115	1,753	4,649

Between January 1 and June 30, 2015, TMWA injected 531 acre-feet (173 million gallons) of treated surface water in the west portion of the West Lemmon Valley Basin in TMWA's Army Air Guard (AAW), Silver Lake (S2W) and Silver Knolls (SKW) Wells (see Table 2A). The average flow rate for AAW was 185 gpm, for S2W was 158 gpm and 236 gpm for SKW. Maximum injection rates attained by AAW, S2W and SKW were 300 gpm; 174 gpm and 311 gpm, respectively. The minimum injection rate was 120 gpm for AAW, 151 gpm for S2W and 186 gpm for SKW. The source was treated Truckee River water from TMWA's surface water treatment plants, delivered to the Stead area through TMWA's distribution system.

During first half of 2015, no water was pumped from SKW, while 50.3 acre-feet (16.4 MG) was pumped from AAW and 13.8 acre-feet (4.5 MG) was pumped from S2W (Table 2B).

Table 2A. Monthly Recharge by Well, West Lemmon Valley, (Jan-Jun) 2015

	JAN	FEB	MAR	APR	MAY	JUN	TOTAL RECHARGE	
							MG	AF
Silver Knolls	3.6	10.3	10.5	9.5	26.0	0.0	59.9	183.9
Air Guard	9.7	8.6	8.8	7.0	26.0	0.0	60.0	184.2
Silver Lake	7.1	6.4	7.0	6.7	26.0	0.0	53.1	163.0
	----	----	----	----	----	----	----	----
Total	20.3	25.3	26.3	23.2	78.0	0.0	173.1	531.1

Table 2B. Monthly Production by Well, West Lemmon Valley, (Jan-Jun) 2015

	JAN	FEB	MAR	APR	MAY	JUN	TOTAL PUMPAGE	
							MG	AF
Silver Knolls	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Guard	0.0	0.0	0.0	0.0	0.0	16.4	16.4	50.3
Silver Lake	0.0	0.0	0.0	0.0	0.0	4.5	4.5	13.8
	----	----	----	----	----	----	----	----
Total	0.0	0.0	0.0	0.0	0.0	20.9	20.9	64.1

The chemistry of the injection and extracted water showed no adverse effects to the aquifer as evidenced from the low total trihalomethanes and consistent water quality data from the extracted water.

Figure 1 is the map of the recharge and monitoring wells.

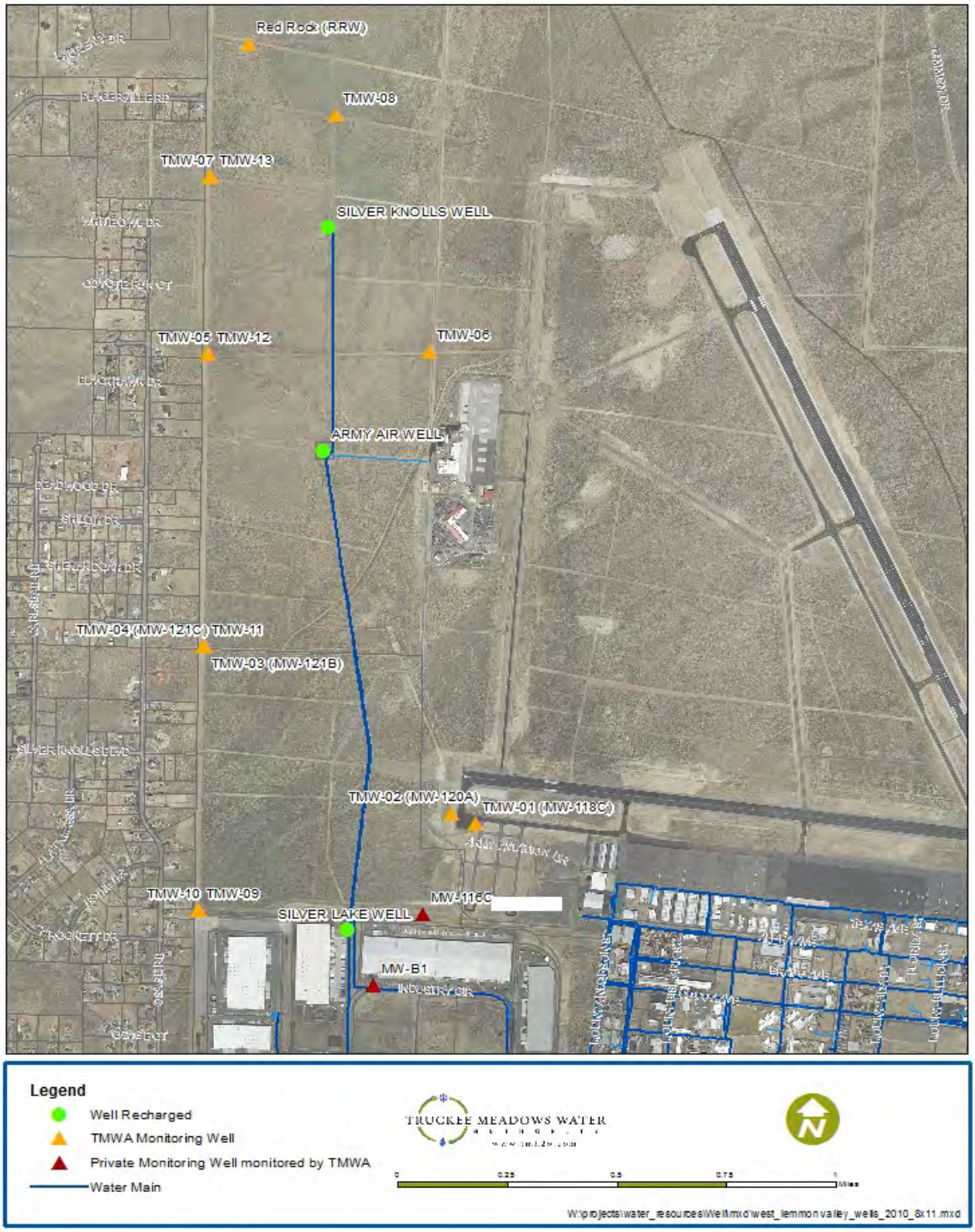

Figure 1. Well Locations - West Lemmon Valley Basin

Figures 2, 3, and 4 are the plots of the water levels, pumping, and injection rates in the three production/injection wells.

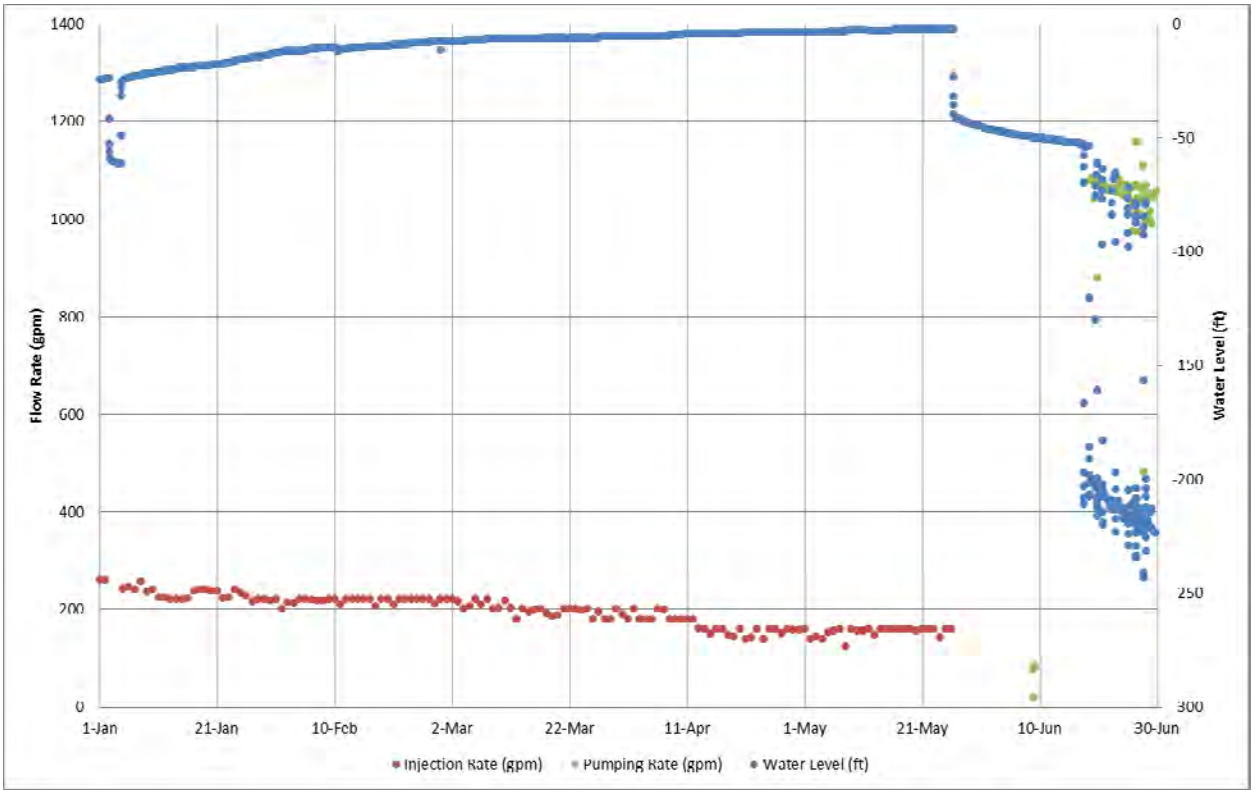

Figure 2. Army Air Guard Well – (Jan-Jun) 2015 Flow Rates and Water Levels

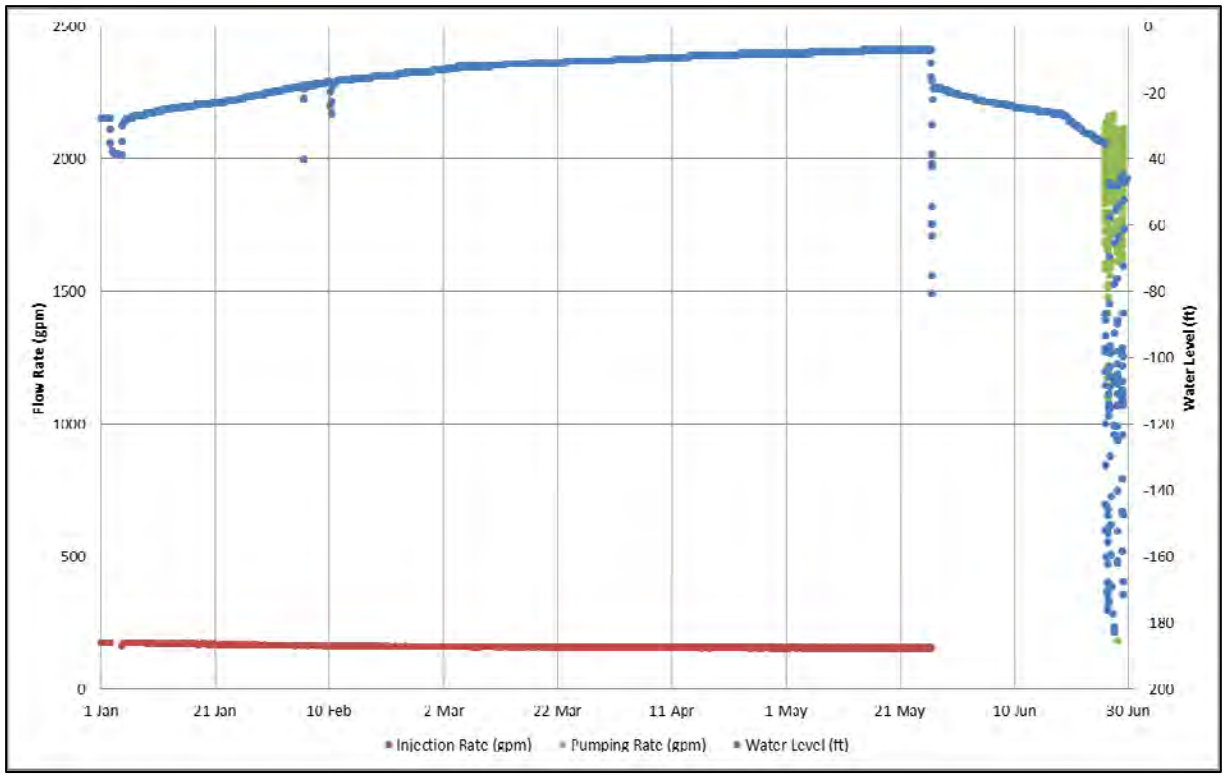

Figure 3. Silver Lake Well – (Jan-Jun) 2015 Flow Rates and Water Levels

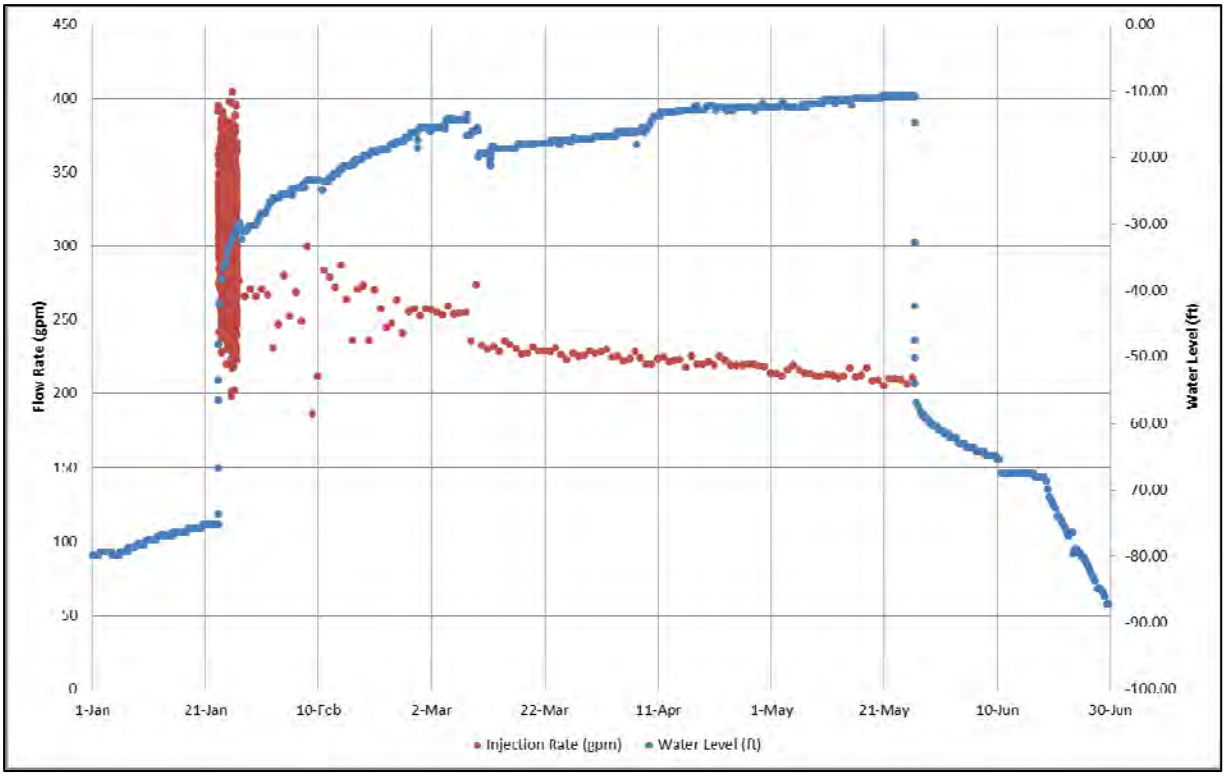

Figure 4. Silver Knolls Well – (Jan-Jun) 2015 Flow Rates and Water Levels

2.0 WATER LEVEL MONITORING

TMWA uses its fifteen monitoring wells plus two private monitoring wells (MW-B1 and MW-116C) as monitoring wells for its West Lemmon Valley ASR program. After drilling four additional wells in 2008, TMWA now has four locations with nested monitoring wells on the west side of the well field to monitor water level changes during injection and pumping in the shallow and deep aquifers. The pairs are, from south to north: TMW-09 (400 ft) and TMW-10 (100 ft); TMW-03 (73 ft), TMW-04 (115 ft) and TMW-11 (400 ft); TMW-05 (400 ft) and TMW-12 (170 ft); and, TMW-07 (400 ft) and TMW-13 (148 ft).

Figure 1 and Tables 3A & B illustrate first half 2015 water levels and water level elevations data. Water levels in all the monitoring wells were measured monthly using electronic water level probes, except in months where the roads were too muddy to access some of the wells. Water levels in the injection wells AAW, S2W and SKW were measured using both an electronic probe and TMWA's SCADA system.

Figure 5A shows water levels and Figure 5B shows the water level elevations in the shallow and the deep wells. Figure 6 shows the differences in water level variations between shallow and deep monitoring wells. In Figure 6, the four pairs of nested wells mentioned above are plotted with the same color. The water level changes in the deep monitoring wells have higher variation between pumping and injection periods than in the shallow ones. This shows that the shallow wells are not as responsive to the injection and pumping activities compared to the deep monitoring wells.

Table 3A. West Lemmon Valley Wells – 1st Half 2015 Water Levels

	MW-B1	MW-116A	TMW-01 (MW-118C)	TMW-02 (MW-120A)	TMW-03 (MW-121B)	TMW-04 (MW-121C)	TMW-05	TMW-06	TMW-07	TMW-08	TMW-09	TMW-10	TMW-11	TMW-12	TMW-13	RRW	AAW	S2W	SKW
01/15/15	-24.34	-32.39	-42.08	-42.21	-47.51	-47.78	-74.58	-63.81	-92.48	-81.65	-33.38	-34.75	-44.56	-77.31	-94.52	-102.43	-18.09	-23.29	-75.21
02/09/15	-23.71		-40.60	-41.21						-71.49							-10.63	-15.74	-23.41
03/09/15	-23.05	-32.11	-39.02	-38.34	-45.57	-44.76	-61.94	-56.73	-79.76	-68.03	-22.51	-31.33	-32.82	-72.97	-90.73	-88.29	-6.94	-10.83	-15.98
04/16/15	-22.80	-32.04	-37.87	-37.27	-44.89	-43.78	-60.43	-55.64	-77.60	-66.63	-20.65	-30.31	-31.18	-72.07	-89.88	-85.45	-5.20	-8.28	-15.84
05/08/15	-22.55	-31.85	-37.29	-36.56	-44.32	-43.23	-59.77	-55.13	-76.42	-65.94	-19.85	-30.18	-30.57	-71.19	-89.11	-83.58	-2.95	-6.40	-11.78
06/05/15	-22.20	-31.68	-37.15	-36.27	-43.98	-43.11	-64.95	-57.13	-71.93	-72.43	-23.61	-30.07	-35.65	-71.74	-91.73	-87.46	-47.59	-21.87	-64.39
Elevation, ft. asl	4975.00	4982.00	4987.00	4983.00	4992.00	4992.00	5021.00	5009.00	5037.00	5028.00	4981.00	4980.00	4992.00	5021.00	5037.00	5043.00	4980.00	4978.00	5020.00
Depth, ft.	34.00	124.00	120.00	57.00	73.00	115.00	400.00	400.00	400.00	400.00	400.00	100.00	400.00	170.00	148.00	672.00	840.00	825.00	647.00
Top of Screen, ft.	30.00	105.00	100.00	37.00	54.00	99.00	200.00	200.00	200.00	200.00	200.00	60.00	360.00	110.00	98.00	328.00	310.00	192.00	328.00

Table 3B. West Lemmon Valley Wells – 1st Half 2015 Water Level Elevations

	MW-B1	MW-116A	TMW-01 (MW-118C)	TMW-02 (MW-120A)	TMW-03 (MW-121B)	TMW-04 (MW-121C)	TMW-05	TMW-06	TMW-07	TMW-08	TMW-09	TMW-10	TMW-11	TMW-12	TMW-13	RRW	AAW	S2W	SKW
01/15/15	4950.78	4949.33	4941.92	4940.39	4944.39	4944.24	4946.82	4945.29	4944.52	4946.65	4946.52	4945.19	4947.42	4943.37	4942.30	4940.17	4986.81	4965.11	4944.39
02/09/15	4951.41		4943.40	4941.39						4956.81							4994.27	4972.66	4996.19
03/09/15	4952.07	4949.61	4944.98	4944.26	4946.33	4947.26	4959.46	4952.37	4957.24	4960.27	4957.39	4948.61	4959.16	4947.71	4946.09	4954.31	4997.96	4977.57	5003.62
04/16/15	4952.32	4949.68	4946.13	4945.33	4947.01	4948.24	4960.97	4953.46	4959.40	4961.67	4959.25	4949.63	4960.80	4948.61	4946.94	4957.15	4999.70	4980.12	5003.76
05/08/15	4952.57	4949.87	4946.71	4946.04	4947.58	4948.79	4961.63	4953.97	4960.58	4962.36	4960.05	4949.76	4961.41	4949.49	4947.71	4959.02	5001.95	4982.00	5007.82
06/05/15	4952.92	4950.04	4946.85	4946.33	4947.92	4948.91	4956.45	4951.97	4965.07	4955.87	4956.29	4949.87	4956.33	4948.94	4945.09	4955.14	4957.31	4966.53	4955.21
Elevation, ft. asl	4975.00	4982.00	4987.00	4983.00	4992.00	4992.00	5021.00	5009.00	5037.00	5028.00	4981.00	4980.00	4992.00	5021.00	5037.00	5043.00	4980.00	4978.00	5020.00
Depth, ft.	34.00	124.00	120.00	57.00	73.00	115.00	400.00	400.00	400.00	400.00	400.00	100.00	400.00	170.00	148.00	672.00	840.00	825.00	647.00
Top of Screen, ft.	30.00	105.00	100.00	37.00	54.00	99.00	200.00	200.00	200.00	200.00	200.00	60.00	360.00	110.00	98.00	328.00	310.00	192.00	328.00

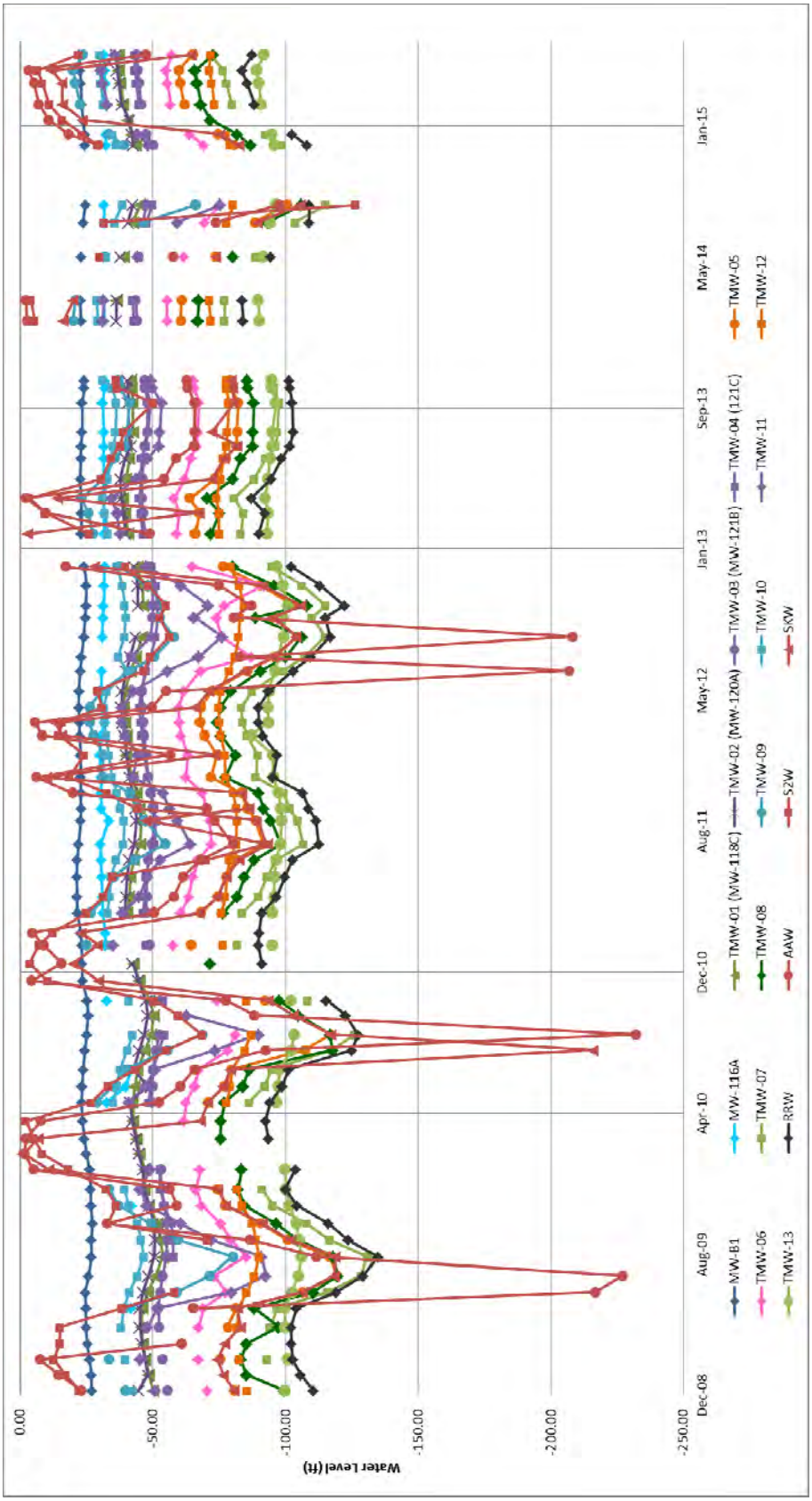

Figure 5A. West Lemmon Valley Wells Water Levels

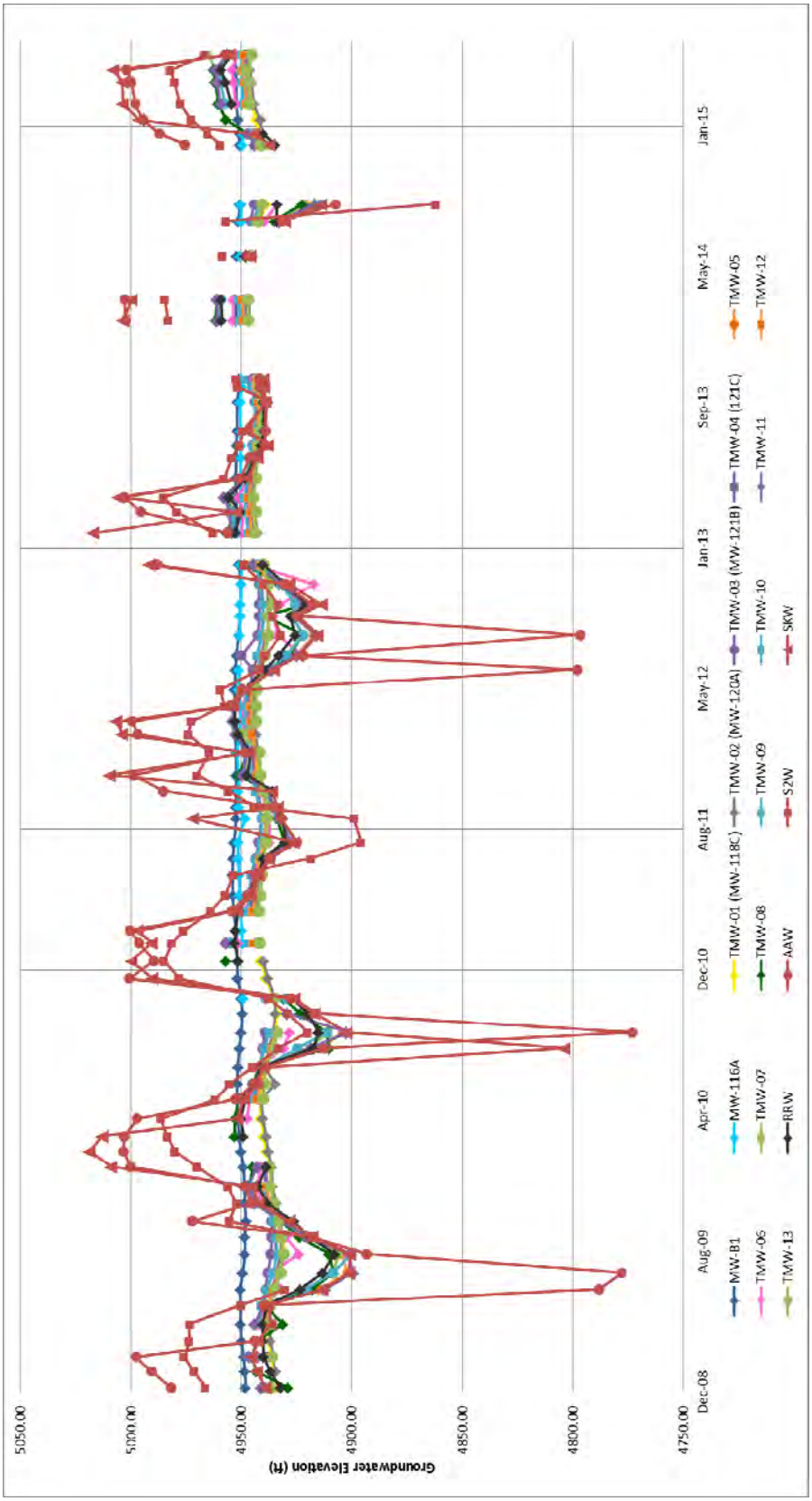

Figure 5B. West Lemmon Valley Water Level Elevations

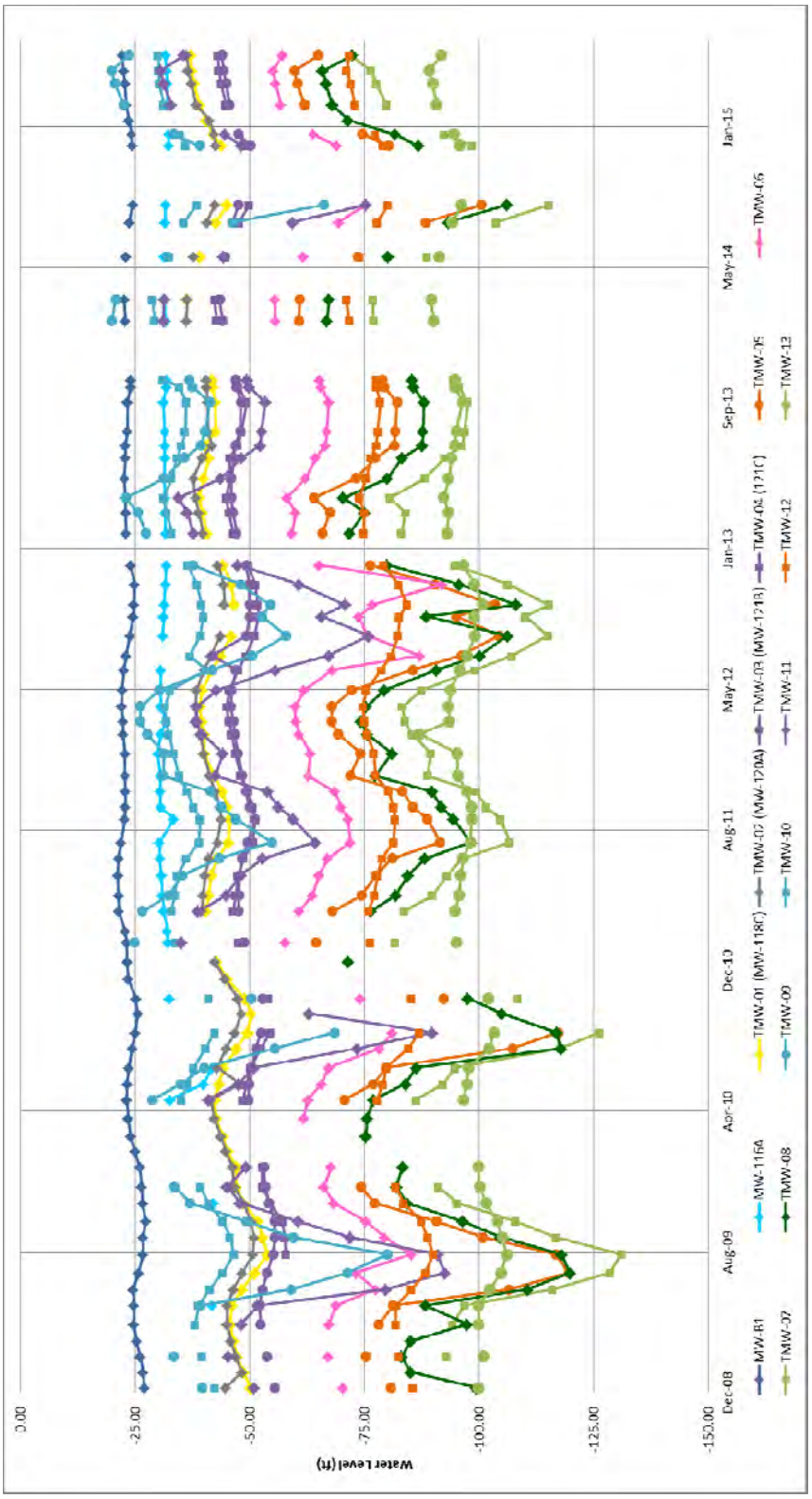

Figure 6. West Lemmon Valley Monitoring Wells Water Levels

3.0 WATER QUALITY

Water sample results of injected water into the Silver Lake Well were taken during the first and second quarters of 2015 and the results are shown in Tables A.1 and A.2 in Appendix A. Two pages of UIC Form U230 follow their respective results table. All the elements analyzed are below the Maximum Contaminant Levels (MCL).

Extracted water sample results taken between January and June 2015 are shown Table A.3 in Appendix A, and in Tables B.1, B.2, and B.3 in Appendix B. The results presented in Tables B.1 and B.2 show first and second quarters (1) Stage 2 HAA5 DBPs concentrations for the twelve sampling locations approved by NDEP for the Truckee Meadows, Lemmon Valley and (2) first and second quarters Stage 2 TTHM DBPs concentrations for the same sampling locations. The system average during the first half of 2015 for TTHM was 35.6 μg/L and for HAA5 was 27.7 μg/L both of which are below the MCLs. The Locational Running Annual Average (LRAA) for the previous four quarters was 29.1 μg/L for TTHM and 21.1 μg/L for HAA5.

Tables B.4 and B.5 show disinfectant residual data for the first and second quarters of 2015. All sample results are in compliance for the drinking water standards. This indicates that injection water is not adversely affecting the aquifer formation water quality in the West Lemmon Valley Basin.

Note that although water was extracted from the Silver Lake Well for four days in late June, the pump failed before a sample could be taken, and produced water sample results for this well are therefore not included in this report.

4.0 CONCLUSION

TMWA's ASR program in the West Lemmon Valley Basin has grown from 32 acre-feet of treated surface water injected in 2000 to 4,649 acre-feet cumulative total at the end of June 2015. The results, as discussed above and shown by various data sheets and charts, show that both injection and pumping activities at S2W, AAW and SKW have very little, if any, effects on the shallow aquifer as demonstrated by water levels in shallow monitoring wells in the vicinity of the injection sites. The data show that where the water level changes were experienced in the shallow wells, the changes were significantly less than the annual historical water level variations in these wells before commencement of the injection tests.

The chemistry of the injection and extracted water shows no adverse effects to the aquifer as evidenced from the low disinfection by-products concentrations and consistent water quality data from the extracted water.

APPENDIX A: WATER QUALITY SAMPLING RESULTS

Table A.1. Zone 5: 1Q 2015 Injected Water Quality, Silver Lake Well

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Silver Lake Well (SLW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV99209	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production Injection	**Date Sampled :**	**3/26/2015** **1115 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	45.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.0068	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000327	EPA 200.8	ICP-MS
barium	mg/L	2	0.019	EPA 200.8	ICP-MS
calcium	mg/L	-	10.0		
chloride	mg/L	400	10.2	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	0.00107	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.001	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	9.29	SM 4500 O C	
EC	µS/cm	at 25 degC	132	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	38.0		
iron	mg/L	0.6	<0.010	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.20	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.0028	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.65	EPA 150.1	
potassium	mg/L	-	1.4	EPA 200.7	ICP
sodium	mg/L	-	12	EPA 200.7	ICP
sulfate	mg/L	500	5.19	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.0		
total dissolved solids	mg/L	1000	86.1	EPA 160.1	
total suspended solids	mg/L	-	<5.0	EPA 160.2	
turbidity	NTU	-	0.51		
zinc	mg/L	5	0.00335	EPA 200.8	ICP-MS

Comments:

TMWA Lab # TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 3/20/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Silver Lake Well (SLR)		UIC Permit No.: UNEV99209
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T21NR19ES30		
City/Valley: Lemmon Valley	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: October 28, 2005		
Diameter of casing: 18 5/8"	Type of Casing: (Steel) PVC Other:	
Total depth of well: 604 feet		
Bottom depth of cement for last cemented casing string: 150 feet		
Screened or open hole interval (top/bottom depths): 440-580, 280-420, 180-260		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: Continuously Recharging		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? : Cap Tube Tape Measure		
Measured Water Level : surface		

UIC Form 230 (06-01-10) **Page 1 of 2**

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	3/26/15	Time Sampled :	1115 W3
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	10 feet from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.65
~~S. Conductivity :~~ NTU : 0.51
Temperature : 11.0 °C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: W Raymond	Date: 3/26/15

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.2. Zone 5: 2Q 2015 Injected Water Quality, Silver Lake Well

Nevada Division of Environmental Protection

Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Silver Lake Well (SLW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV99209	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production [Injection]	**Date Sampled :**	**4/28/2015** **1320 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	103	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.00824	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.0024	EPA 200.8	ICP-MS
barium	mg/L	2	0.025	EPA 200.8	ICP-MS
calcium	mg/L	-	11.2		
chloride	mg/L	400	18	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	0.00227	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0010	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	7.9	SM 4500 O C	
EC	µS/cm	at 25 degC	284	SM 2510 B	
fluoride	mg/L	4	0.264	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	43.0		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.6	EPA 200.7	
manganese	mg/L	0.1	<0.0010	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.00010	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00241	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	0.4	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.41	EPA 150.1	
potassium	mg/L	-	4.4	EPA 200.7	ICP
sodium	mg/L	-	49	EPA 200.7	ICP
sulfate	mg/L	500	14.10	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	14.9		
total dissolved solids	mg/L	1000	185	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
turbidity	NTU	-	0.38		
zinc	mg/L	5	0.00478	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 4/28/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Silver Lake Well (SLR)		UIC Permit No.: UNEV99209
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T21NR19ES30		
City/Valley: Lemmon Valley	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: October 28, 2005		
Diameter of casing: 18 5/8"	Type of Casing: (Steel) PVC Other:	
Total depth of well: 604 feet		
Bottom depth of cement for last cemented casing string: 150 feet		
Screened or open hole interval (top/bottom depths): 440-580, 280-420, 180-260		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: recharging all month		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	4/28/15	Time Sampled :	1320 W3
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	10 feet from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	Continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		
FIELD MEASUREMENTS pH : 7.41 ~~S. Conductivity :~~ NTU : 0.38 Temperature : 14.9°C			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES ☒ NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			
FORM PREPARATION			
Project Manager: Christian Kropf			
Company: Truckee Meadows Water Authority			
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com		
Signature:	Date:		
Qualified Sample Person: Will Raymond			
Company: Truckee Meadows Water Authority			
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com		
Signature: WRaymond	Date: 4/28/15		

Attachments:

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Table A.3. Zone 5: 2Q 2015 Extracted Water Quality, Army Air Guard Well

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Army Air Guard Well (AAW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV99209	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	JB/CM
Type of Well :	Monitor **Production** Injection	**Date Sampled :**	**6/23/2015** **1015 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	84.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.00136	EPA 200.8	ICP-MS
barium	mg/L	2	0.0252	EPA 200.8	ICP-MS
calcium	mg/L	-	12.0		
chloride	mg/L	400	15.0	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	9.02	SM 4500 O G	
EC	µS/cm	at 25 degC	224	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	52.0		
iron	mg/L	0.6	<0.020	EPA 200.7	ICP
lead	mg/L	0.015	0.00183	EPA 200.8	ICP-MS
magnesium	mg/L	150	5.30	Calculation	
manganese	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0002	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.010	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	8.22	EPA 150.1	
potassium	mg/L	-	3.10	EPA 200.7	ICP
sodium	mg/L	-	32.0	EPA 200.7	ICP
sulfate	mg/L	500	11.0	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.5		
total dissolved solids	mg/L	1000	146	EPA 160.1	
total suspended solids	mg/L	-	<5.00	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	46.0	EPA 524.2	
turbidity	NTU	-	0.35		
zinc	mg/L	5	<0.0100	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/23/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Army Air Guard Well (AAW)		UIC Permit No.: UNEV99209
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T21NR19ES19		
City/Valley: Lemmon Valley	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: November 1, 1968		
Diameter of casing: 12 3/4" and 10"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 840 feet (plugged to 722 ft on February 12, 2003)		
Bottom depth of cement for last cemented casing string: 50 feet		
Screened or open hole interval (top/bottom depths): 310-358, 406-478, 550-694 (10")		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: producing water 6 of previous 6 days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? : Cap Tube Tape Measure		
Measured Water Level : surface		

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/23/15	Time Sampled :	1015
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 foot		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	IN production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		

FIELD MEASUREMENTS

pH : 8.22
~~S. Conductivity :~~ NTU : 0.35
Temperature : 13.5 C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES (☒) NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature:	Date:

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

APPENDIX B: DISINFECTION BY-PRODUCTS AND DISINFECTANT RESIDUAL RESULTS

Table B.1. Disinfection By-Products (DBP) Report – 1st Half 2015: HAA5

HAA5
STAGE 2 DBPR QUARTERLY MONITORING REPORT
Locational Running Annual Average (LRAA); Operational Evaluation Level (OEL)

PUBLIC WATER SYSTEM NAME: **Truckee Meadows Water Authority** PUBLIC WATER SYSTEM ID: **PWS 190C**

	D	C	B	A				
	D = Prior to Quarter C Sample	C = Prior to Quarter B Sample	B = Prior to Quarter A Sample	A = Current Quarter Sample				
Current Reporting Quarter	Sample Date:	Sample Date:	Sample Date:	Sample Date:	HAA5 Maximum Contaminant Level (MCL) = 0.060 mg/L			
	8/12/2014	11/12/2014	2/17/2015	5/19/2015	LRAA (mg/L)	LRAA > 0.060 mg/L ?[1]	OEL (mg/L)	OEL > 0.060 mg/L ?[2]
Stage 2 Compliance Monitoring Location ID:	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	(A + B + C + D)/4	YES / NO	(2A + B + C)/4	YES / NO
777 Panther Dr	0.011	0.017	0.031	0.024	0.021	NO	0.024	NO
1390 Tarleton	0.018	0.022	0.033	0.026	0.025	NO	0.027	NO
4855 Turning Leaf Way	0.014	0.016	0.034	0.027	0.023	NO	0.026	NO
4725 Goodwin	0.021	0.009	0.036	0.038	0.026	NO	0.030	NO
1075 North Hills Blvd	0.009	0.018	0.026	0.028	0.020	NO	0.025	NO
1450 Viewcrest	0.011	0.018	0.043	0.023	0.024	NO	0.027	NO
1600 Grandview	0.014	0.017	0.022	0.026	0.020	NO	0.023	NO
2270 Saddle Tree Trail	0.011	0.022	0.032	0.027	0.023	NO	0.027	NO
5859 Solstice	0.008	0.008	0.037	0.023	0.019	NO	0.023	NO
Hunter Creek Reservoir	0.015	0.008	0.018	0.011	0.013	NO	0.012	NO
6060 Silver Lake Rd	0.012	0.016	0.022	0.033	0.021	NO	0.026	NO
240 W Moana	0.012	0.013	0.032	0.013	0.018	NO	0.018	NO

[1]**YES** is an MCL violation. Provide Tier 2 Public Notice within 30 days per 40 CFR Subpart Q. Per 40 CFR §141.31, provide NDEP a copy.
[2]**YES** will require an OEL per 40 CFR §141.626. Submit evaluation to NDEP within 90 days of LAB REPORT date.

Date: _____
Phone Number: _____

Mail To:
Division of Environmental Protection
Bureau of Safe Drinking Water
901 South Stewart Street, Suite 4001
Carson City, NV 89701

FAX To:
(775) 687-5699
Email To:
E-data_BSDW@ndep.nv.gov

Signature: _____
Print Name: _____

Form Due by the 10th of January, April, July and October

Table B.2. Disinfection By-Products (DBP) Report – 1st Half 2015: TTHM

TTHM
STAGE 2 DBPR QUARTERLY MONITORING REPORT
Locational Running Annual Average (LRAA); Operational Evaluation Level (OEL)

PUBLIC WATER SYSTEM NAME: Truckee Meadows Water Authority PUBLIC WATER SYSTEM ID: PWS 190C

	D	C	B	A				
	D = Prior to Quarter C Sample	C = Prior to Quarter B Sample	B = Prior to Quarter A Sample	A = Current Quarter Sample				
Current Reporting Quarter	Sample Date:	Sample Date:	Sample Date:	Sample Date:	TTHM Maximum Contaminant Level (MCL) = 0.080 mg/L			
	8/12/2014	11/12/2014	2/17/2015	5/19/2015	LRAA (mg/L)	LRAA > 0.080 mg/L ?[1]	OEL (mg/L)	Is OEL > 0.080 mg/L ?[2]
Stage 2 Compliance Monitoring Sample Point & Location ID:	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	(A + B + C + D)/4	YES / NO	(2A + B + C)/4	YES / NO
777 Panther Dr	0.015	0.022	0.038	0.032	0.027	NO	0.031	NO
1390 Tarleton	0.027	0.024	0.044	0.033	0.032	NO	0.034	NO
4855 Turning Leaf Way	0.018	0.021	0.038	0.033	0.028	NO	0.031	NO
4725 Goodwin	0.021	0.028	0.042	0.046	0.034	NO	0.041	NO
1075 North Hills Blvd	0.013	0.027	0.031	0.037	0.027	NO	0.033	NO
1450 Viewcrest	0.017	0.027	0.069	0.030	0.036	NO	0.039	NO
1600 Grandview	0.020	0.023	0.023	0.030	0.024	NO	0.027	NO
2270 Saddle Tree Trail	0.014	0.031	0.044	0.033	0.031	NO	0.035	NO
5859 Solstice	0.039	0.024	0.058	0.034	0.039	NO	0.038	NO
Hunter Creek Reservoir	0.023	0.011	0.014	0.011	0.015	NO	0.012	NO
6060 Silver Lake Rd	0.020	0.029	0.047	0.043	0.035	NO	0.041	NO
240 W Moana	0.019	0.018	0.031	0.014	0.021	NO	0.019	NO

[1]**YES** is an MCL violation. Provide Tier 2 Public Notice within 30 days per 40 CFR Subpart Q. Per 40 CFR §141.31, provide NDEP a copy.
[2]**YES** will require an OEL per 40 CFR §141.626. Submit evaluation to NDEP within 90 days of LAB REPORT date.

Date: _____
Phone Number: _____

Mail To:
Division of Environmental Protection
Bureau of Safe Drinking Water
901 South Stewart Street, Suite 4001
Carson City, NV 89701

FAX To:
(775) 687-5699

Email To:
E-data_BSDW@ndep.nv.gov

Signature: _____
Print Name: _____

Form Due by the 10th of January, April, July and October

Table B.3. Zone 5: 1Q 2015 Disinfectant Residual Data

DISINFECTANT RESIDUAL DATA QUARTERLY REPORT 2015

PUBLIC WATER SYSTEM NAME: Truckee Meadows Water Authority
PUBLIC WATER SYSTEM ID: NV0000190

QUARTER (Circle One)	ONE	TWO	THREE	FOUR
	January, February, March	April, May, June	July, August, September	October, November, December

First Month of Quarter: Monthly Summary			
Month:	January		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	1.11

Second Month of Quarter: Monthly Summary			
Month:	February		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	1.06

Third Month of Quarter: Monthly Summary			
Month:	March		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	1.11

Quarterly Summary			
Total Number of Samples Taken for this Quarter	540	AVERAGE of all disinfectant residuals for this quarter	1.09
HIGHEST Residual for this quarter	1.43		

Running Annual Average Summary[1]				
Quarter	A	B	C	D
Year-Quarter	**2nd 2014**	**3rd 2014**	**4th 2014**	**1st 2015**
Average for quarter	0.98	1.01	0.93	1.09
Running Annual Average (RAA)			(A+B+C+D)/4=	1.00

1- Running annual average is the average of the last 12 months of monthly averages and will be computed after 12 months of data are available.

Signature: Kelli Burgess Date: 04/01/15

Print Name: Kelli Burgess Phone Number: 775-834-8117

Mail To: Bureau of Health Protection Services
1179 Fairview Dr., Suite 101
Carson City, NV 89701
Form Due by the 10th of April, July, October, and January

Table B.3. Zone 5: 2Q 2015 Disinfectant Residual Data

DISINFECTANT RESIDUAL DATA QUARTERLY REPORT 2015

PUBLIC WATER SYSTEM NAME: Truckee Meadows Water Authority
PUBLIC WATER SYSTEM ID: NV0000188

QUARTER (Circle One)	ONE January, February, March	TWO April, May, June	THREE July, August, September	FOUR October, November, December

First Month of Quarter: Monthly Summary			
Month:	April		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	0.99

Second Month of Quarter: Monthly Summary			
Month:	May		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	0.95

Third Month of Quarter: Monthly Summary			
Month:	June		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	0.98

Quarterly Summary			
Total Number of Samples Taken for this Quarter	540	AVERAGE of all disinfectant residuals for this quarter	0.97
HIGHEST Residual for this quarter	1.28		

Running Annual Average Summary[1]				
Quarter	A	B	C	D
Year-Quarter	**3rd 2014**	**4th 2014**	**1st 2015**	**2nd 2015**
Average for quarter	1.01	0.93	1.09	0.97
Running Annual Average (RAA)			(A+B+C+D)/4=	1.00

1- Running annual average is the average of the last 12 months of monthly averages and will be computed after 12 months of data are available.

Signature: Kelli Burgess Date: 07/08/15

Print Name: Kelli Burgess Phone Number: 775-834-8117

Mail To: Bureau of Health Protection Services
1179 Fairview Dr., Suite 101
Carson City, NV 89701
Form Due by the 10th of April, July, October, and January

REPORT ON AQUIFER STORAGE AND RECOVERY
SPANISH SPRINGS VALLEY HYDROGRAPHIC BASIN

JANUARY 1 THROUGH JUNE 30 2015

NDEP PERMIT # UNEV2009202

AND

NDWR PERMIT #R-19

July 2015

CERTIFICATION

The information contained in this report is true and correct according to the best belief and knowledge of the undersigned.

Certified by

John A. Erwin
Director Natural Resources-Planning & Management
Truckee Meadows Water Authority

Truckee Meadows Water Authority
1355 Capital Boulevard
Reno, Nevada 89502
www.tmh20.com

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TABLES

FIGURES

1.0 SUMMARY

The Truckee Meadows Water Authority ("TMWA") Aquifer and Storage ("ASR") program in Spanish Springs hydrographic basin is performed under Nevada Division of Environmental Protection ("NDEP") Permit #UNEV2009202, issued on December 10, 2009, renewed on March 3, 2015, and valid until March 3, 2020. Nevada Department of Water Resources ("NDWR") issued permit #R-19 on July 27, 2010 for an indefinite period, subject to periodic review by the State Engineer.

TMWA injected 720 acre-feet (234.6 MG) of treated surface water from TMWA's treatment plant at Chuck Bluff into Hawkings Court Well ("HCW") during first half of 2015. During the same period, 111.5 acre-feet (36.3 MG) of water was pumped from HCW (see Table 1). The monthly average, highest and lowest injection rates for Hawkings Court Well are shown in Table 2.

Table 1. Hawkings Court Well –Injection and Pumping, Jan to Jun 2015

	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	
							MG	AF
Recharge	15.6	16.6	86.3	94.1	22.0	0	234.6	720.0
Pumping	0	0	0	0	0	36.3	36.3	111.5

Table 2. Hawkings Court Well – Average, Highest and Lowest Monthly Flow Rates (gpm), Jan to Jun 2015

	JAN	FEB	MAR	APR	MAY	JUN
Recharge						
Average	654	1486	2116	2192	2197	0
Highest	666	2816	2276	2309	2288	0
Lowest	625	80	109	2099	2166	0
Pumping						
Average	0	0	0	0	0	2251
Highest	0	0	0	0	0	2649
Lowest	0	0	0	0	0	989

Figure 1 shows the location of Hawkings Court Well and its monitoring wells plus other production wells in the vicinity. The average injection rate over the injection period was approximately 1729 gpm. Flow rates and water levels in Hawkings Court Well for the first half of 2015 are shown in Figure 2.

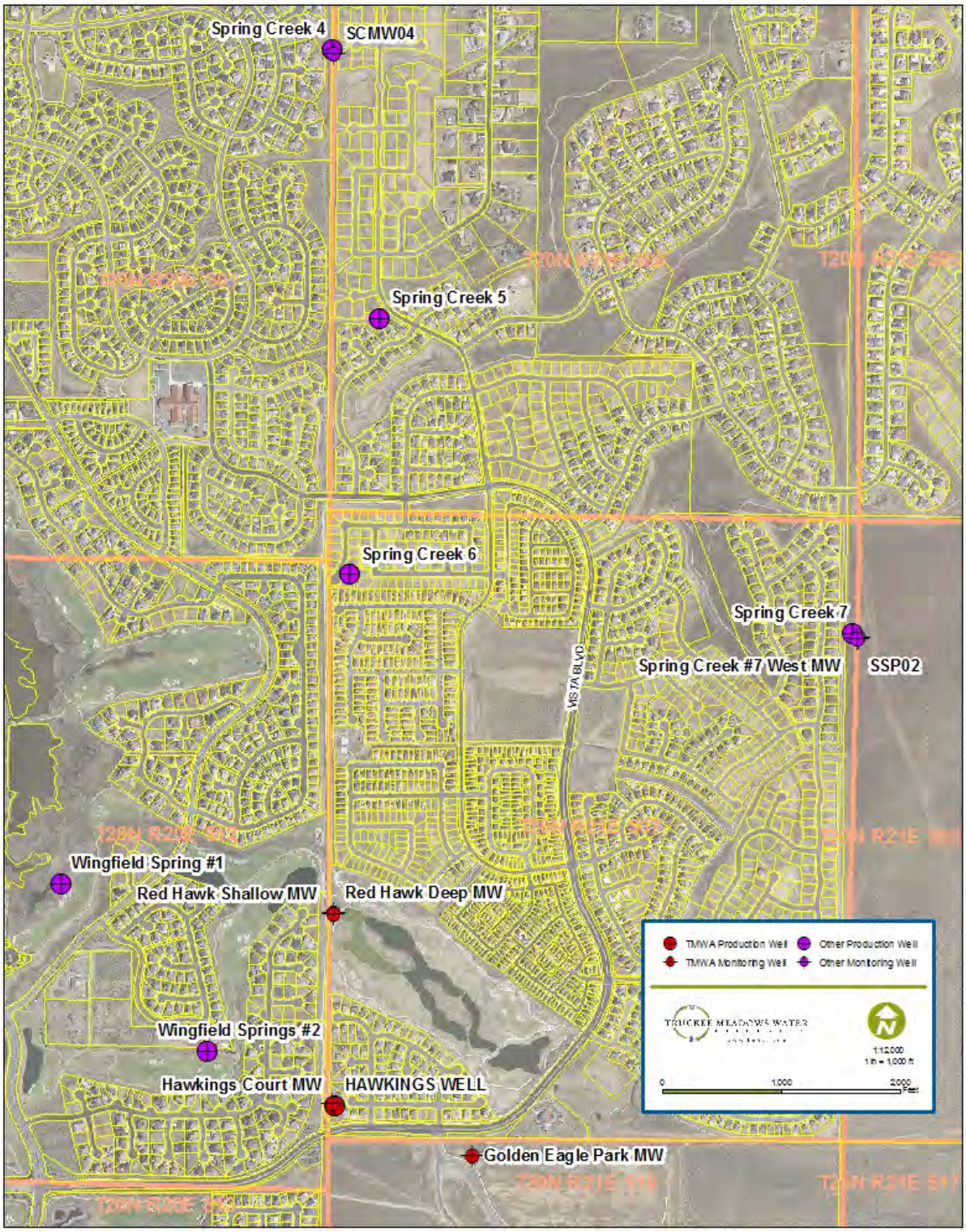

Figure 1: Hawkings Court Well and Nearby Wells

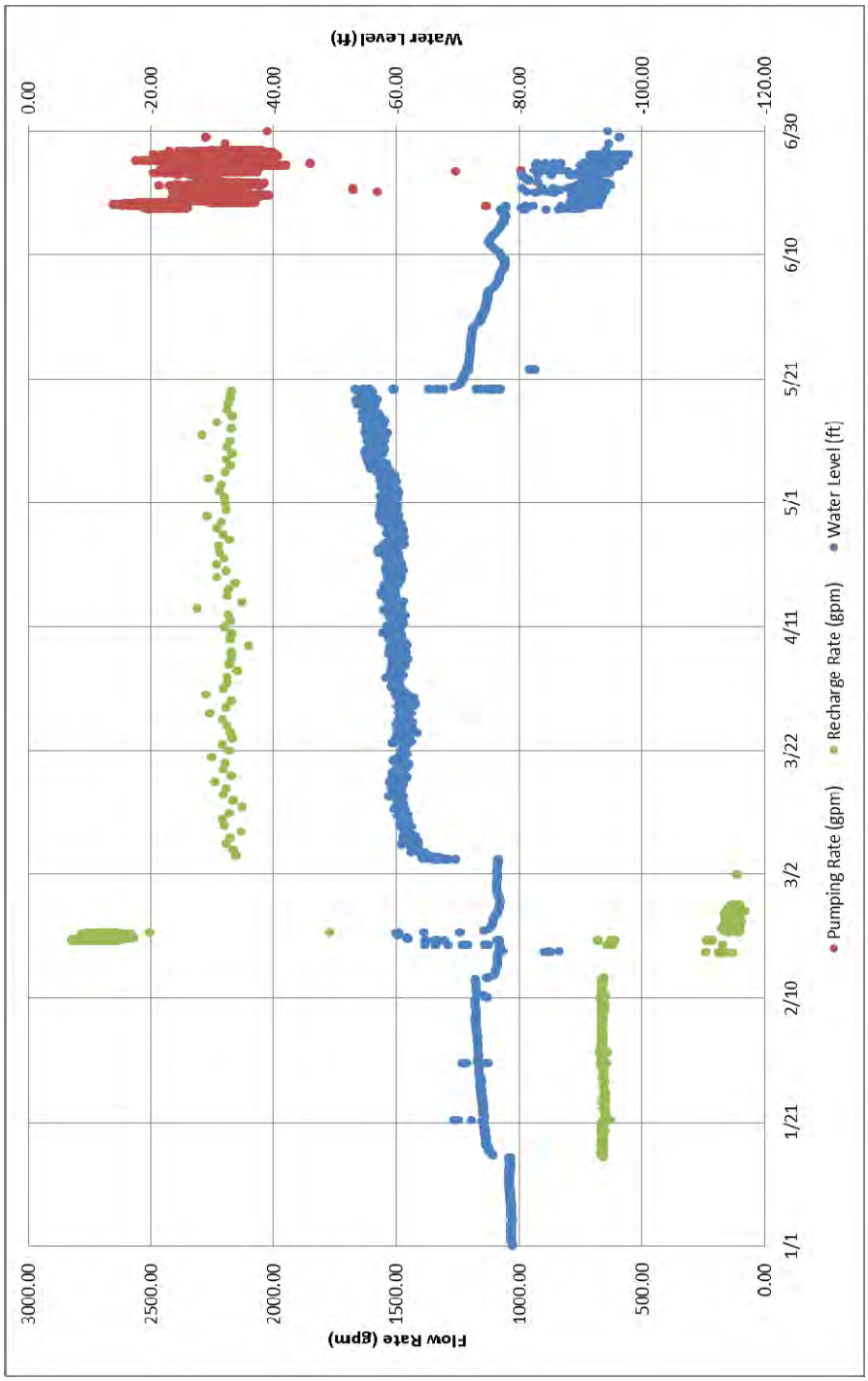

Figure 2: Hawkings Court Well Injection and Pumping Rates and Water Levels, Jan to Jun 2015

Figure 3 shows water levels in the injection/production well and its four monitoring wells. Red Hawk Shallow Monitoring Well ("RHSMW"), which was completed at 140 feet in alluvium, shows less amplitude in water level variation than the deep Red Hawk Deep Monitoring Well ("RHDMW") completed in volcanic rocks as HCW.

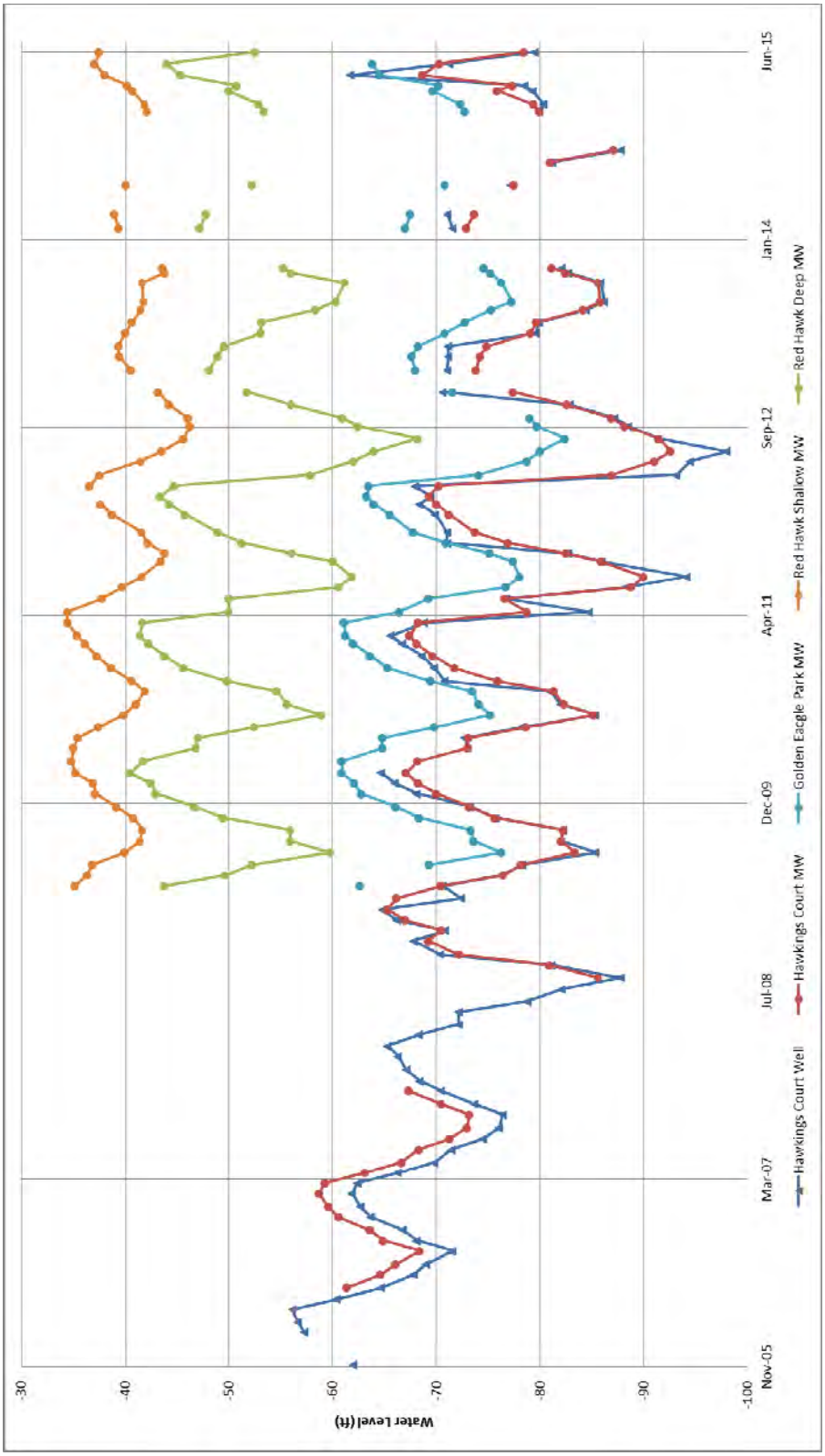

Figure 3: Water Levels for the Hawkings Court Well and its Monitoring Wells

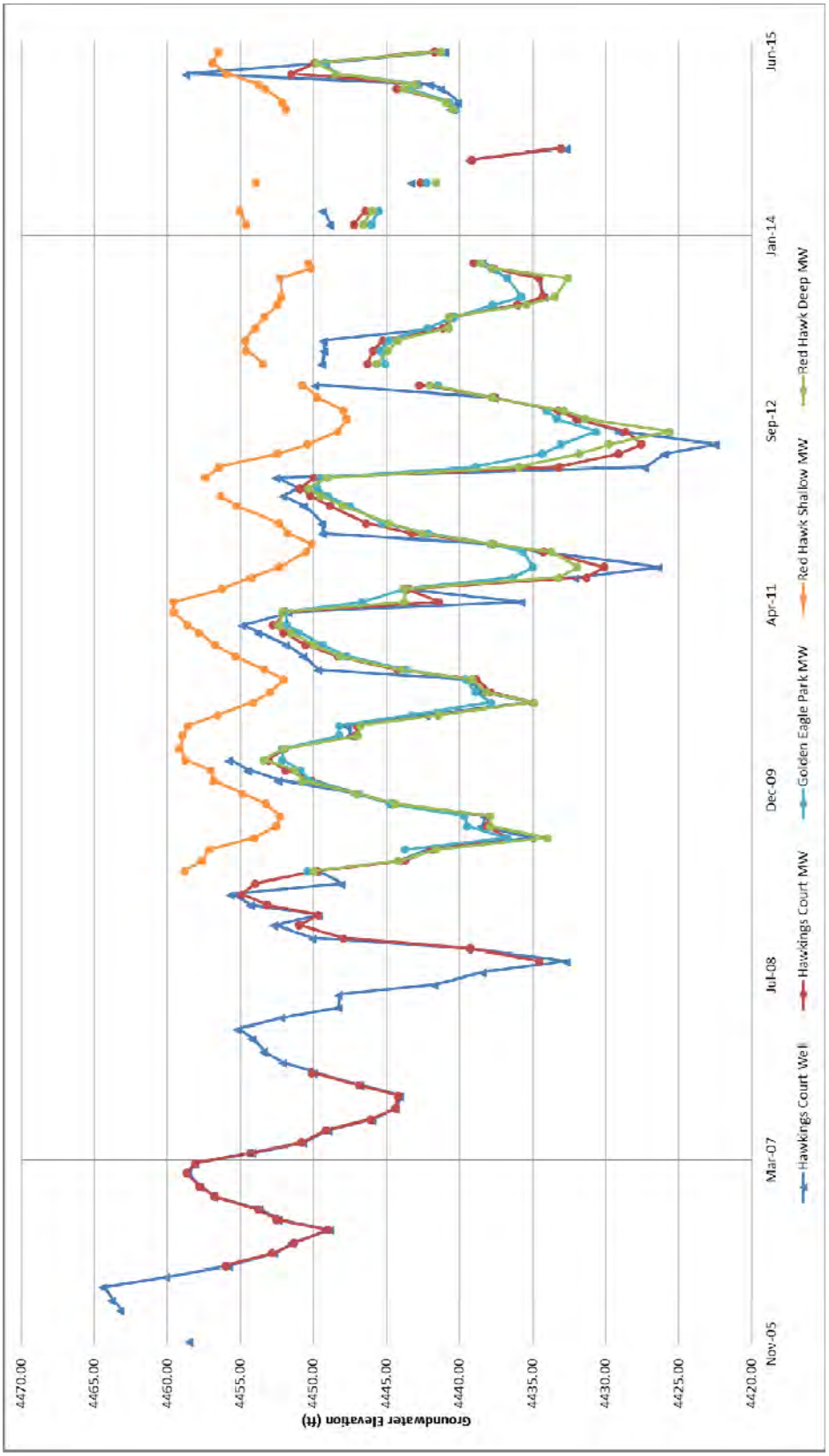

Figure 4: Water Level Elevations for the Hawkings Court Well and its Monitoring Wells

2.0 WATER QUALITY

Following the March 3, 2015 revision to UIC permit UNEV2009202, semi-annual reporting is no longer required. Water quality results will therefore be presented as part of an annual report for the 12-month period ending December 31, 2015, to be submitted no later than February 15th of each year.

3.0 CONCLUSIONS

TMWA injected 720 acre-feet (234.6 MG) of treated surface water in Hawkings Court Well during the first half of 2015 under NDEP Permit number UNEV2009202 and NDWR Permit number R-19. During the first half of CY2015, 111.5 acre-feet (36.3 MG) was pumped from the Hawkings Court Well.

The data and related analysis, as discussed above, continue to demonstrate that active injection of treated Truckee River water into TMWA's Hawkings Court Well has not negatively affected the eastern portion of the aquifer in the Spanish Springs basin. This conclusion is supported by the positive contribution of the volume of injected water to enhance groundwater levels in the aquifer.

TRUCKEE MEADOWS WATER AUTHORITY

REPORT ON AQUIFER STORAGE AND RECOVERY
TRUCKEE MEADOWS HYDROGRAPHIC BASIN

JANUARY 1 THROUGH JUNE 30, 2015

NDEP PERMIT #UNEV92200

and

NDWR PERMIT #R-16

JULY 2015

CERTIFICATION

The information contained in this report is true and correct according to the best belief and knowledge of the undersigned.

Certified by

John A. Erwin

Director Natural Resources-Planning & Management

Truckee Meadows Water Authority

Truckee Meadows Water Authority

1355 Capital Boulevard

Reno, Nevada 89502

www.tmwa.com

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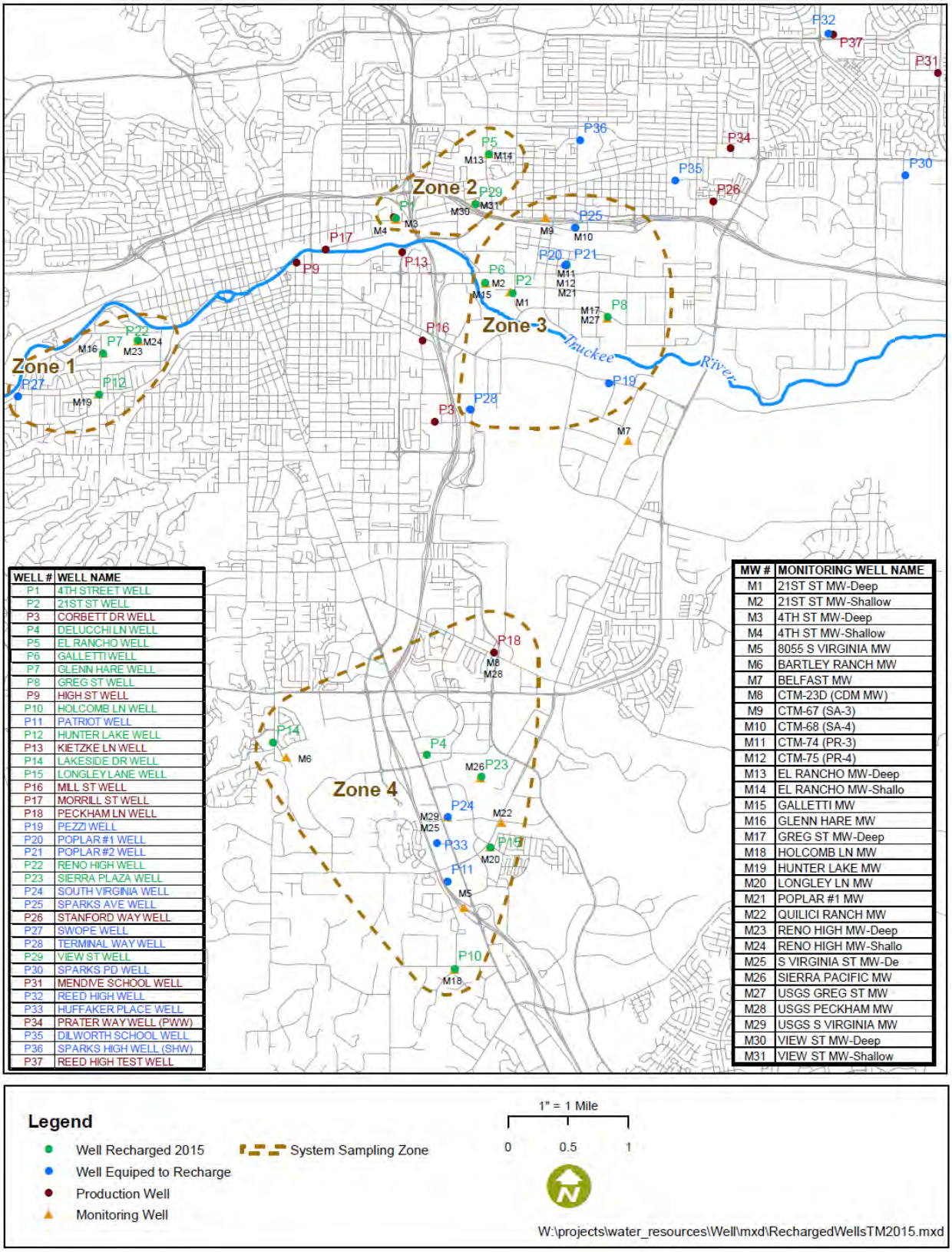
1.0 SUMMARY

The Truckee Meadows Water Authority's (TMWA) Aquifer-Storage and Recovery (ASR) program injects treated surface water into the groundwater aquifer of the Truckee Meadows hydrographic basin in conformance with provisions set out by the Nevada Division of Water Resources (NDWR) and the Nevada Division of Environmental Protection (NDEP). On October 19, 2006, NDWR issued Permit No R-16 authorizing TMWA to annually inject up to 7,000 acre-feet of treated water into 22 wells located within the Truckee Meadows hydrographic basin. This permit is issued for an indefinite period, subject to periodic review by the State Engineer. The corresponding water quality permit is NDEP Permit No. UNEV92200. The permits require TMWA to submit semi-annual and annual reports by summarizing injection activities including water quality, water levels, and injected and extracted volumes for the first half of the year and for the whole year. This is the semi-annual report covering the period between January 1 and June 30, 2015.

Figure 1 shows the locations of TMWA's wells in the Truckee Meadows hydrographic basin and those where recharge occurred during the first half of 2015.

TMWA's ASR in the Truckee Meadows basin has grown from 81 acre-feet of treated surface water injected in 1993 to 25,108 acre-feet cumulative total as of June 30, 2015 (Table 1). During the first half of 2015, TMWA injected 2,548 acre-feet (831 MG) of treated water into fourteen wells in the Truckee Meadows Hydrographic Basin.

Table 2A is the summary of the monthly recharge at the fourteen wells. Table 2B summarizes the amount of water pumped monthly from each of the injection wells. During the first half of 2015, TMWA pumped 816 acre-feet (266 MG) of water from the fourteen recharged wells. Charts of water levels, injection and extraction rates, and historical water level hydrographs for each injection well, and its respective monitoring wells, are included with the discussion on each well.



WELL #	WELL NAME
P1	4TH STREET WELL
P2	21ST ST WELL
P3	CORBETT DR WELL
P4	DELUCCHI LN WELL
P5	EL RANCHO WELL
P6	GALLETTI WELL
P7	GLENN HARE WELL
P8	GREG ST WELL
P9	HIGH ST WELL
P10	HOLCOMB LN WELL
P11	PATRIOT WELL
P12	HUNTER LAKE WELL
P13	KIETZKE LN WELL
P14	LAKESIDE DR WELL
P15	LONGLEY LANE WELL
P16	MILL ST WELL
P17	MORRILL ST WELL
P18	PECKHAM LN WELL
P19	PEZZI WELL
P20	POPLAR #1 WELL
P21	POPLAR #2 WELL
P22	RENO HIGH WELL
P23	SIERRA PLAZA WELL
P24	SOUTH VIRGINIA WELL
P25	SPARKS AVE WELL
P26	STANFORD WAY WELL
P27	SWOPE WELL
P28	TERMINAL WAY WELL
P29	VIEW ST WELL
P30	SPARKS PD WELL
P31	MENDIVE SCHOOL WELL
P32	REED HIGH WELL
P33	HUFFAKER PLACE WELL
P34	PRATER WAY WELL (PWW)
P35	DILWORTH SCHOOL WELL
P36	SPARKS HIGH WELL (SHW)
P37	REED HIGH TEST WELL

MW #	MONITORING WELL NAME
M1	21ST ST MW-Deep
M2	21ST ST MW-Shallow
M3	4TH ST MW-Deep
M4	4TH ST MW-Shallow
M5	8055 S VIRGINIA MW
M6	BARTLEY RANCH MW
M7	BELFAST MW
M8	CTM-23D (CDM MW)
M9	CTM-67 (SA-3)
M10	CTM-68 (SA-4)
M11	CTM-74 (PR-3)
M12	CTM-75 (PR-4)
M13	EL RANCHO MW-Deep
M14	EL RANCHO MW-Shallo
M15	GALLETTI MW
M16	GLENN HARE MW
M17	GREG ST MW-Deep
M18	HOLCOMB LN MW
M19	HUNTER LAKE MW
M20	LONGLEY LN MW
M21	POPLAR #1 MW
M22	QUILICI RANCH MW
M23	RENO HIGH MW-Deep
M24	RENO HIGH MW-Shallo
M25	S VIRGINIA ST MW-De
M26	SIERRA PACIFIC MW
M27	USGS GREG ST MW
M28	USGS PECKHAM MW
M29	USGS S VIRGINIA MW
M30	VIEW ST MW-Deep
M31	VIEW ST MW-Shallow

Legend

- Well Recharged 2015
- Well Equiped to Recharge
- Production Well
- Monitoring Well
- System Sampling Zone

Figure 1. Truckee Meadows Basin Well Locations

Table 1. Aquifer Storage and Recovery History, Annual Injection Quantity in Acre-feet

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
																							Jan-Jun	
Lakeside Drive	3	9	116	132	111	377	194	246	258	218	292	194	192	213	148	270	198	232	215	104	150	166	349	4387
Hunter Lake	0	0	0	0	0	0	196	290	332	175	246	34	22	0	0	122	253	190	0	0	0	52	284	2196
View Street	0	0	0	0	0	173	327	486	433	260	353	598	264	202	179	291	68	61	78	195	218	158	313	4657
Reno High	0	0	0	0	0	0	61	190	216	142	173	26	50	213	182	256	184	134	0	0	0	86	254	2167
Poplar #1	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
Poplar #2	0	0	0	0	0	0	0	68	46	70	9	44	37	2	0	0	7	3	0	41	5	21	0	353
Kietzke Lane	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
Morrill Avenue	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Fourth Street	25	0	0	0	0	0	0	39	452	309	152	139	82	113	90	160	107	71	15	0	0	190	193	2137
Glen Hare	0	0	0	0	0	0	0	36	117	62	99	15	9	0	0	62	71	70	0	0	0	46	166	753.5
Greg Street	0	0	0	0	0	0	0	76	135	137	177	164	41	0	0	0	16	56	0	191	34	13	198	1238
Terminal Way	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
El Rancho	0	0	0	0	0	0	0	121	216	178	255	139	97	103	62	119	22	76	0	43	136	124	110	1801
Holcomb Lane	0	0	0	0	0	0	0	21	39	187	123	72	17	137	0	40	48	87	0	0	0	72	154	997.3
21st Street	0	0	0	0	0	0	0	61	202	193	259	172	108	151	108	154	116	91	0	0	0	68	125	1808
Galletti Way	0	0	0	0	0	0	0	81	239	234	262	218	119	175	149	225	177	41	0	0	0	99	163	2182
Longley Lane	0	0	0	0	0	0	0	0	10	14	0	0	0	0	0	0	0	0	0	0	0	16	24	64.41
Sparks Avenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	18	5	0	14	8	0	0	64
Delucchi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	125	136.6
Sierra Plaza	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	89.58
Total	81	9	116	132	133	550	778	1717	2695	2179	2400	1815	1038	1309	918	1718	1285	1117	308	588	551	1123	2548	25108

Table 2A. Monthly Recharge by Well, Jan to Jun 2015

Wells	JAN	FEB	MAR	APR	MAY	JUN	YTD Total	
							MG	AF
Fourth Street	17.1	14.9	1.8	13.0	16.0	0.0	62.8	192.7
View Street	31.2	26.3	28.0	16.5	0.0	0.0	102.0	313.2
Greg Street	11.6	9.2	10.0	7.5	26.0	0.0	64.4	197.5
Delucchi	3.9	3.4	3.7	3.6	26.0	0.0	40.6	124.6
Lakeside Drive	17.8	22.3	24.5	23.2	26.0	0.0	113.8	349.2
Holcomb Lane	7.6	6.7	7.1	7.0	22.0	0.0	50.3	154.3
21st Street	12.8	9.2	12.1	6.5	0.0	0.0	40.6	124.6
Reno High	17.1	14.3	15.6	15.0	21.0	0.0	82.9	254.4
El Rancho	11.6	9.2	7.6	7.3	0.0	0.0	35.7	109.7
Hunter Lake	25.5	21.7	23.8	21.7	0.0	0.0	92.6	284.3
Glen Hare	1.0	8.5	9.5	9.2	26.0	0.0	54.2	166.5
Galletti Way	14.8	13.9	14.2	10.4	0.0	0.0	53.2	163.2
Longley Lane	4.0	2.3	1.3	0.3	0.0	0.0	8.0	24.4
Sierra Plaza	0.0	0.5	1.3	1.4	26.0	0.0	29.2	89.6
Total MG	176.0	162.5	160.3	142.5	189.0	0.0	830.3	
Total AF	540.3	498.6	491.8	437.4	580.0	0.0		2548.1

Table 2B. Monthly Production from Recharged Wells, Jan to Jun 2015

Wells	JAN	FEB	MAR	APR	MAY	JUN	YTD Total	
							MG	AF
Fourth Street	0.0	0.0	0.0	0.0	0.0	16.3	16.3	49.9
View Street	0.0	0.0	0.0	0.0	0.0	27.9	27.9	85.7
Greg Street	0.0	0.0	0.0	0.0	0.0	6.1	6.1	18.7
Delucchi	0.0	0.0	0.0	0.0	0.0	9.5	9.5	29.1
Lakeside Drive	0.0	0.0	0.0	0.0	0.0	11.5	11.5	35.2
Holcomb Lane	0.0	0.0	0.0	0.0	0.0	11.7	11.7	35.8
21st Street	0.0	0.0	0.0	0.0	0.0	25.9	25.9	79.6
Reno High	0.0	0.0	0.0	0.0	0.0	40.9	40.9	125.5
El Rancho	0.0	0.0	0.0	0.0	0.0	10.1	10.1	30.9
Hunter Lake	0.0	0.0	0.0	0.0	0.0	35.9	35.9	110.3
Glen Hare	0.0	0.0	0.0	0.0	0.0	15.6	15.6	48.0
Galletti Way	0.0	0.0	0.0	0.0	0.0	6.6	6.6	20.3
Longley Lane	0.0	0.0	0.0	0.0	0.0	26.0	26.0	79.8
Sierra Plaza	0.0	0.0	0.0	0.0	0.0	22.0	22.0	67.7
Total MG	0.0	0.0	0.0	0.0	0.0	266.0	266.0	
Total AF	0.0	0.0	0.0	0.0	0.0	816.4		816.4

Table 3 shows the average, maximum, and minimum monthly injection rates for the six recharged wells.

Table 3. Average, Highest and Lowest Injection Rates (gpm), Jan to Jun 2015

	January			February			March			April			May			June		
Wells	Ave	High	Low	Ave	High	Low	Ave	High	Low	Ave	High	Low	Ave	High	Low	Ave	High	Low
Fourth Street	384	406	359	371	406	349	367	367	367	337	373	308	318	356	290	0	0	0
View Street	700	733	660	653	673	627	633	644	622	641	722	500	0	0	0	0	0	0
Greg Street	281	307	230	228	234	223	223	227	219	214	235	205	219	232	200	0	0	0
Delucchi	86	88	85	85	86	84	84	84	73	83	83	83	83	83	83	0	0	0
Lakeside Drive	451	645	347	554	650	504	537	638	489	547	634	469	546	627	488	0	0	0
Holcomb Lane	170	174	165	165	168	135	164	193	143	162	165	159	156	162	151	0	0	0
21st Street	288	302	276	272	289	127	271	276	262	206	272	123	0	0	0	0	0	0
Reno High	383	417	358	363	377	338	350	376	330	349	360	323	365	377	357	0	0	0
El Rancho	259	283	212	222	253	187	191	226	10	181	280	8	0	0	0	0	0	0
Hunter Lake	567	589	533	536	543	525	528	539	516	529	539	518	0	0	0	0	0	0
Glen Hare	198	220	120	211	218	205	212	221	204	214	225	204	214	226	203	0	0	0
Galletti Way	330	370	301	345	377	321	327	356	277	314	350	168	0	0	0	0	0	0
Longley Lane	91	96	72	74	103	14	97	108	43	91	93	88	0	0	0	0	0	0
Sierra Plaza	0	0	0	29	31	25	29	32	26	32	36	28	33	36	30	0	0	0

Water quality information is contained under Section 2 of this report.

1.1 Lakeside Well

The Lakeside Well is located in the southeast quarter of the northeast quarter of Section 35, Township 19.

TMWA injected a total of 349.2 acre-feet (113.8 MG) of treated surface water into the groundwater aquifer at the Lakeside Well during first half of 2015 (see Tables 1 and 2A, and Figure 2A). The average injection rate was 527 gpm. The maximum injection rate was 650 gpm and minimum 347 gpm (Table 3). A total of 35.2 acre-feet (11.5 MG) was pumped from the Lakeside Well between January and June 2015 (Table 2B).

Flow rates and water levels during injection and pumping for the reporting period are shown in Figure 2A. Historical monthly water levels for Lakeside Well and Bartley Ranch Monitoring Well are shown in Figure 2B.

Water levels in Bartley Ranch Well follow the same trend as in Lakeside, rising during recharge and dropping during pumping. As a result of recharge activities at the Lakeside Drive Well, water level in Bartley Ranch Well has risen by as much as 60 feet compared to the water level in 1993. This is a positive effect to the aquifer around Lakeside Well. The trend has remained the same since recharge commenced in 1993.

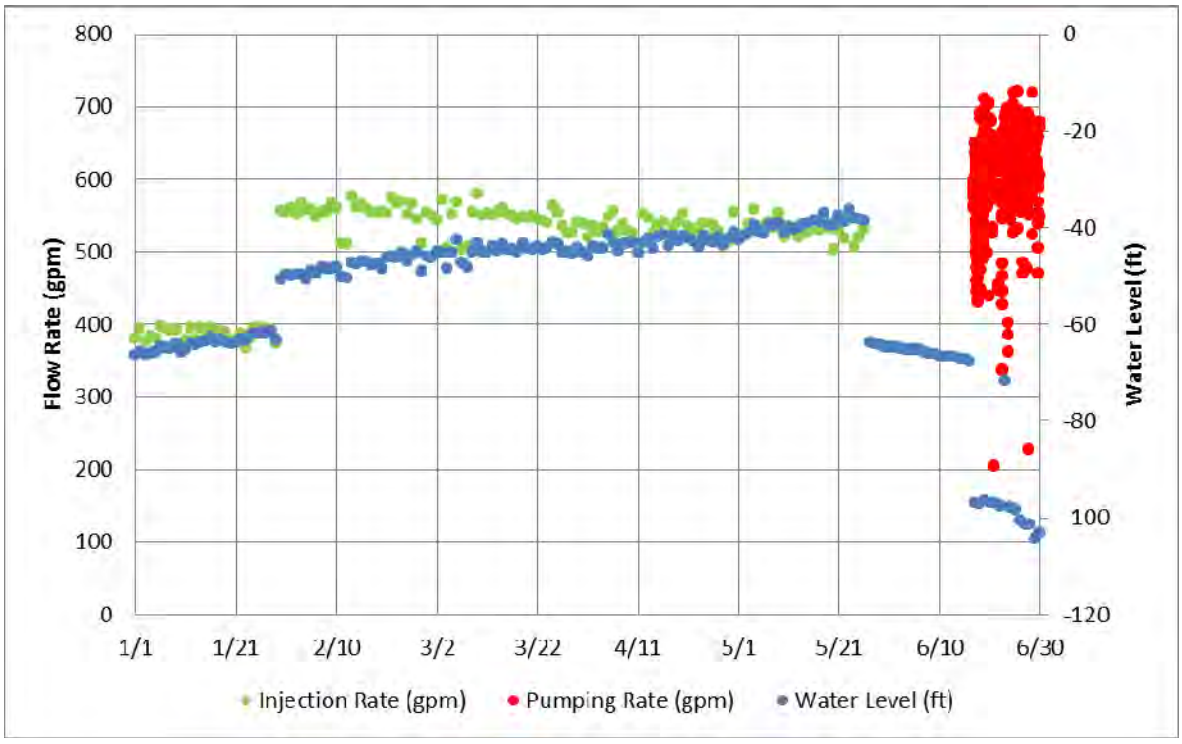


Figure 2A. Lakeside Well - Flow Rates and Water Levels, Jan to Jun 2015

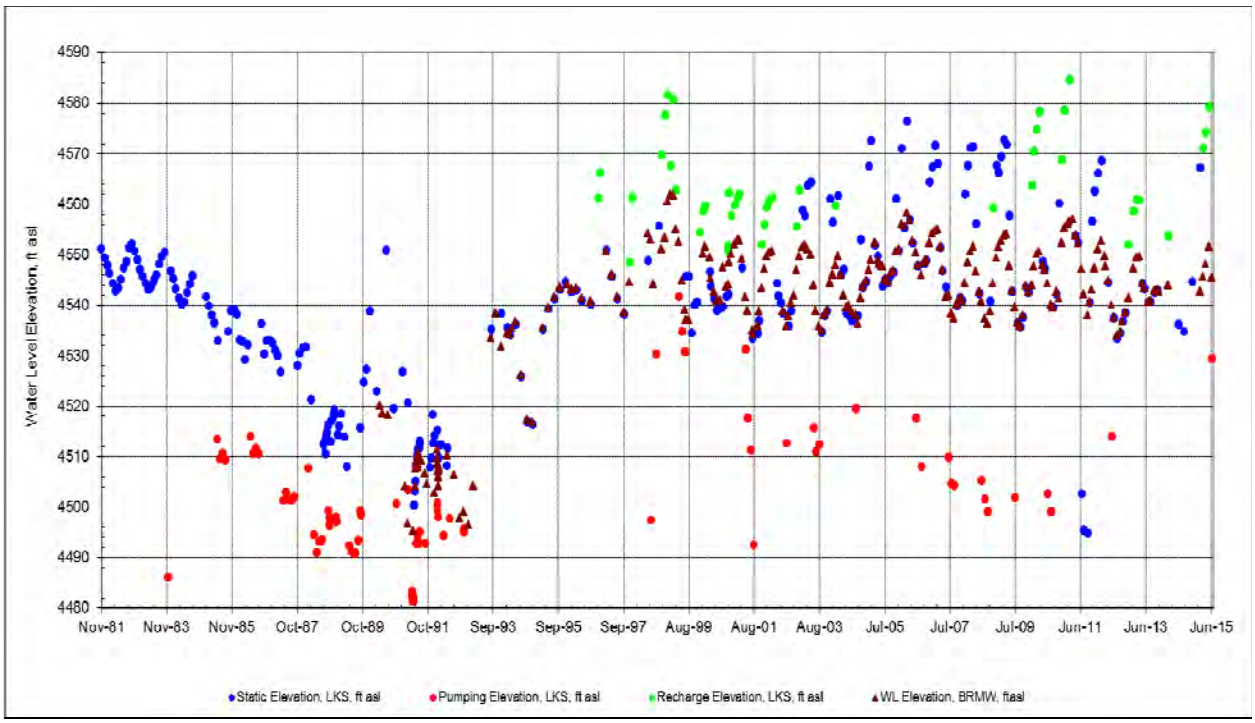


Figure 2B. Lakeside and Bartley Ranch Wells - Water Level Elevations

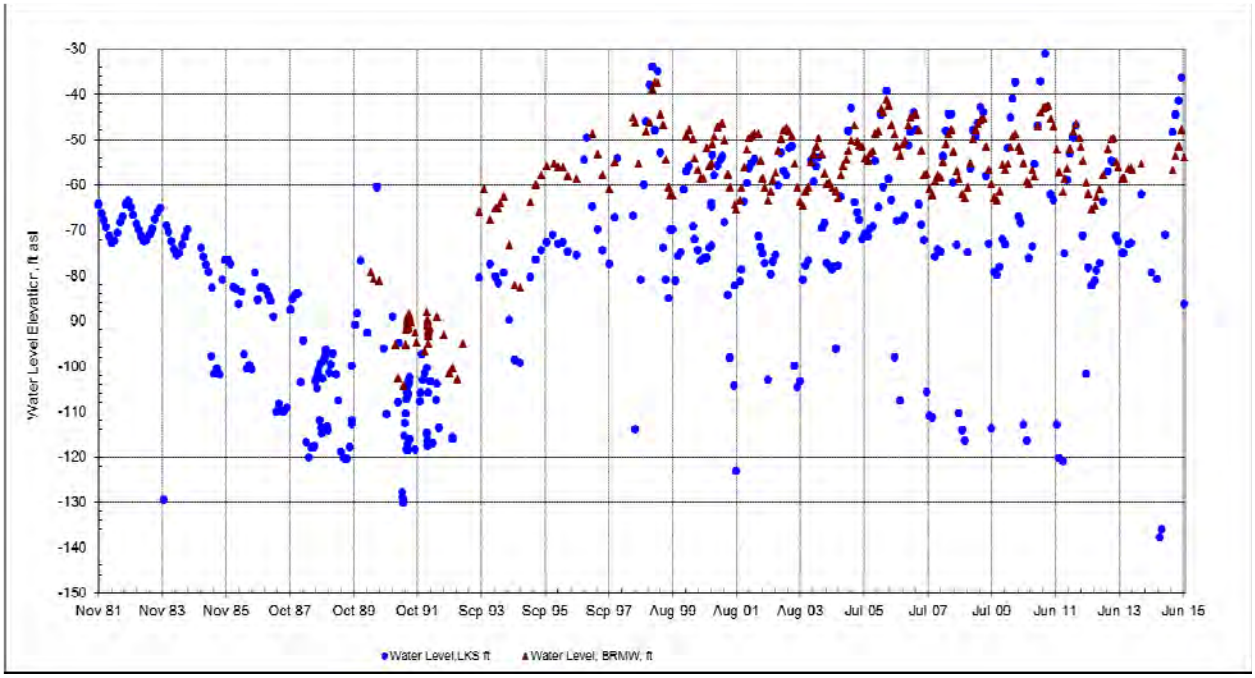


Figure 2C. Lakeside and Bartley Ranch Wells - Water Levels

1.2 View Street Well

TMWA's View Street Well is centrally located in the Truckee Meadows, specifically in the northeast quadrant of the I-80 and US 395 junction, adjacent to I-80.

TMWA injected 313.2 acre-feet (102 MG) of treated surface water into View Street Well during first half of 2015 (Tables 1 and 2A, and Figure 3A). During the same period, 85.7 acre-feet (27.9 MG) of water were pumped from View Street Well (Table 2B).

Historical monthly water level elevations for View Street Well and its monitoring wells are shown in Figure 3B. The hydrographs for the injection/production well as well as those for the shallow and deep monitoring wells are shown in Figure 3C.

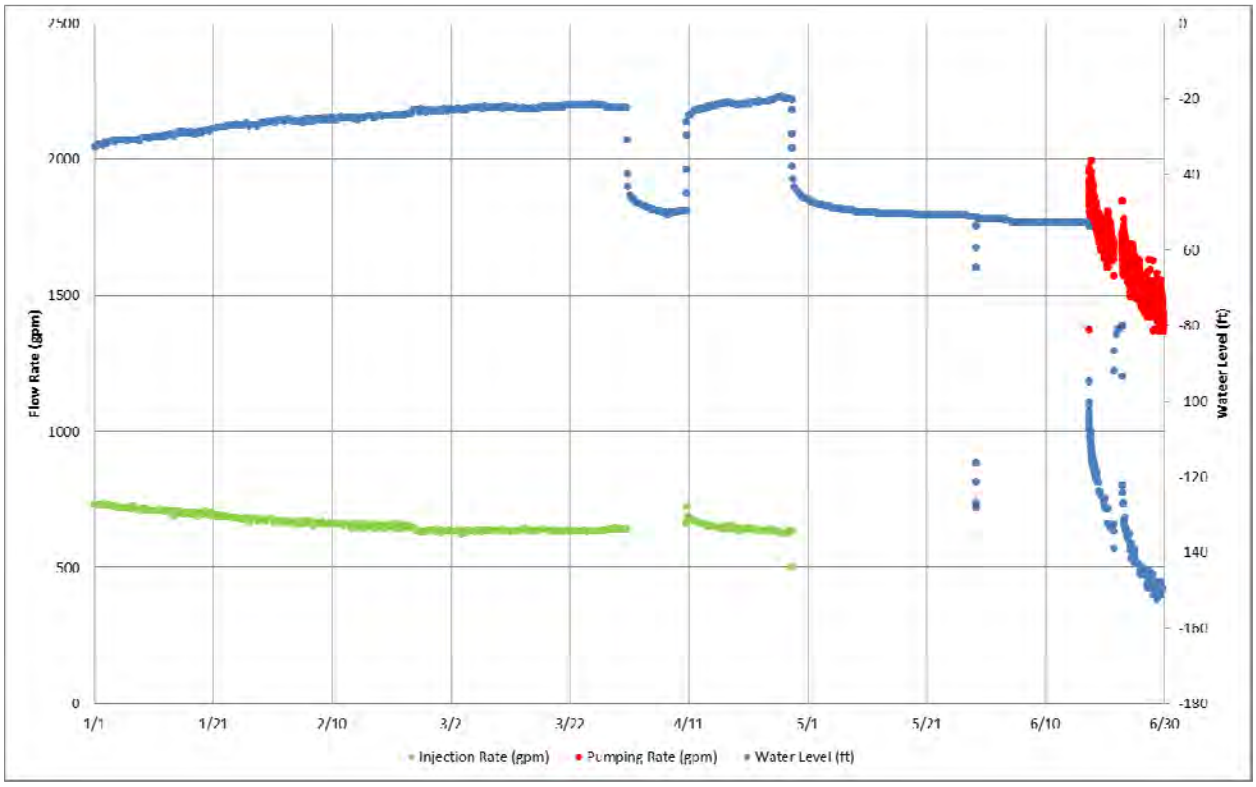


Figure 3A. View Street Well – Flow Rates and Water Levels, Jan to Jun 2015

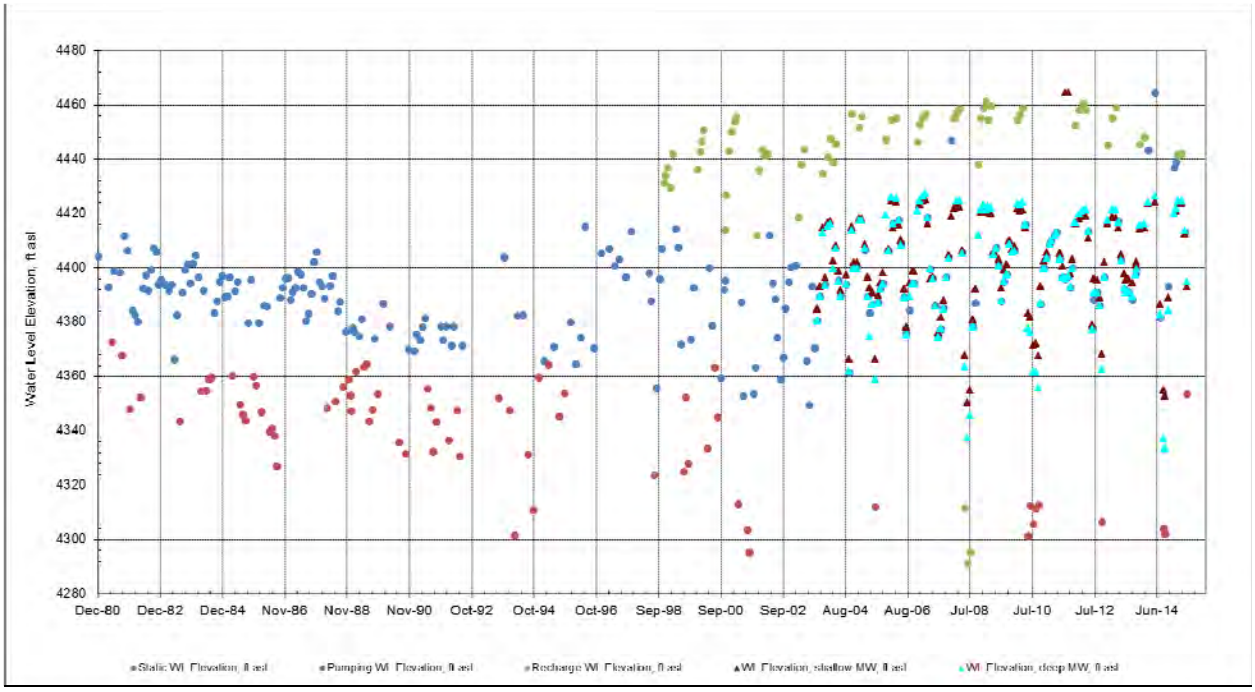


Figure 3B. View Street Production and Monitoring Wells - Water Level Elevations

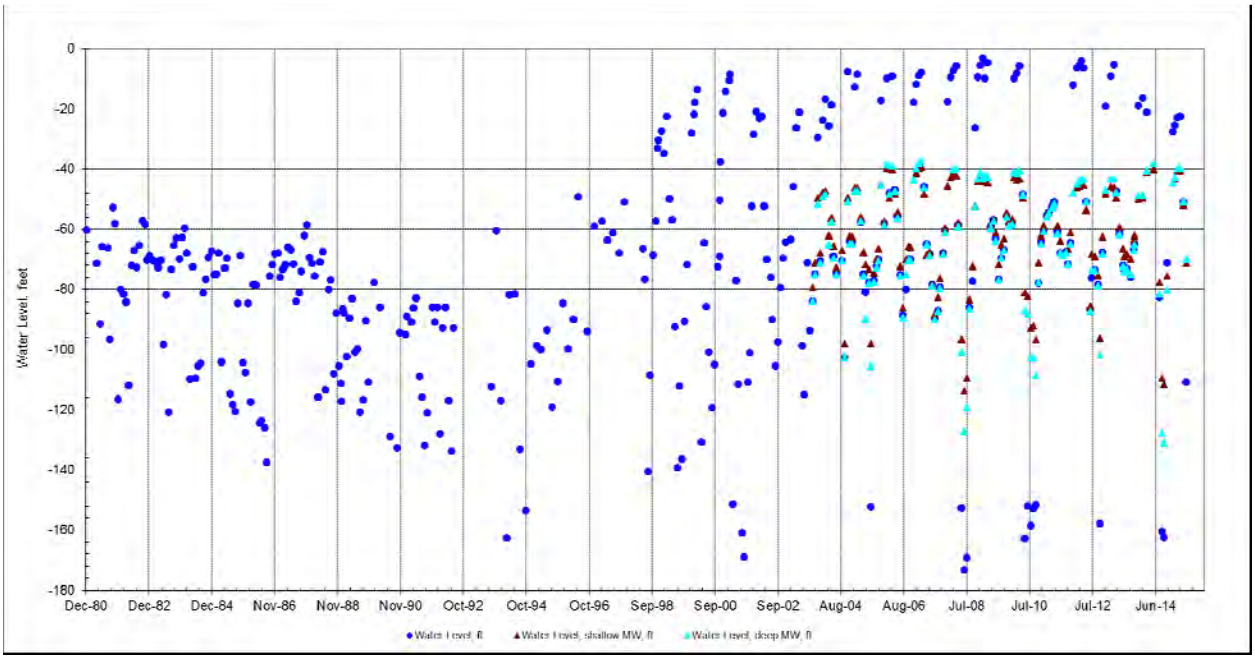


Figure 3C. View Street Production and Monitoring Wells - Water Levels

1.3 El Rancho Well

TMWA's El Rancho Well is centrally located in the Truckee Meadows, specifically in the northeast quarter of the southeast quarter of Section 6, Township 19 North, Range 20 East.

During first half of 2015, 109.7 acre-feet (35.7 MG) of water were injected into El Rancho Drive Well. 30.9 acre-feet (10.1 MG) of water were pumped from the well during the same period (see Tables 1 and 2A, and Figure 4A. Historical monthly water level elevations for El Rancho Well and its monitoring wells are shown in Figure 4B. The water levels for the injection/production well as well as those for the shallow and deep monitoring wells are shown in Figure 4C.

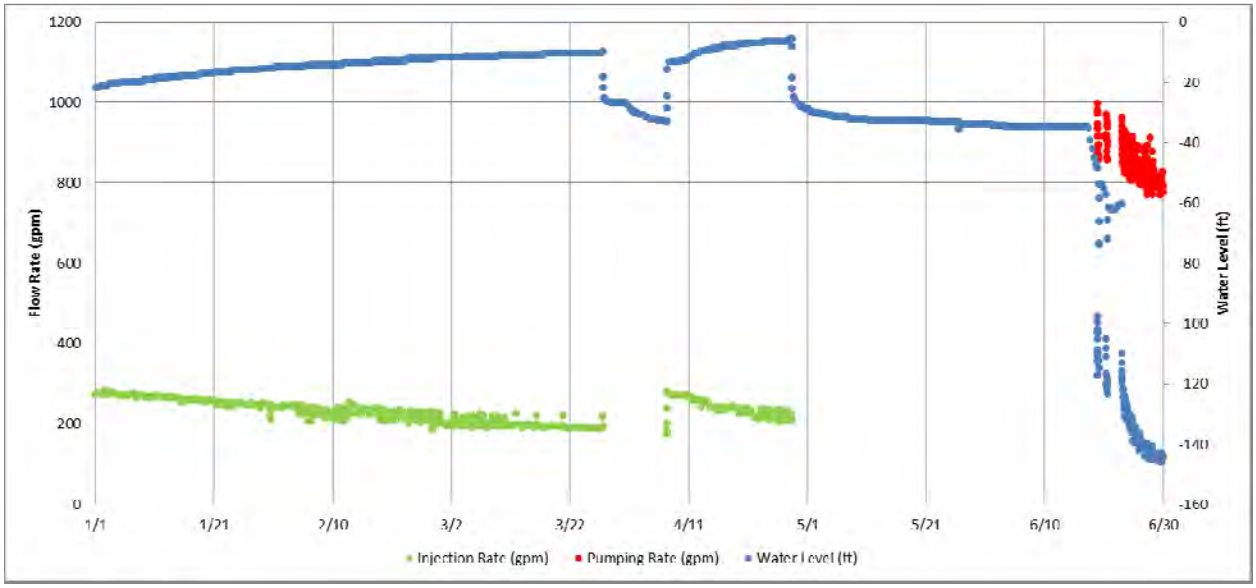


Figure 4A. El Rancho Drive Well –Flows and Water Levels, Jan to Jun 2015

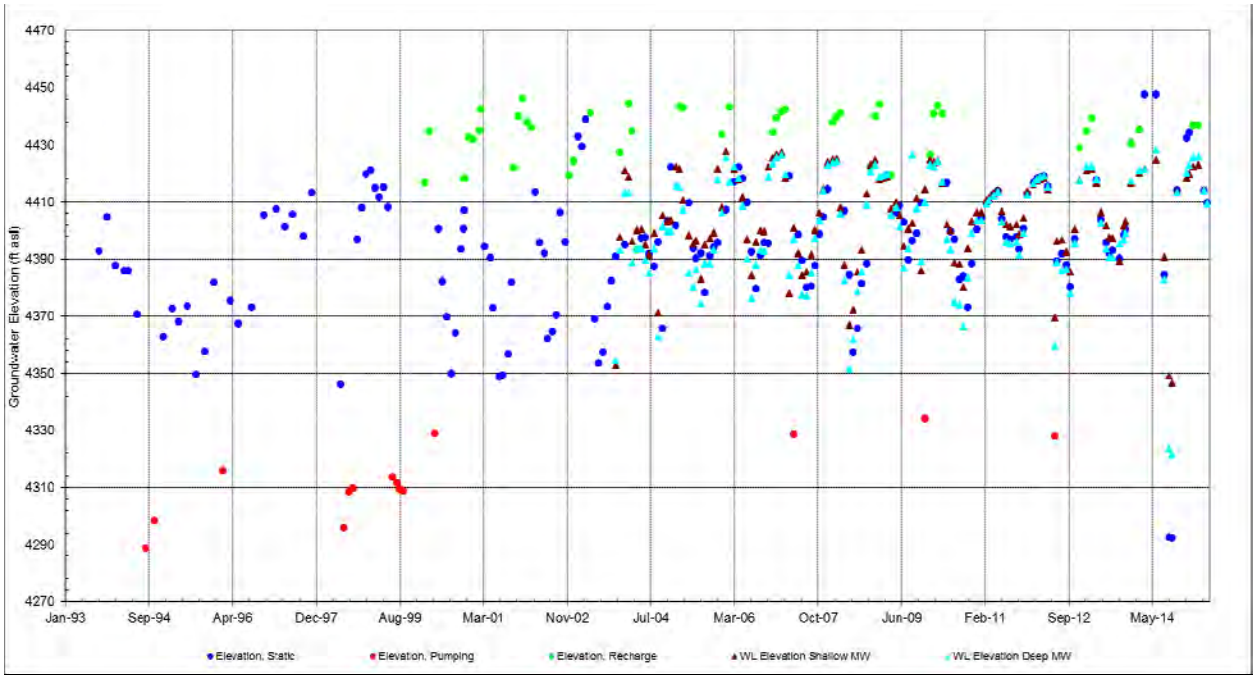


Figure 4B. El Rancho Drive Production and Monitoring Wells - Water Level Elevations

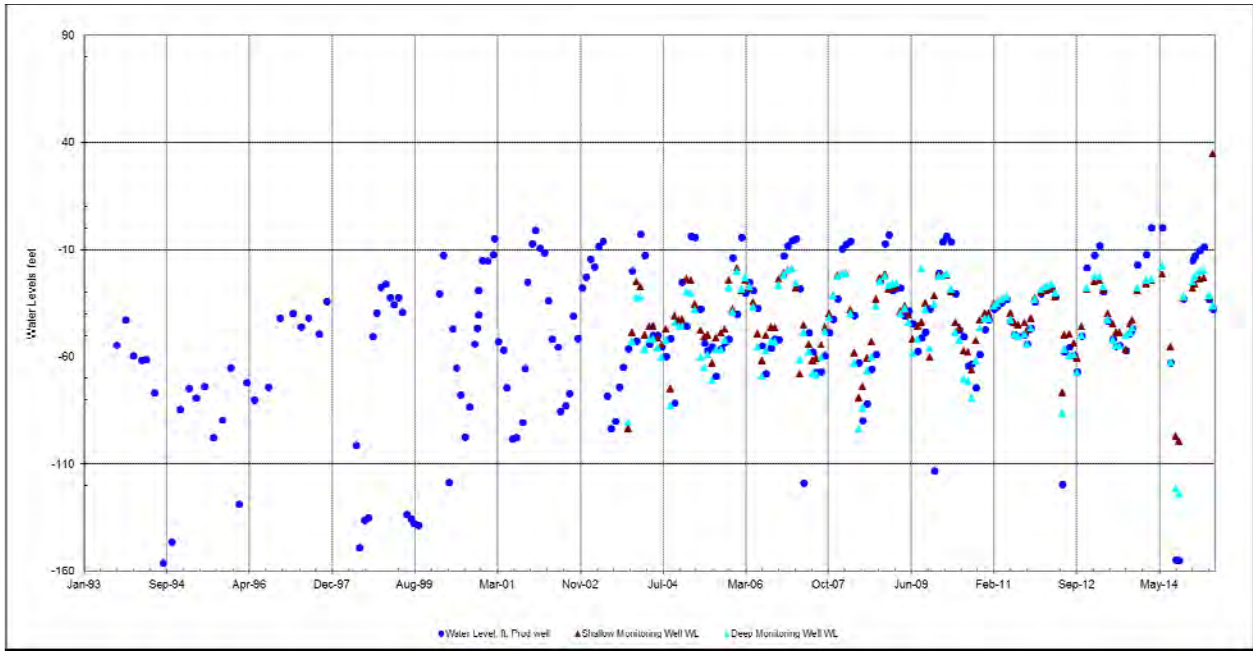


Figure 4C. El Rancho Drive Injection and Monitoring Wells - Water Levels

1.4 Reno High Well

Reno High Well is located on Idlewild Drive, north and adjacent to Reno High School.

During first half of 2015, 254.4 acre-feet (82.9 MG) of water were injected into the Reno High Well. During the same period, 125.5 acre-feet (40.9 MG) of water were pumped from the well (see Tables 1 and 2A, and Figure 5A).

Historical monthly water level elevations for Reno High Well and its monitoring wells are shown in Figure 5B.

The water levels for the injection/production well as well as those for the shallow and deep monitoring wells are shown in Figure 5C.

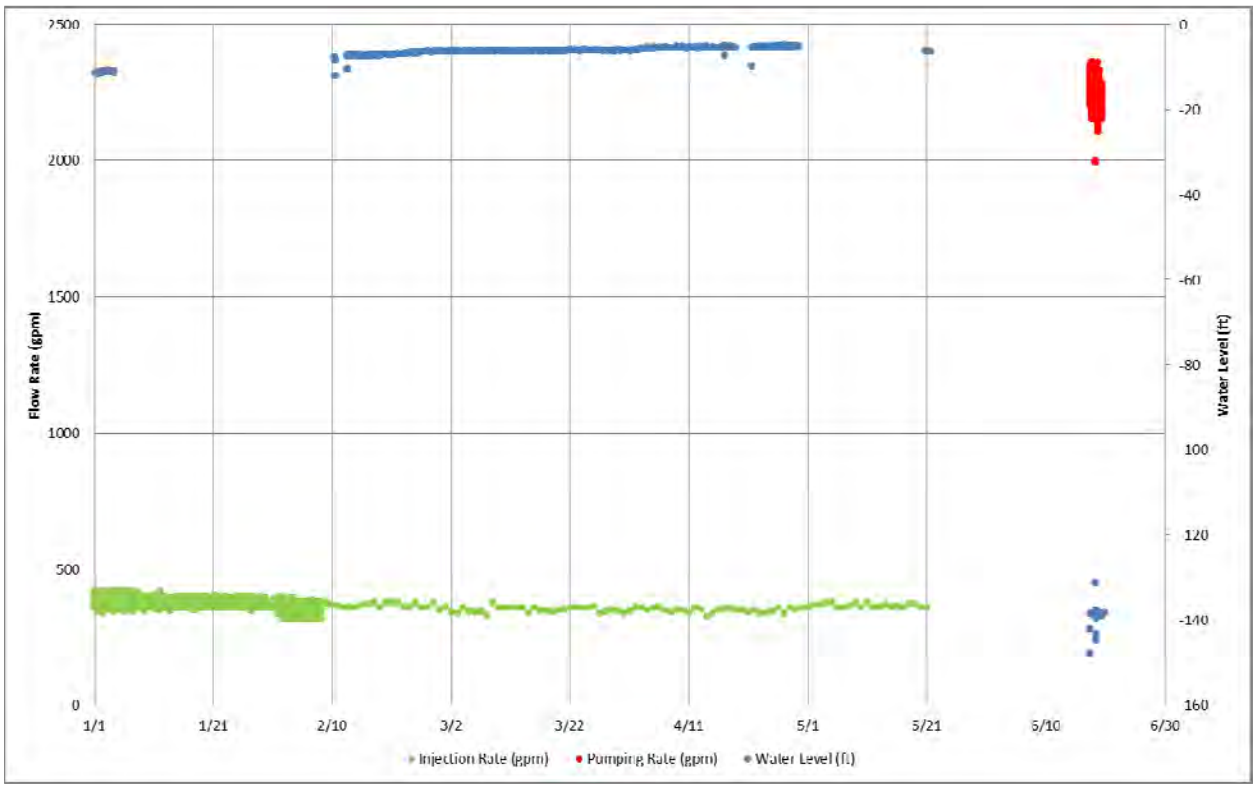


Figure 5A. Reno High Well – Flow Rates and Water Level, Jan to Jun 2015

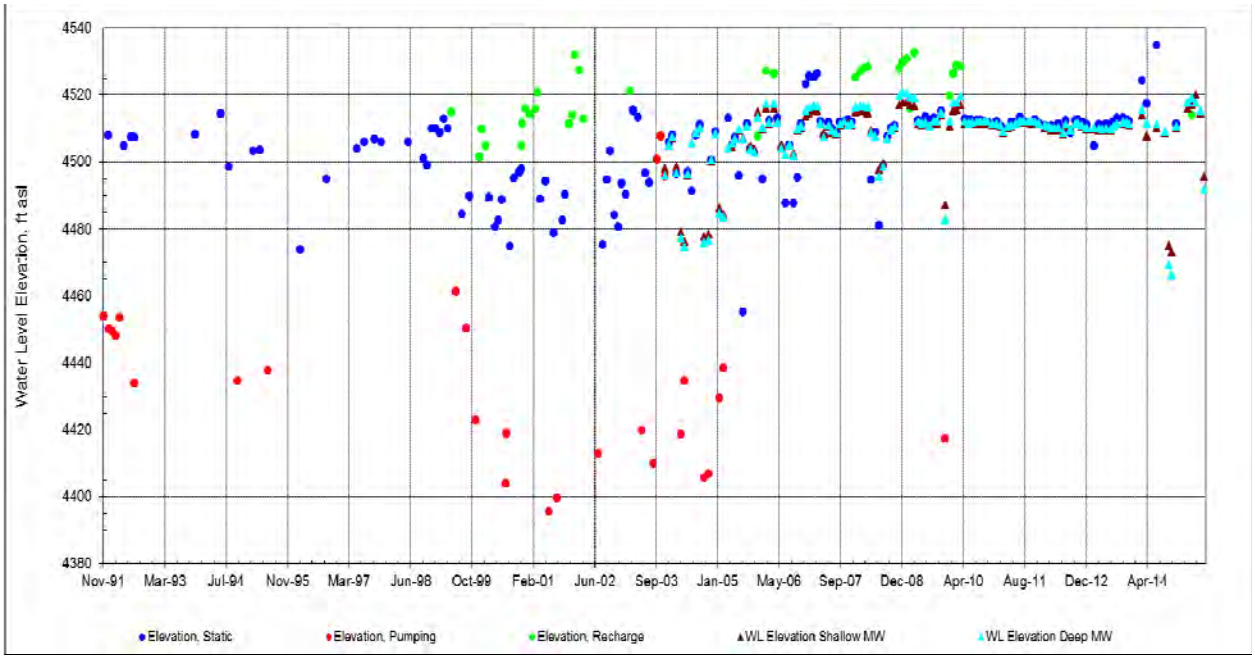


Figure 5B. Reno High Production and Monitoring Wells - Water Level Elevations

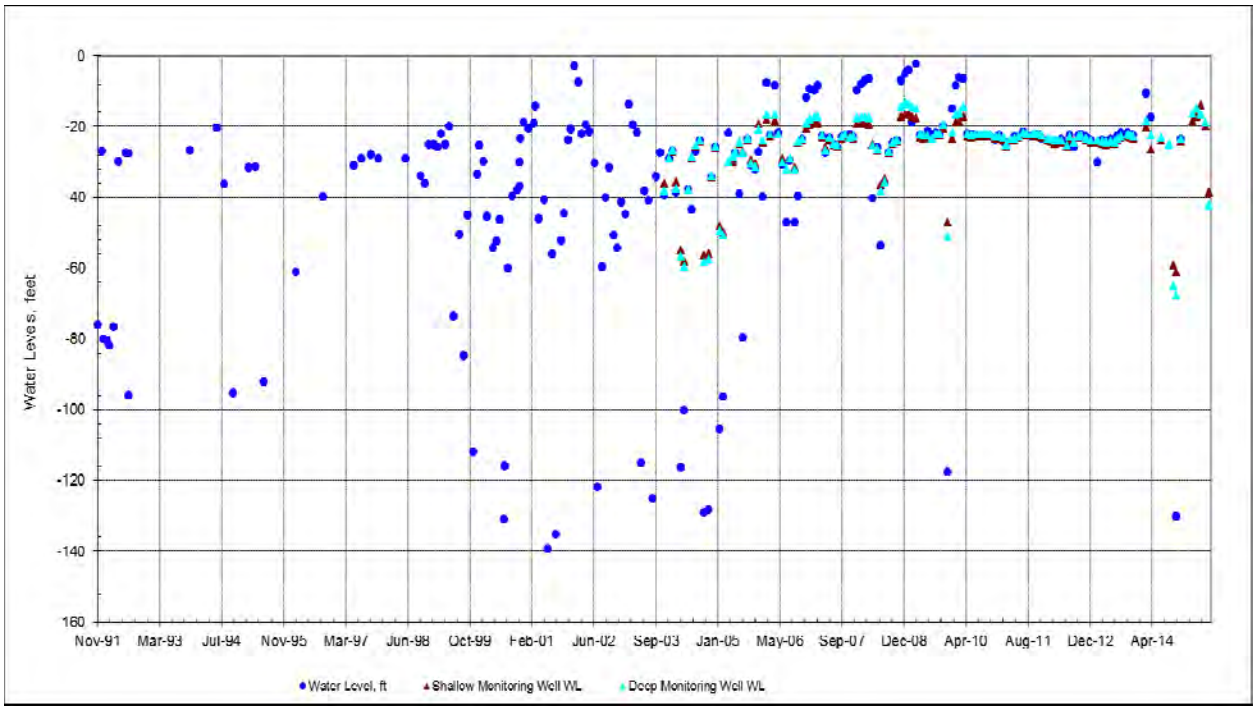


Figure 5C. Reno High Injection and Monitoring Wells - Water Levels

1.5 4th Street Well

The 4th Street Well is located in the northeast quarter of northeast quarter of Section 12, Township 19N, Range 19E, in Washoe County, Nevada, at the northeast corner of East 4th Street and Threlkel Street. The 4th Street Well was one of the first wells to be recharged beginning in 1993, but injection was discontinued because of its proximity to wells containing PCE. Recharge of the well was resumed in 2001 in cooperation with Washoe County Department of Water Resources, which is supervising remediation of PCE contaminated wells near this well.

During first half of 2015, 192.7 acre-feet (62.8 MG) of water were injected into the 4th Street Well. 49.9 acre-feet (16.3 MG) of water were pumped from the well during the same period (see Tables 1, 2A, and Table 2B.

Figure 6A shows water levels and pumping rates for 4th Street Well during the first half of 2015. Historical monthly water level elevations for 4th Street Well and its monitoring wells are shown in Figure 6B. The water levels for the production well as well as those for the shallow and deep monitoring wells are shown in Figure 6C.

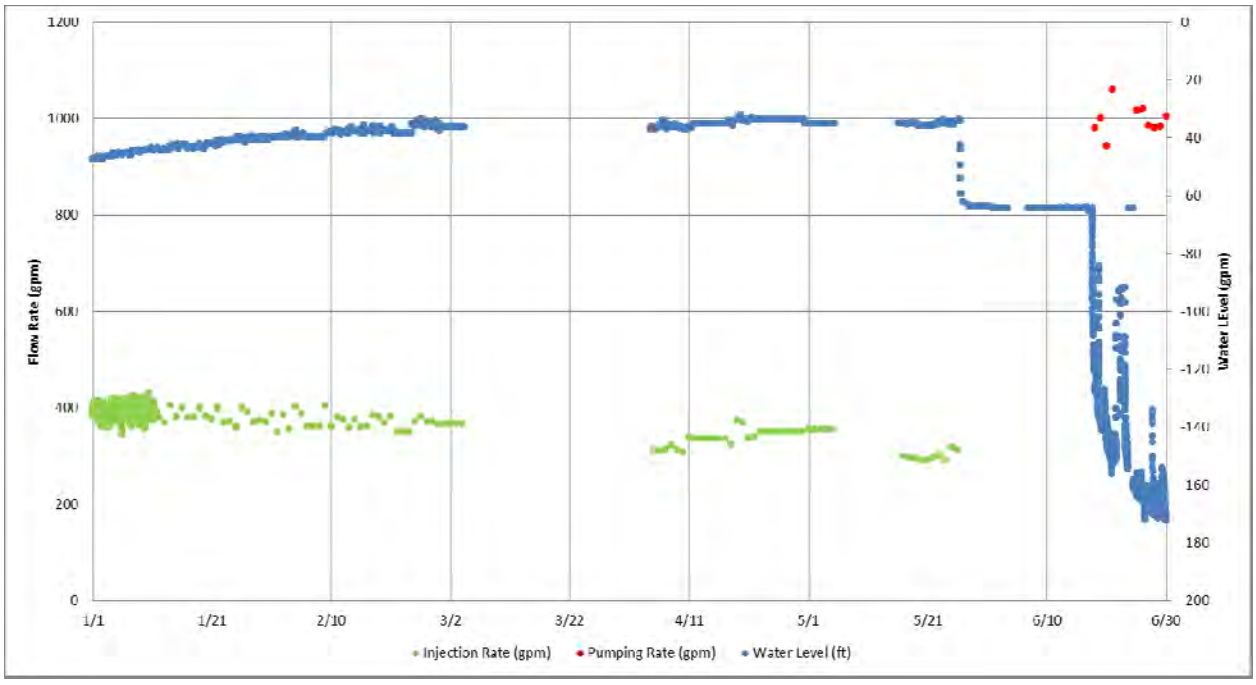


Figure 6A. 4th Street Well – Flow Rates and Water Levels, Jan to Jun 2015

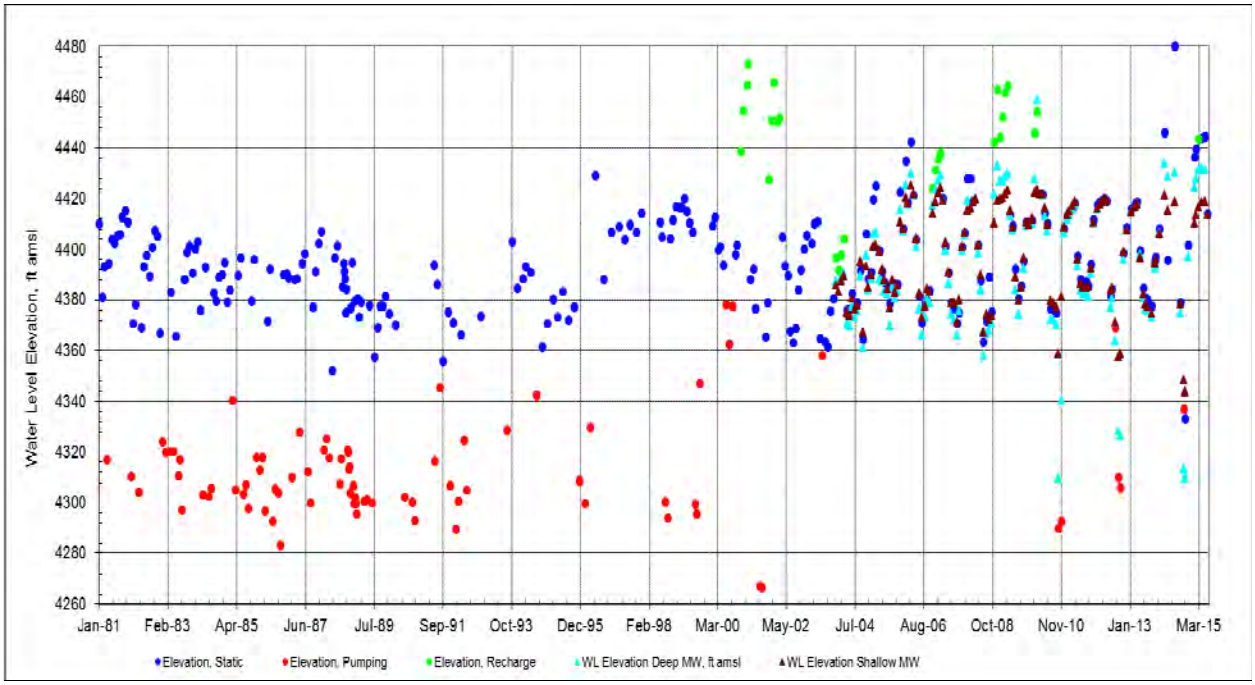


Figure 6B. 4th Street Production and Monitoring Wells - Water Level Elevations

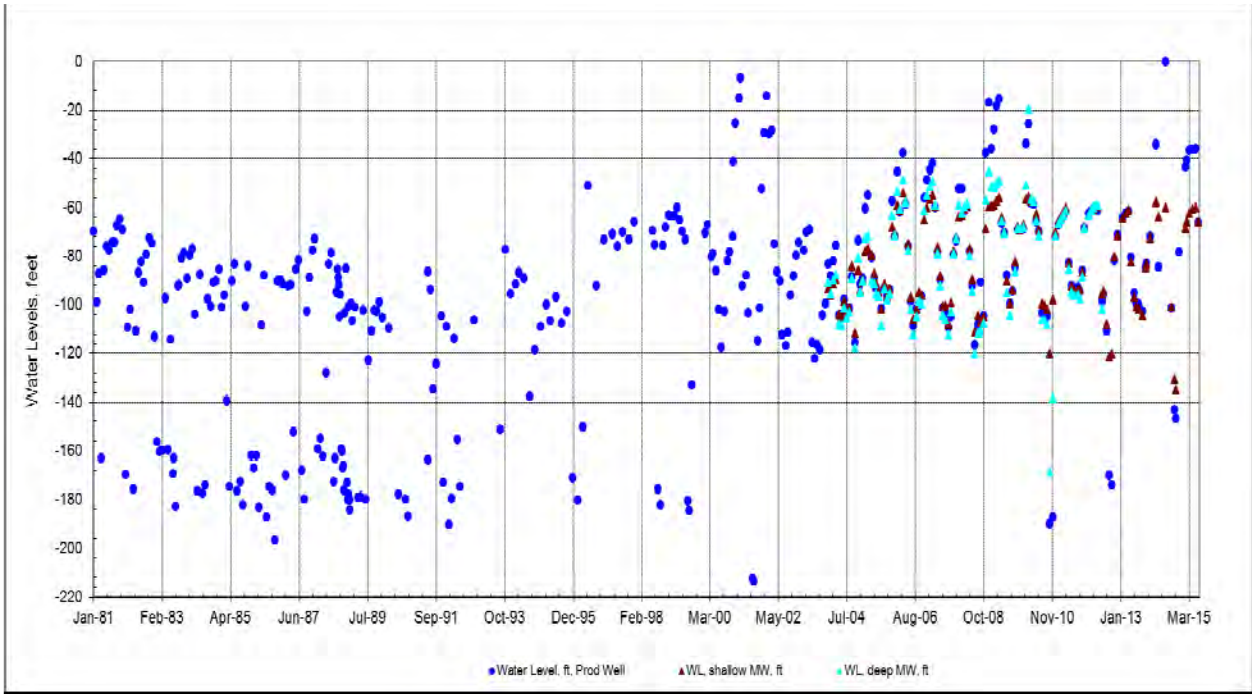


Figure 6C. 4th Street Injection and Monitoring Wells - Water Levels

1.6 21st Street Well

The 21st Street Well is located in the northeast quarter of southeast quarter of Section 7, Township 19N, Range 20E, or at a point from which the east quarter corner of said Section 7 bears north 21 41'00" east, a distance of 945.0 feet, in Washoe County, Nevada.

During first half of 2015, 124.6 acre-feet (40.6 MG) of water were injected into the 21st Street Well. 79.6 acre-feet (25.9 MG) of water were pumped from the well during the same period (see Tables 1, 2A, and 2B. Historical monthly water level elevations for the 21st Street Well and its monitoring wells are shown in Figure 7C.

Figure 7A shows water levels and extraction rates for 21st Street Well. Historical monthly water level elevations for 21st Street Well and its monitoring wells are shown in Figure 7B.

The water levels for the 21st Street Well and its two monitoring wells are shown in Figure 7C. The shallow monitoring well near the injection well is drilled to 60 feet and shows no water level changes due to pumping activities in the 21st Street Well. Water levels in the deep monitoring well which is screened in the same interval as the injection well show the same variations as in the production well.

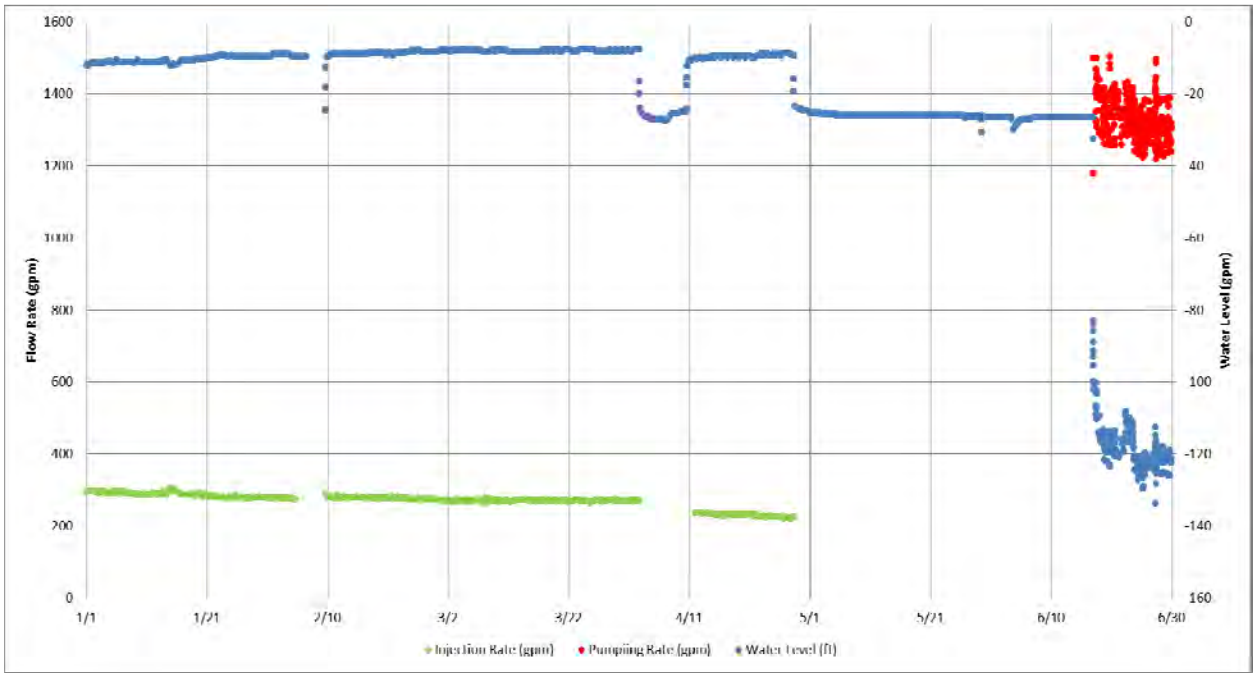


Figure 7A. 21st Street Well – Flow Rates and Water Levels, Jan to Jun 2015

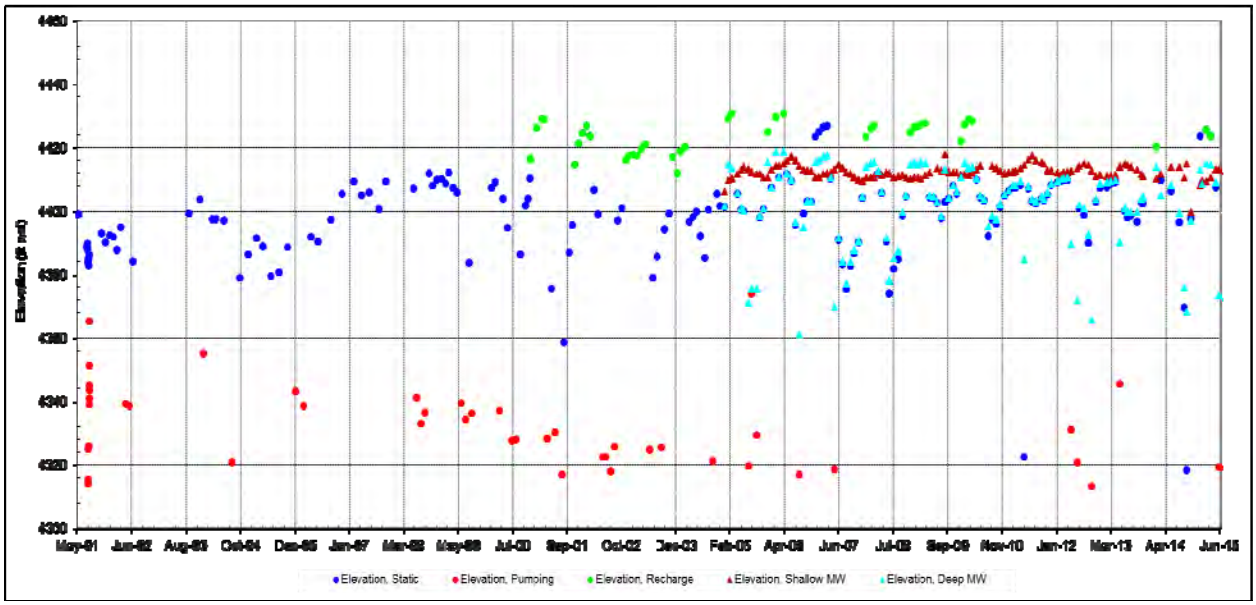


Figure 7B. 21st Street Production and Monitoring Wells - Water Level Elevations

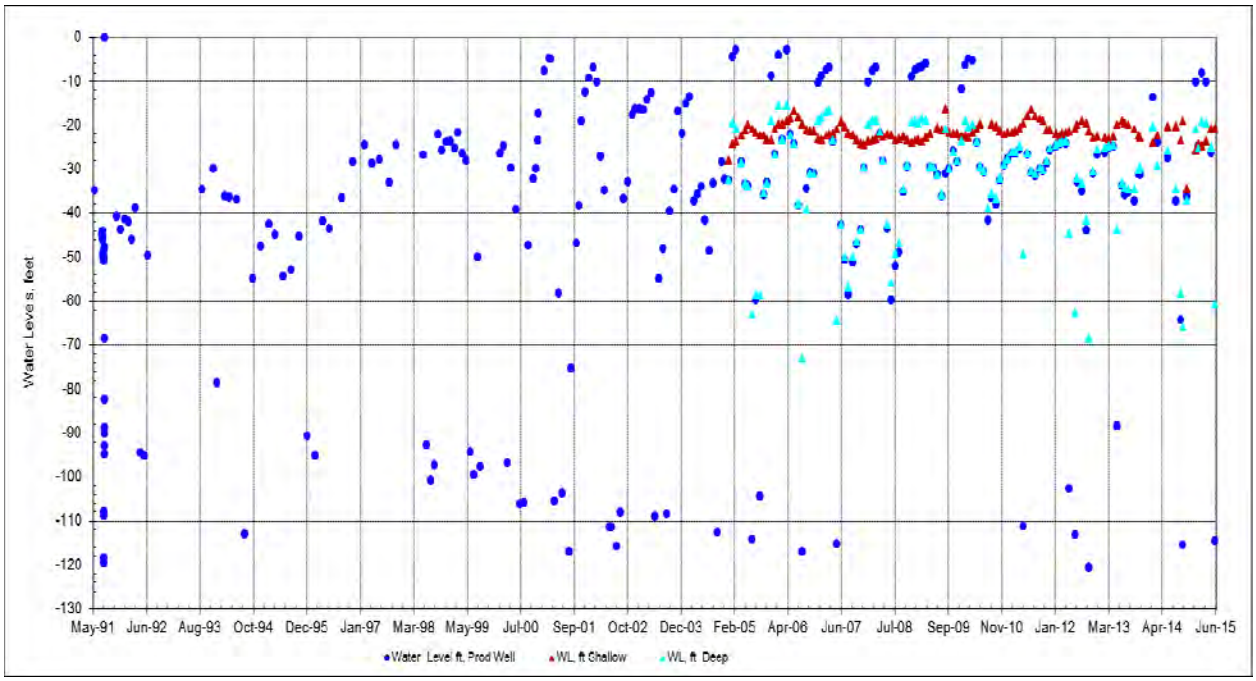


Figure 7C. 21st Street Injection and Monitoring Wells - Water Levels

1.7 Galletti Way Well

Galletti Way Well is located in northwest quarter of southeast quarter of Section 7, Township 19N, Range 20E, or at a point which bears south 85 0'0" west from the east quarter corner of said Section 7, a distance of 1572.6 feet, in Washoe County.

During first half of 2015, 163.2 acre-feet (53.2 MG) of water were injected into the Galletti Way Well, and 20.3 acre-feet (6.6 MG) of water were pumped from the well during the same period (see Tables 1 and 2A, and Figure 8A.)

Galletti Way monitoring well is the monitoring well for the Galletti Way production/injection well. Water level elevations for the Galletti Way injection and monitoring wells are shown in Figure 8B while water levels for the two wells are shown in Figure 8C. Water levels in the monitoring well have the same trend as the production well, which indicates that the two wells are in communication.

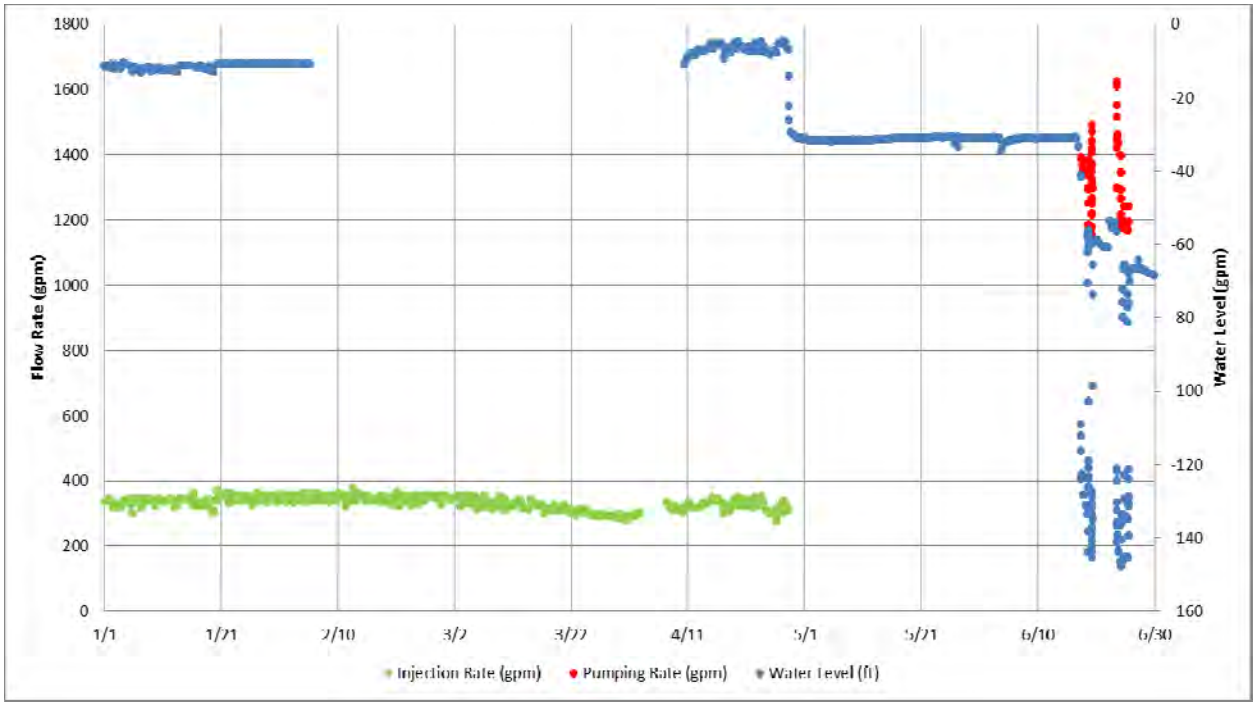


Figure 8A. Galletti Way Well – Flow Rates and Water Levels, Jan to Jun 2015

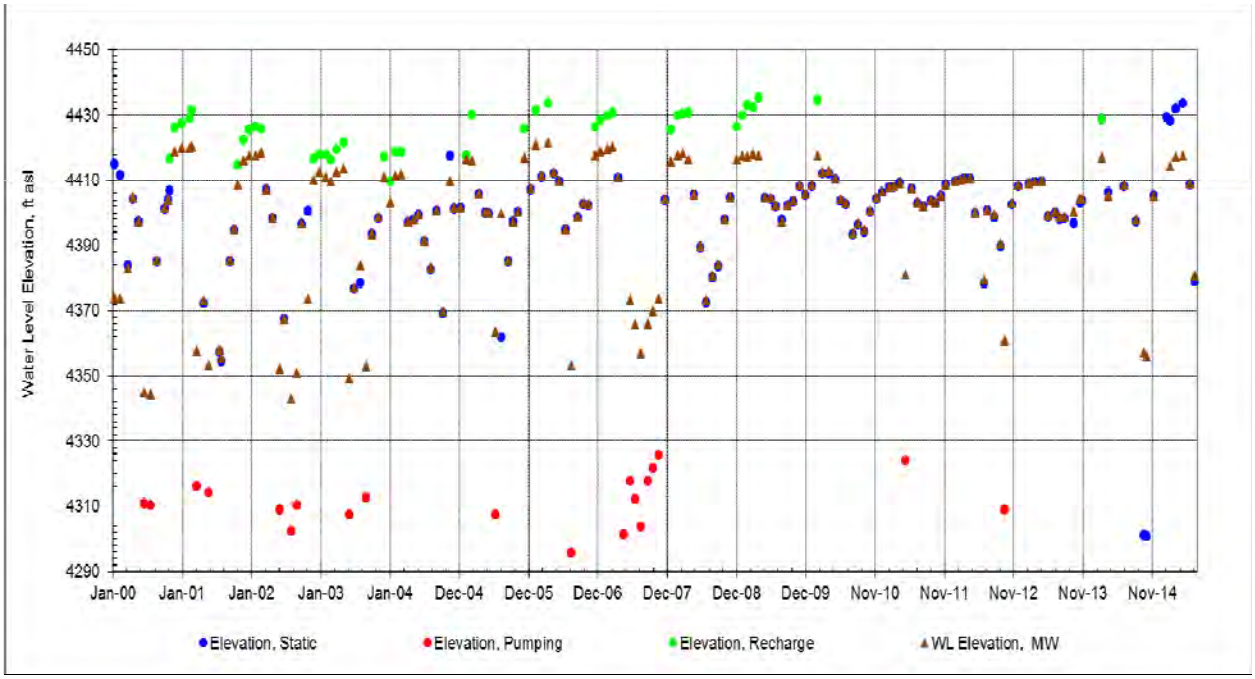


Figure 8B. Galletti Way Production and Monitoring Wells - Water Level Elevations

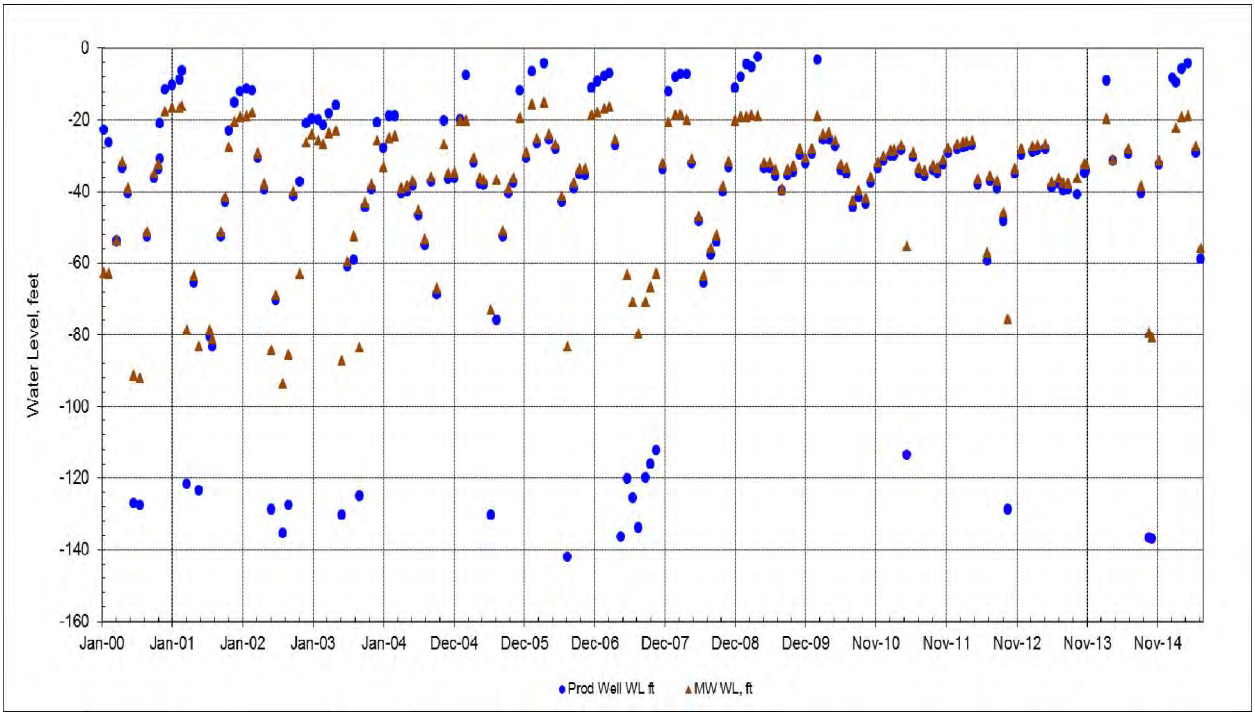


Figure 8C. Galletti Way Production and Monitoring Wells - Water Levels

1.8 Hunter Lake Well

The Hunter Lake Well is located on the Hunter Lake Elementary School property, in Reno, Nevada, at the southwest corner of California Avenue and Hunter Lake Drive.

During first half of 2015, 284.3 acre-feet (92.6 MG) of water were injected into the Hunter Lake Well, and 110.3 acre-feet (35.9 MG) of water were pumped from the well during the same period (see Tables 1 and 2A, and Figure 9A.)

Historical monthly water level elevations for Hunter Lake Well and its monitoring well are shown in Figure 9B while the water levels are shown in Figure 9C. Water levels in the monitoring well have the same trend as the production well, which indicates that the two wells are in communication.

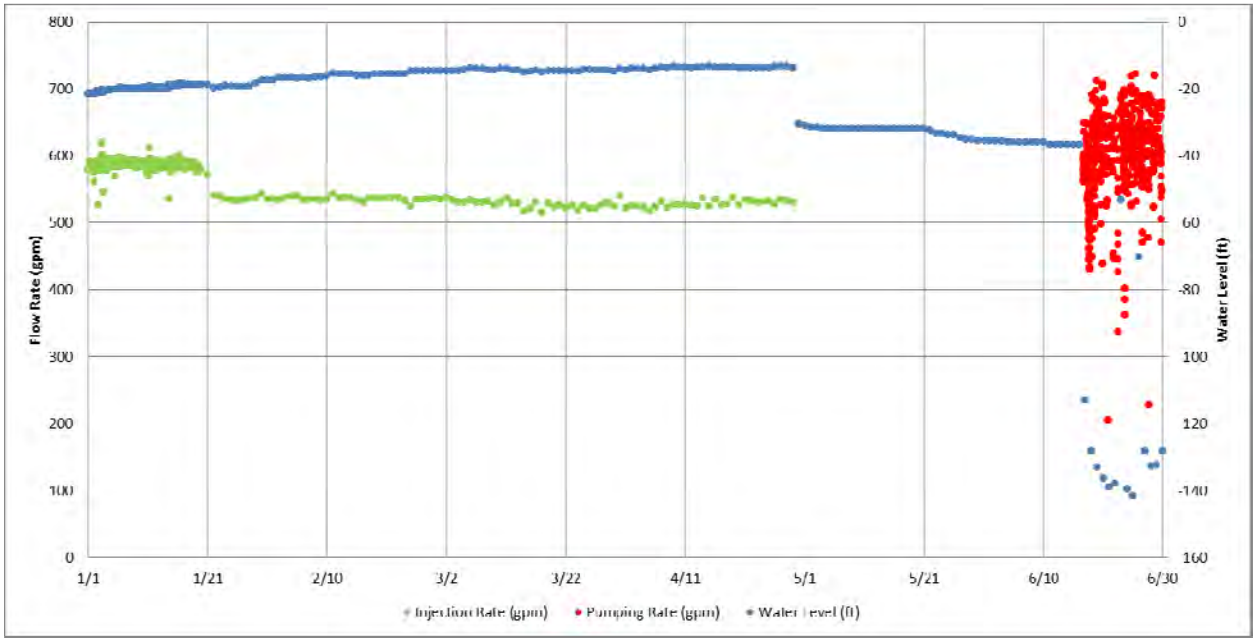


Figure 9A. Hunter Lake Well – Flow Rates and Water Levels, Jan to Jun 2015

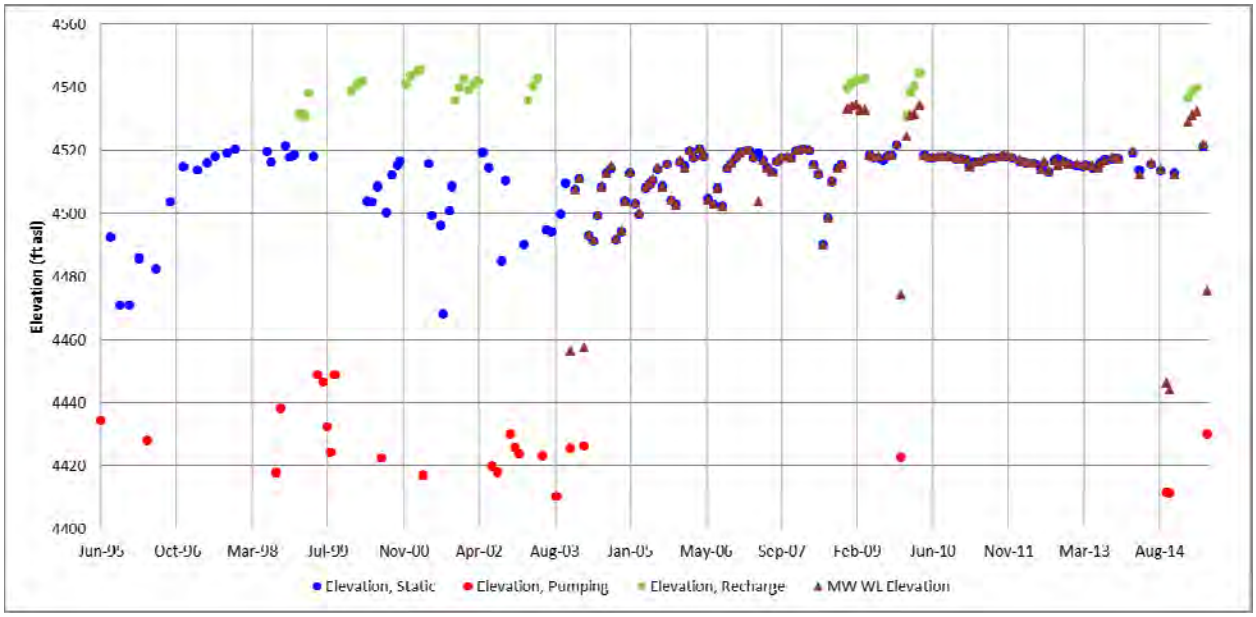


Figure 9B. Hunter Lake Injection and Monitoring Wells - Water Level Elevations

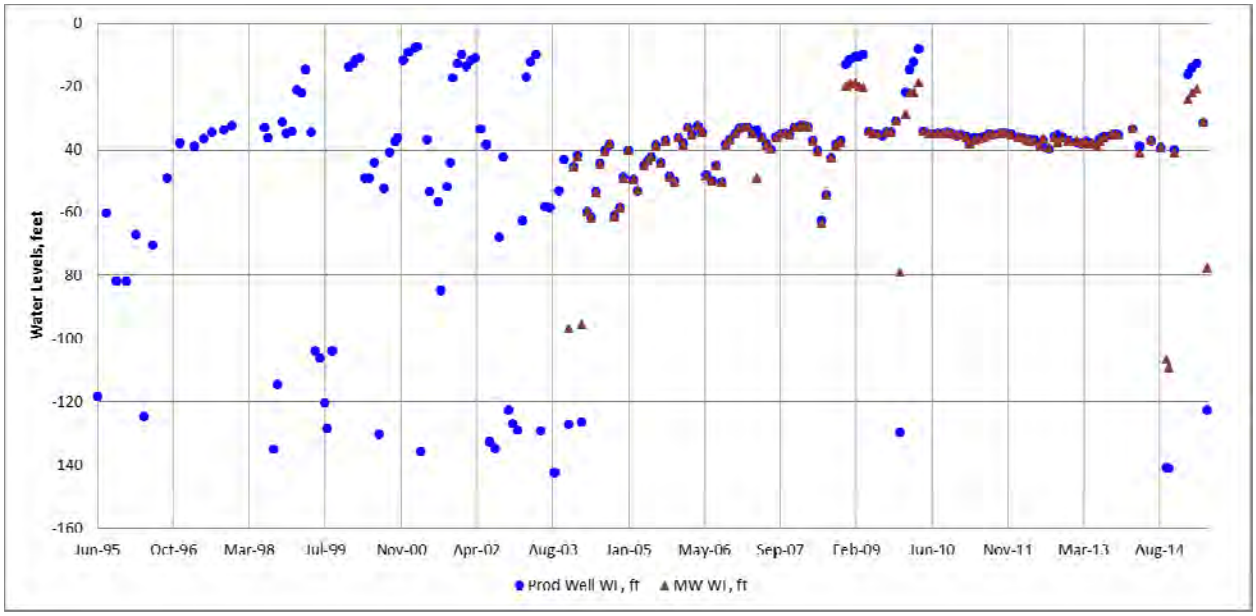


Figure 9C. Hunter Lake Injection and Monitoring Wells - Water Levels

1.9 Glen Hare Well

Glen Hare Well is located in the NW ¼ of NE ¼ of Section 15, T.19N., R.19E., M.D.B.& M., or at a point from which the NE corner of said Section 15 bears North 20 31'00" East, a distance of 2502.35 feet, in Washoe County.

During first half of 2015, 166.5 acre-feet (54.2 MG) of water were injected into the Glen Hare Well (see Tables 1 and 2A, and Figure 10A). During the same period, 48.0 acre-feet (15.6 MG) of water were pumped from the well (Table 2B and Figure 10A).

Glen Hare monitoring well is the monitoring well for the Glen Hare production/injection well. Water level elevations for the Glen Hare injection and monitoring wells are shown in Figure 10B and Figure 10C shows their water levels. Water levels in the monitoring well have the same trend as the production well, which indicates that the two wells are in communication.

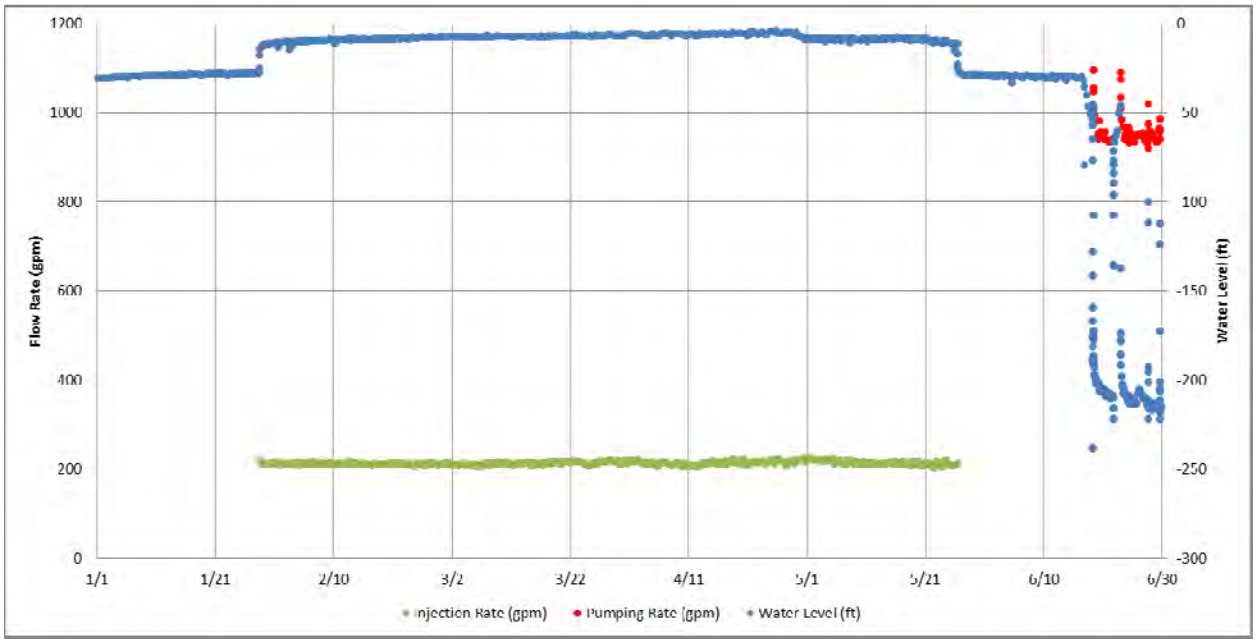


Figure 10A. Glen Hare Well – Flows Rates and Water Levels, Jan to Jun 2015

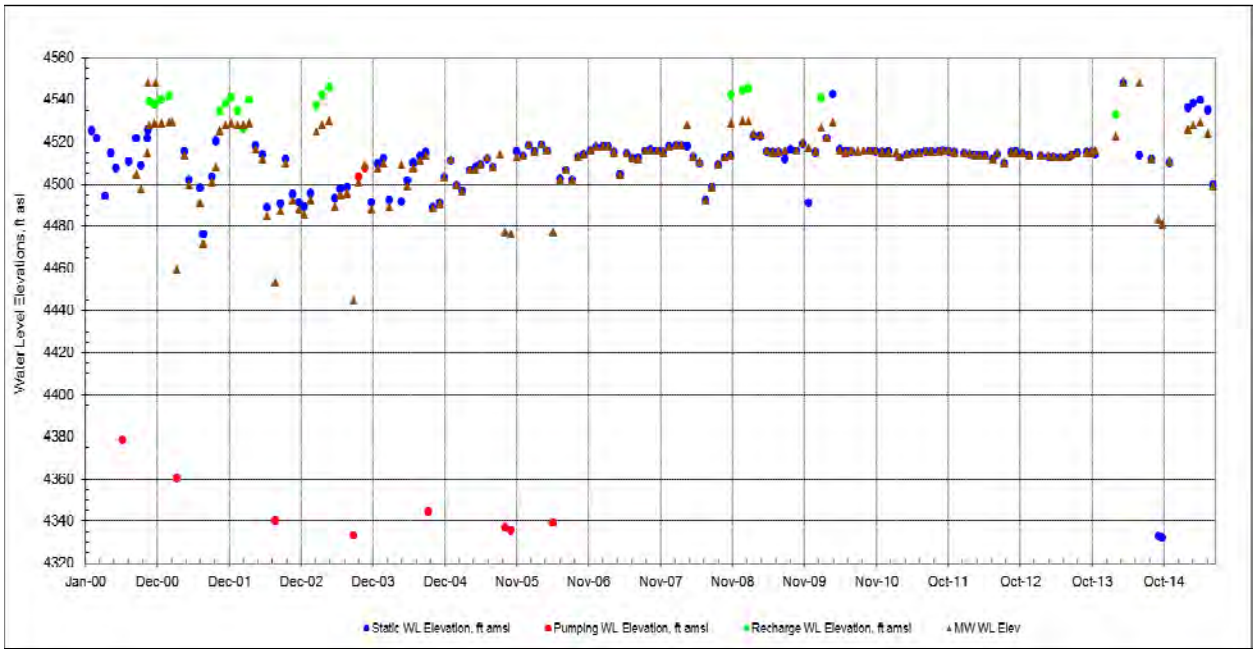


Figure 10B. Glen Hare Injection and Monitoring Wells - Water Level Elevations

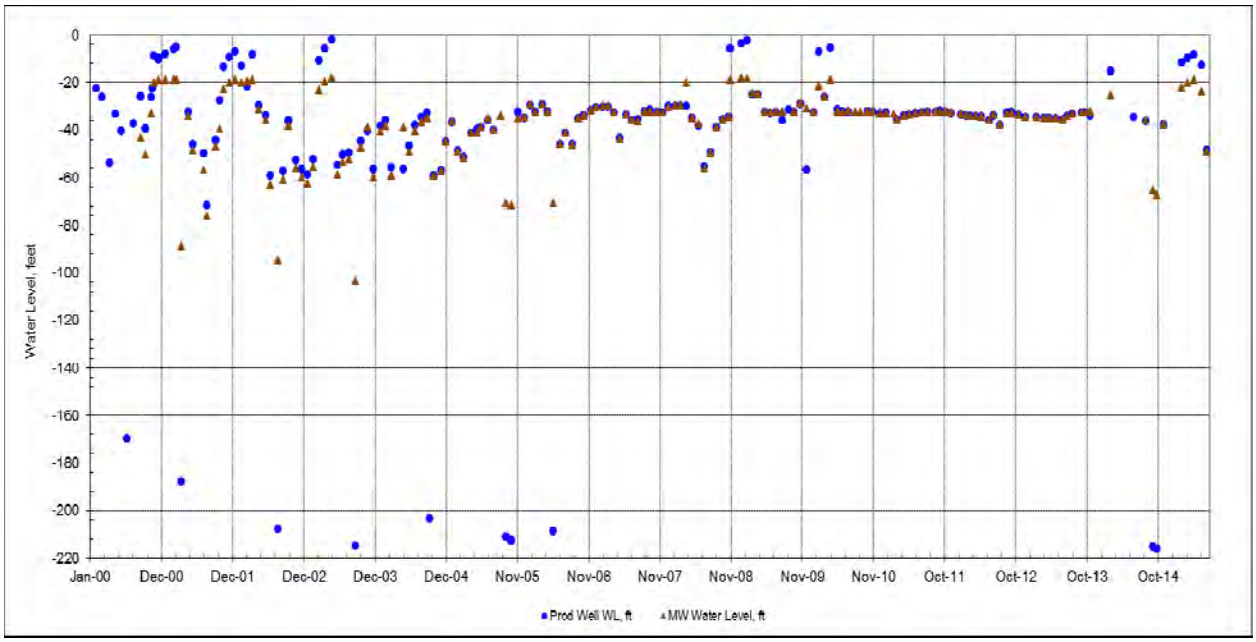


Figure 10C. Glen Hare Injection and Monitoring Wells - Water Levels

1.10 Holcomb Lane Well

Holcomb Lane Well is located at SE 1/4 SW 1/4 of Section 35, T.19N. R.19E, M.D.B.& M., or at a point from which the SW corner of said Section 35 bears South 68 08'20" West, a distance of 2258.30 feet, in Washoe County, Nevada.

During first half of 2015, 154.3 acre-feet (50.3 MG) of water were injected into the Holcomb Lane Well (see Tables 1, 2A and 2B, and Figure 11A). During the same period, 35.8 acre-feet (11.7 MG) of water were pumped from the well (Table 2B and Figure 11A).

Holcomb Lane monitoring well is the monitoring well for the Holcomb Lane production/injection well. Water level elevations for the Holcomb Lane injection and monitoring wells are shown in Figure 11B.

Figure 11C shows their water levels. Water levels in the monitoring well have the same trend as the production well which indicates that the two wells are in communication.

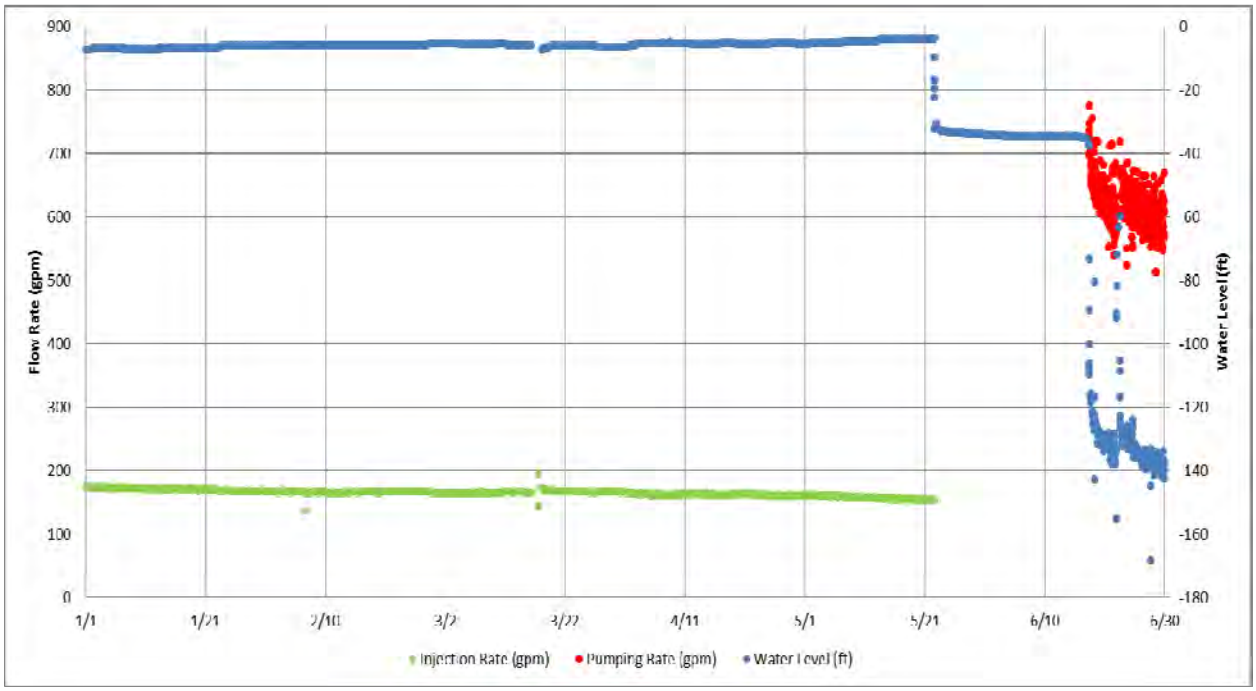


Figure 11A. Holcomb Lane Well – Flow Rates and Water Levels, Jan to Jun 2015

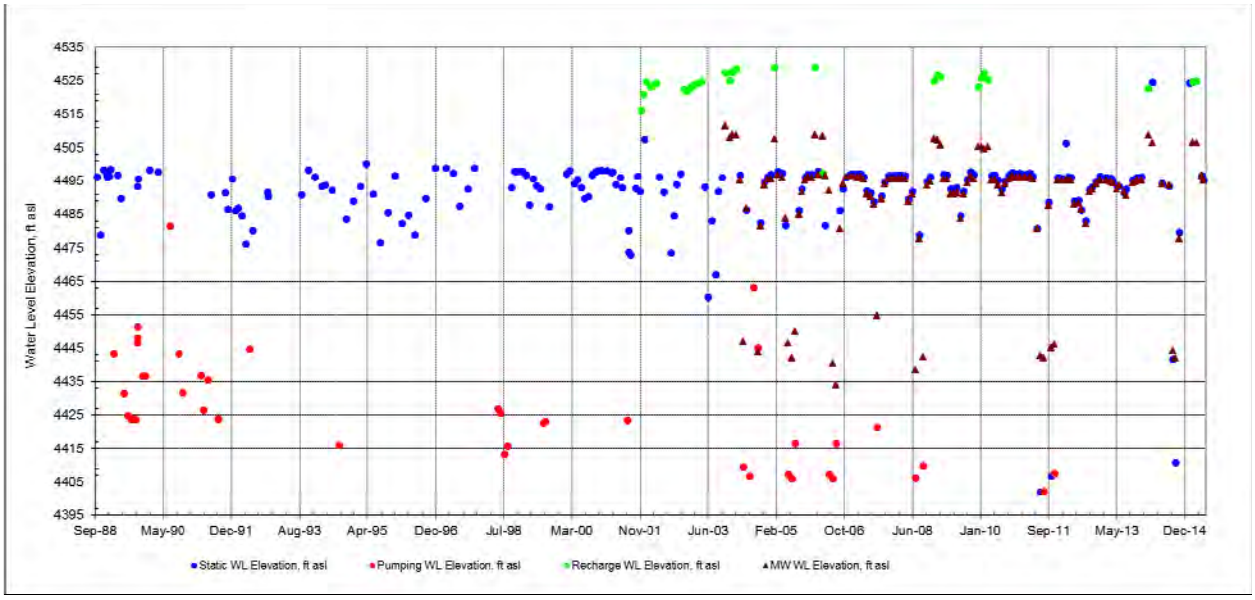


Figure 11B. Holcomb Lane Injection and Monitoring Wells - Water Level Elevations

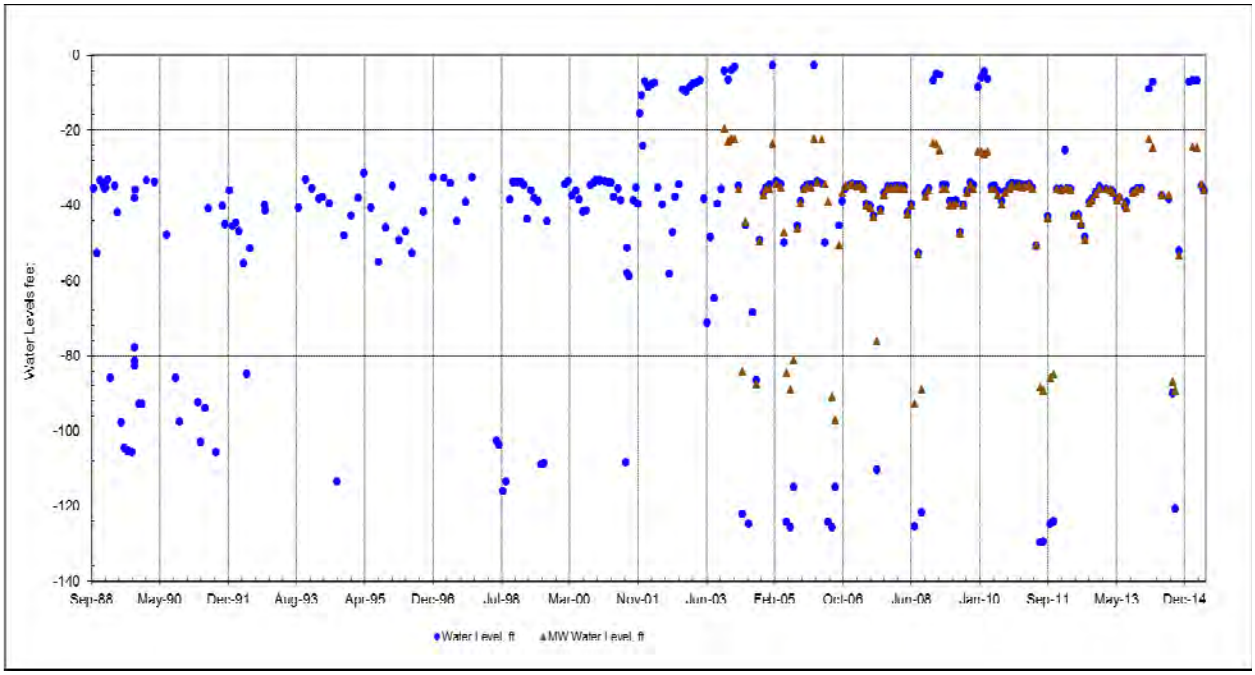


Figure 11C. Holcomb Lane Injection and Monitoring Wells - Water Levels

1.11 Nugget Avenue (Sparks Avenue) Well

Sparks Ave, now known as Nugget Avenue Well, is located in the NE ¼ NW ¼ of Section 8, T. 19N., R. 20E., M.D.B.&M., or at a point from which the North ¼ corner of said Section 8 bears North 03° 01' 25" East, a distance of 549.76 feet, in Washoe County, Nevada.

During the first half of 2015, no water was injected into the Nugget Avenue Well (Tables 1 and 2A, and Figure 12A). During the same period, 26.1 acre-feet (8.5 MG) of water were pumped from the well.

Nugget Avenue Well uses two nested wells belonging to Central Truckee Meadows Remediation District (CTMRD) as its monitoring wells. Water level elevations for the Sparks Avenue injection and monitoring wells are shown in Figure 12B. The water levels are shown in Figure 12C.

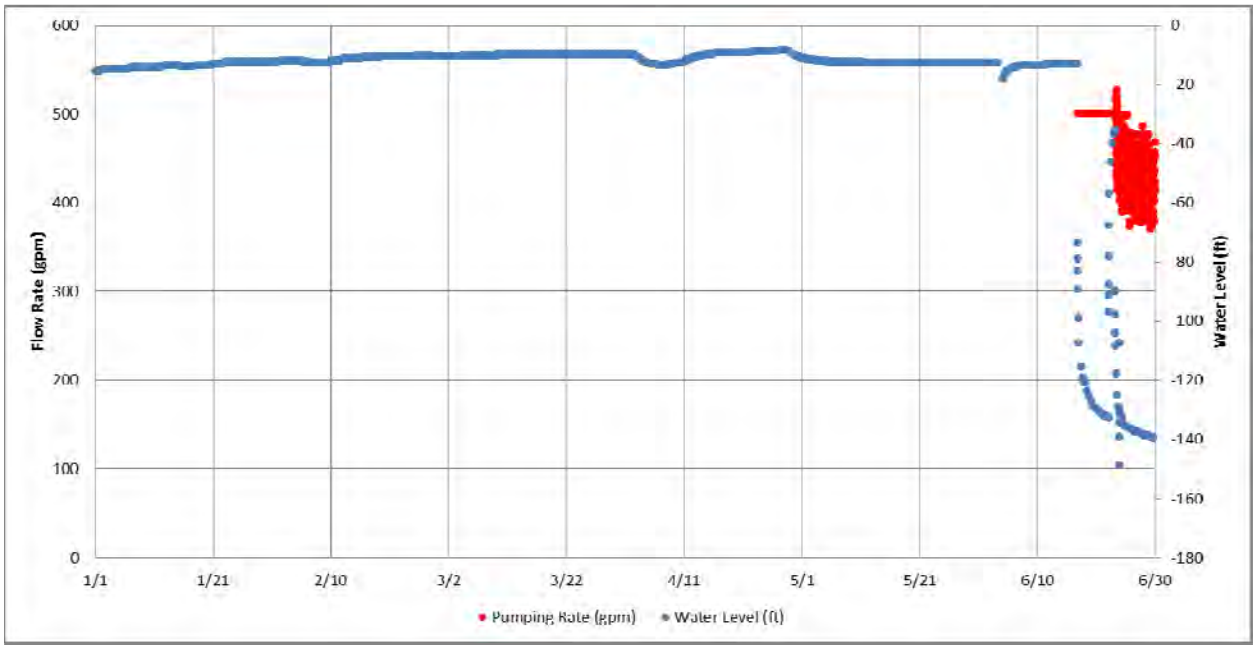


Figure 12A. Nugget Avenue Well – Water Levels, Jan to Jun 2015

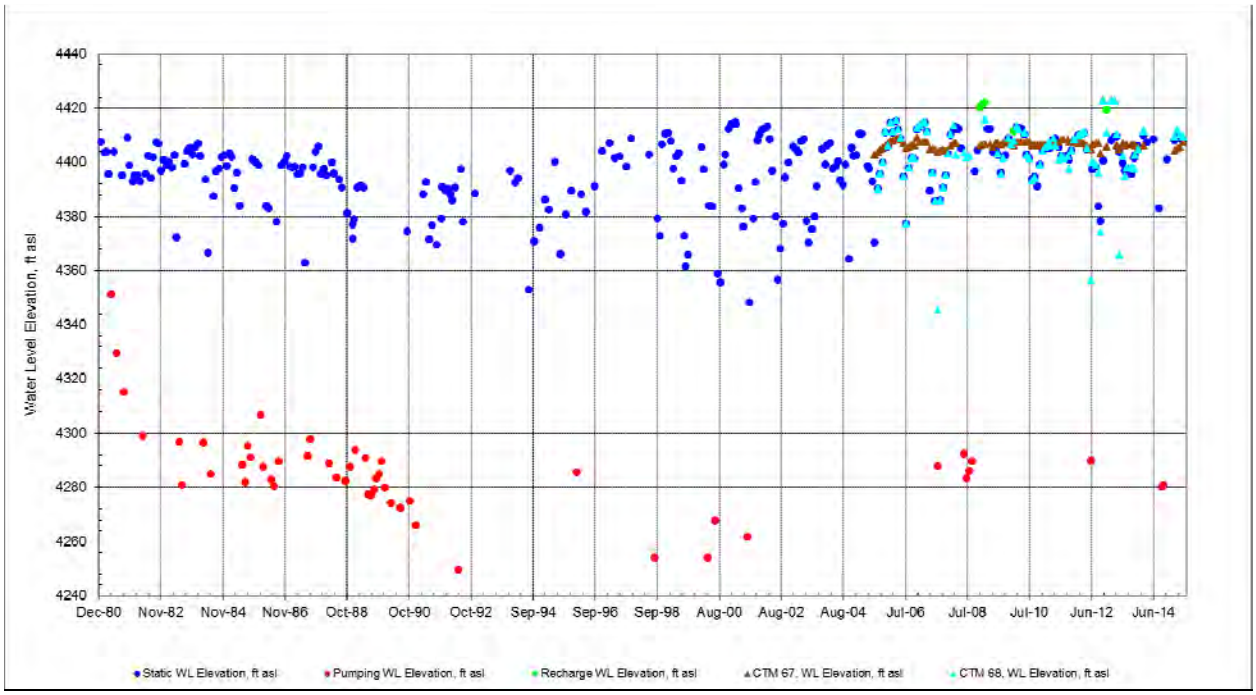


Figure 12B. Nugget Avenue Injection and Monitoring Wells - Water Level Elevations

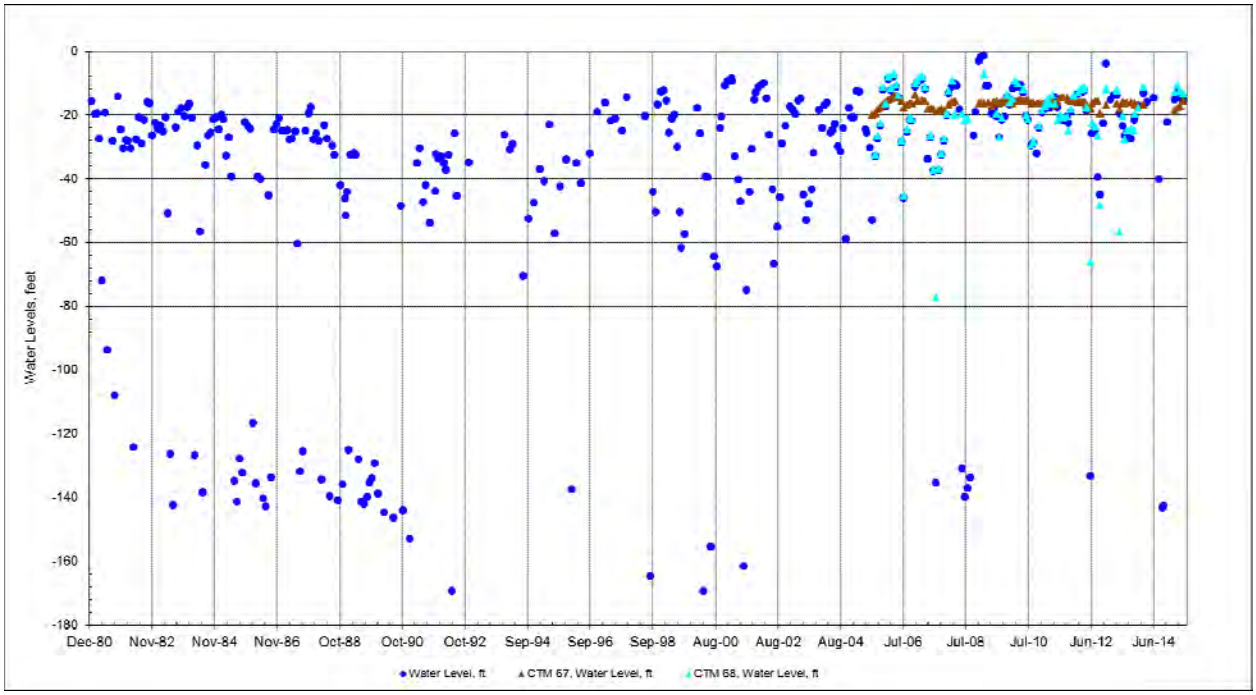


Figure 12C. Nugget Avenue Injection and Monitoring Wells - Water Levels

1.12 Greg Street Well

Greg Street Well is located SE ¼ of SE ¼ of Section 8, T.19N., R.20E., M.D.B.& M., in Washoe County.

During the first half of 2015, 197.5 acre-feet (64.4 MG) of water were injected into Greg Street Well. (Tables 1 and 2A, and Figure 13A). During the same period, 18.7 acre/ft. (6.1 MG) of water were pumped from Greg Street Well (Table 2B and Figure 13A). Monthly water level elevations for Greg Street Well and its two monitoring wells, a shallow (30 feet) and deep (290 feet) wells, are shown in Figure 13B.

Figure 13C shows water levels in the three wells. The water levels in the Greg Street shallow monitoring well are not affected by the recharge or pumping activities in the Greg Street recharge/production well. The deep monitoring well water levels have the same trend as the production/injection well.

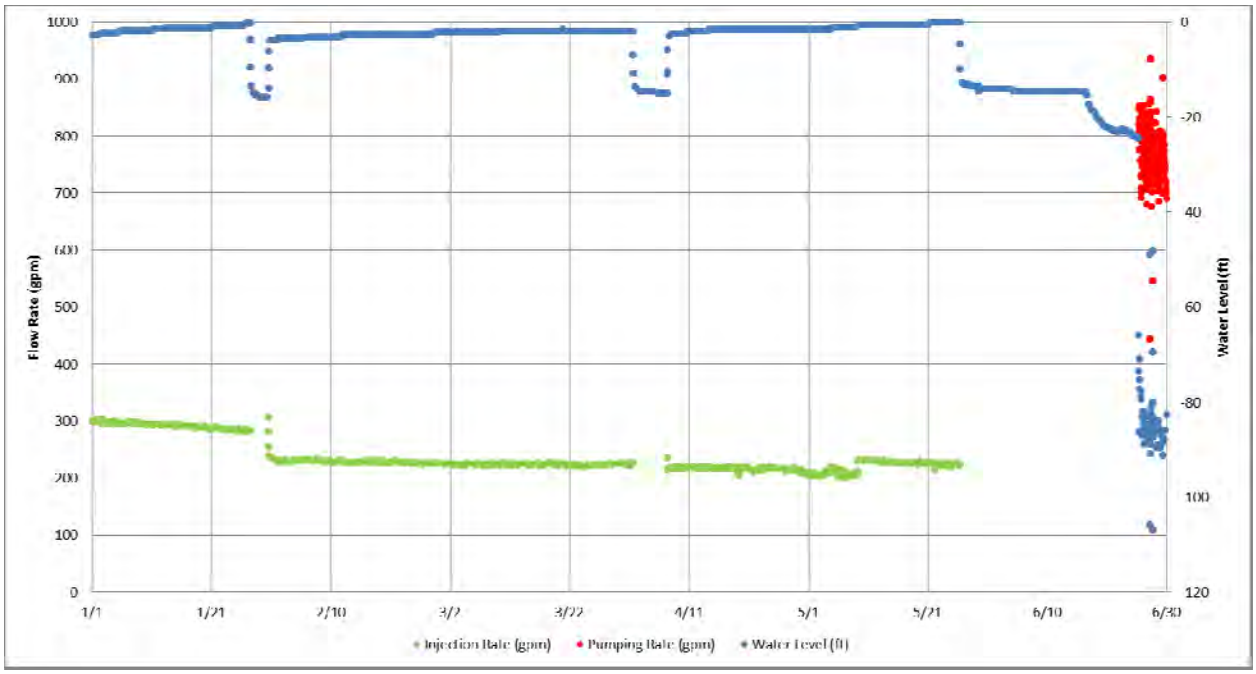


Figure 13A. Greg Street Well –Flow Rates and Water Levels, Jan to Jun 2015

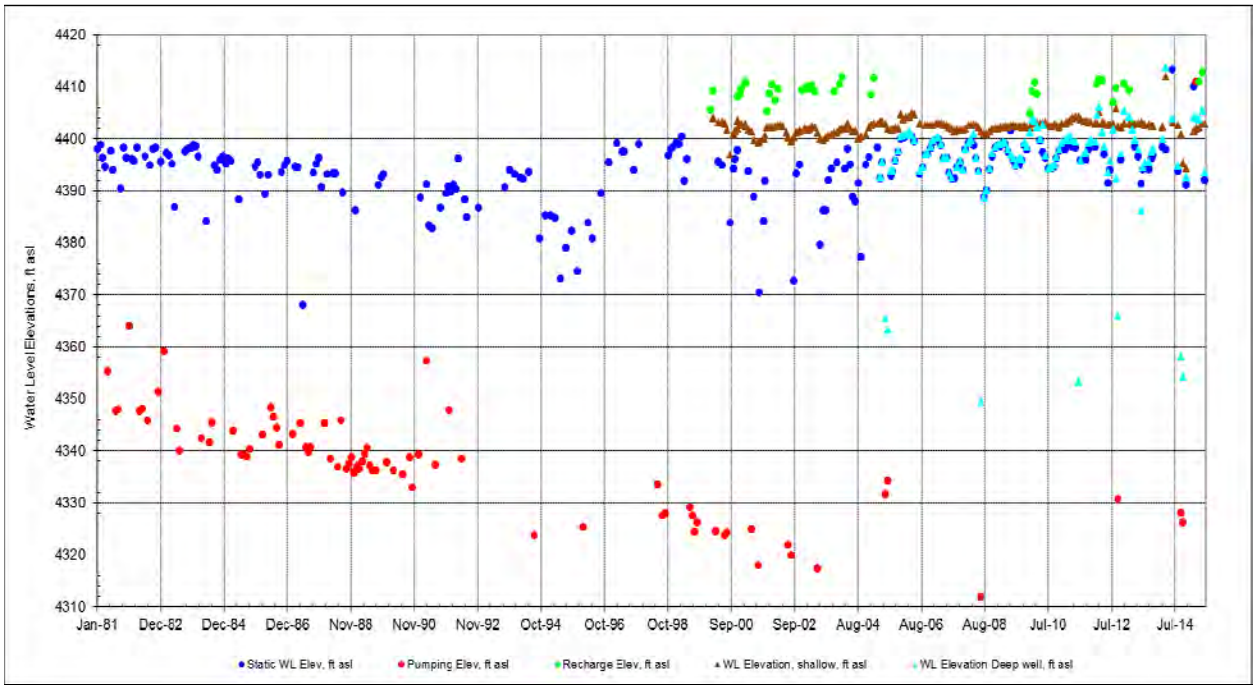


Figure 13B. Greg Street Injection and Monitoring Wells - Water Level Elevations

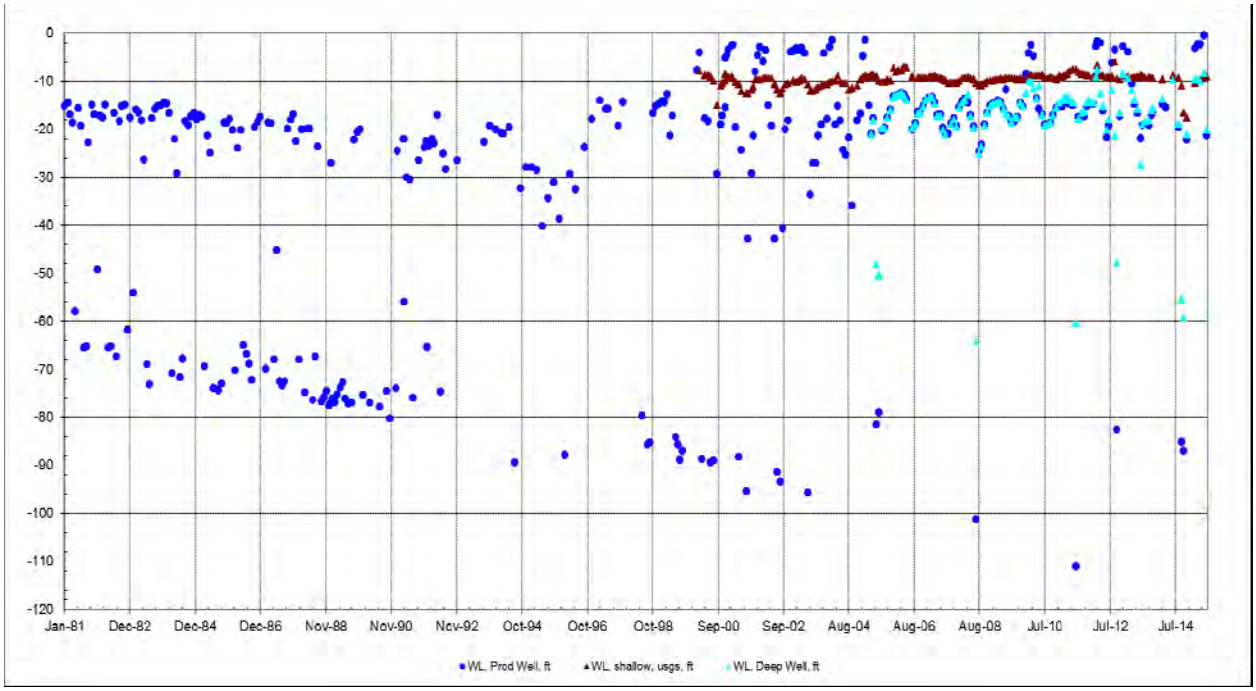


Figure 13C. Greg Street Injection and Monitoring Wells - Water Levels

1.13 Poplar #2 Well

Poplar #2 Well is located at the northwest corner of Shaber Avenue and S. 15th Street in Sparks.

During the first half of 2015, no water was injected into the Poplar #2 Well (Table 1 and Figure 14A). During the same period, 83.8 acre-feet (27.3 MG) of water were pumped from the well.

Poplar #2 Well uses two monitoring wells (CTM 74 and CTM 75), belonging to the Central Truckee Meadows Remediation District (CTMRD) as its monitoring wells. Monthly water level elevations for Poplar #2 Well and its two monitoring wells are shown in Figure 14B and their water levels are shown in Figure 14C. The deep monitoring well (CTM 75) water levels have the same trend as the production/injection well.

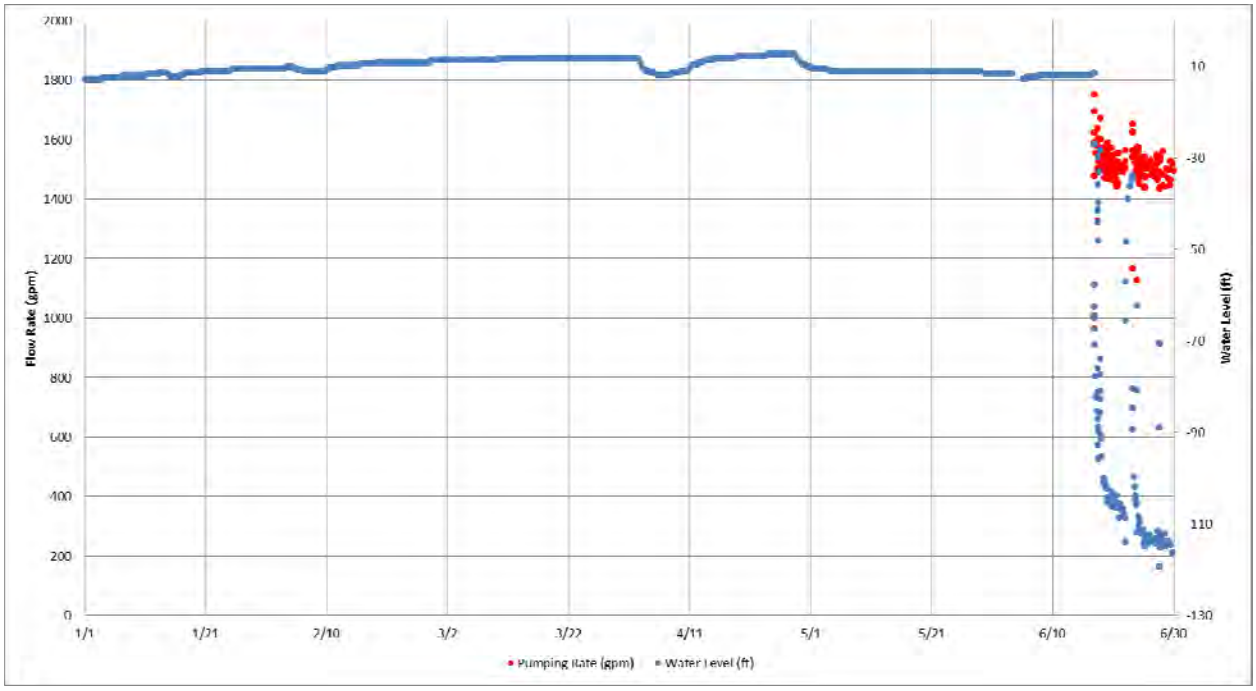


Figure 14A. Poplar #2 Well – Flow Rates and Water Levels, Jan to Jun 2015

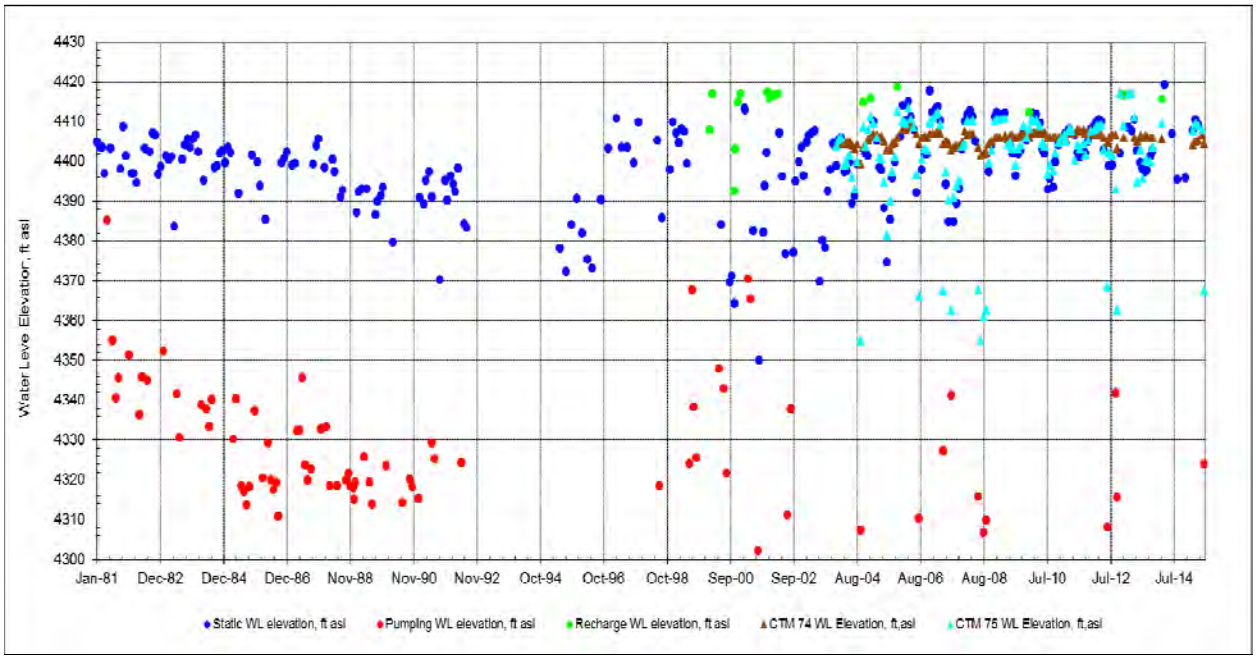


Figure 14B. Poplar #2 Injection and Monitoring Wells - Water Level Elevations

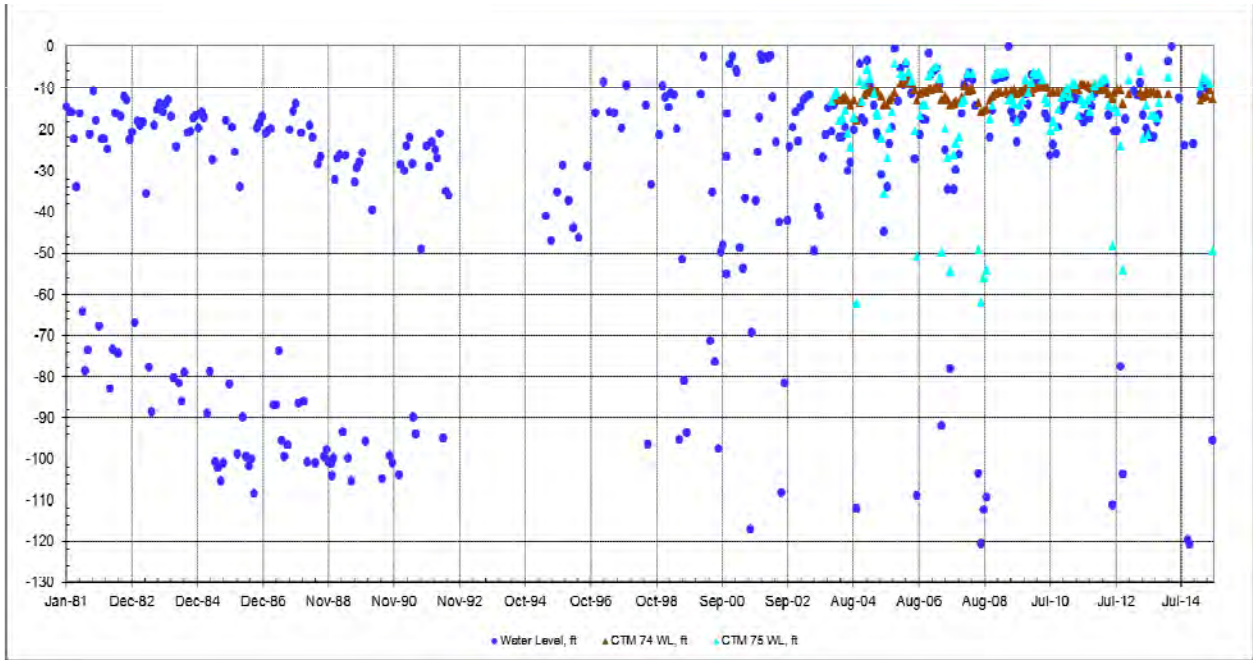


Figure 14C. Poplar #2 Injection and Monitoring Wells - Water Levels

1.14 Delucchi Lane Well

Delucchi Lane Well is situated in the NE ¼ SW ¼ of Section 31, T. 19N., R. 20E., M.D.B.&M., or at a point from which the Northwest corner of said Section 31 bears North 27° 21' 05" West, a distance of 3,067.64 feet, in Washoe County, Nevada**.**

During the first half of 2015, 124.6 acre-feet (40.6 MG) of water were injected into the Delucchi Lane Well. During the same period, 29.1 acre-feet (9.5 MG) of water were pumped from the well (Tables 1, 2A and 2B and Figure 15A).

There is no monitoring well for Delucchi Lane well. Its historical water level elevations and water levels are shown in Figures 15B and 15C, respectively.

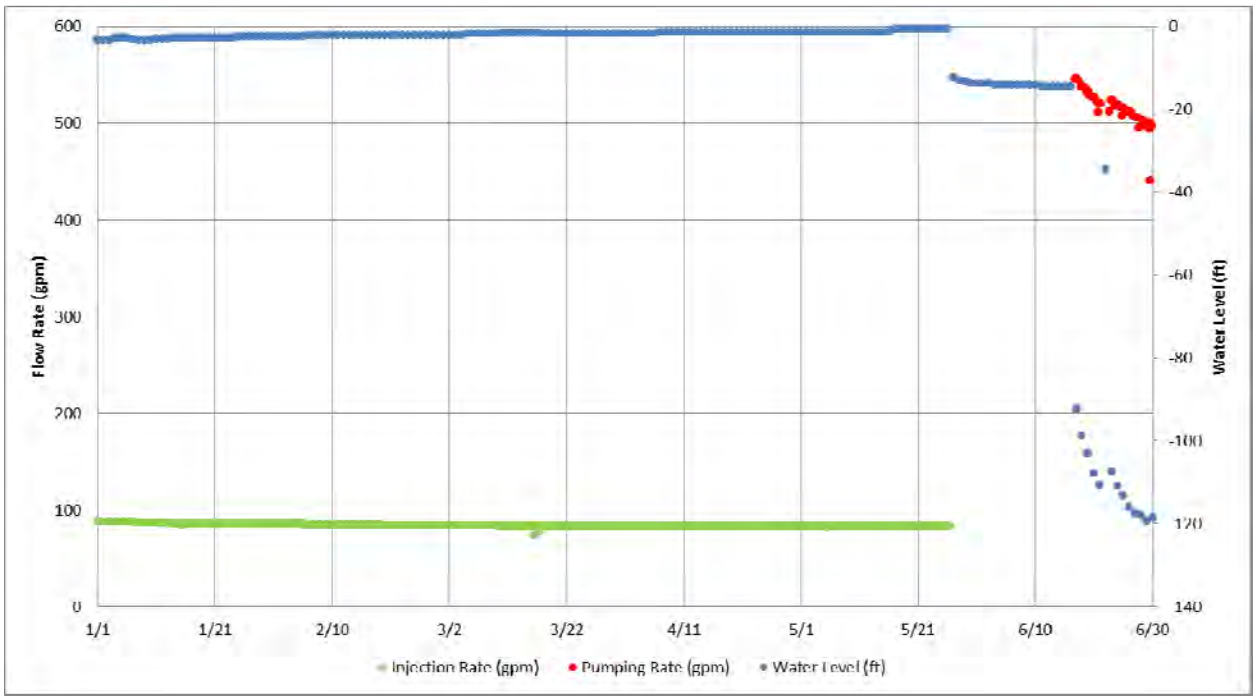


Figure 15A. Delucchi Lane Well – Flow Rates and Water Levels, 2015

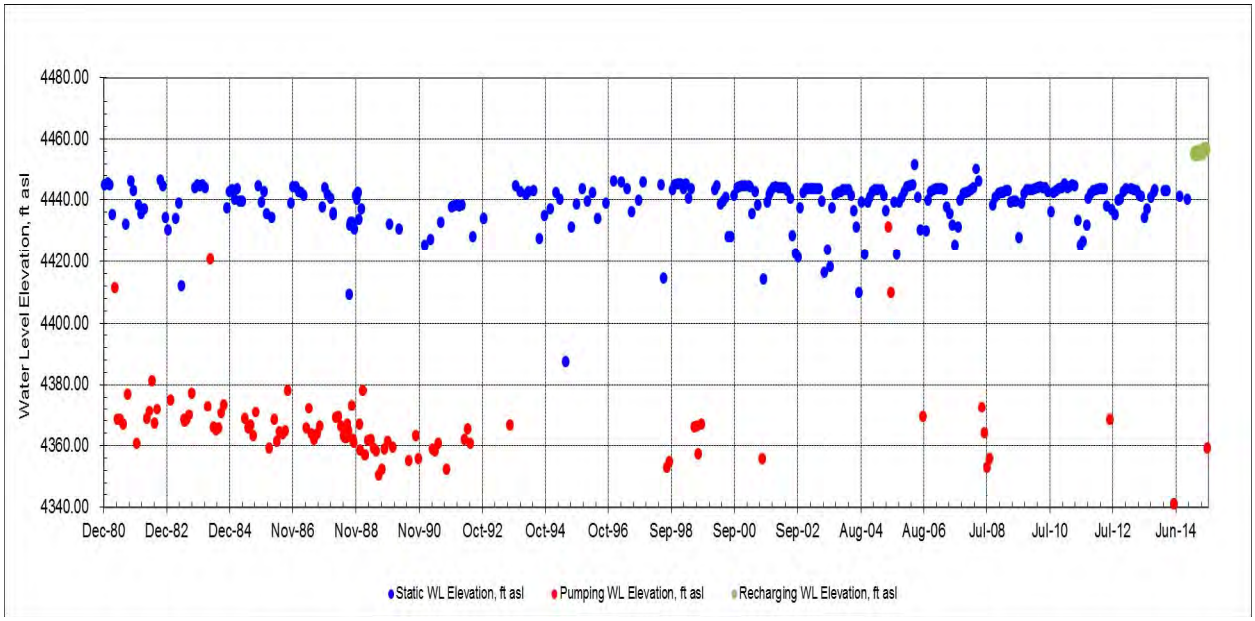


Figure 15B. Delucchi Lane Well - Water Level Elevations

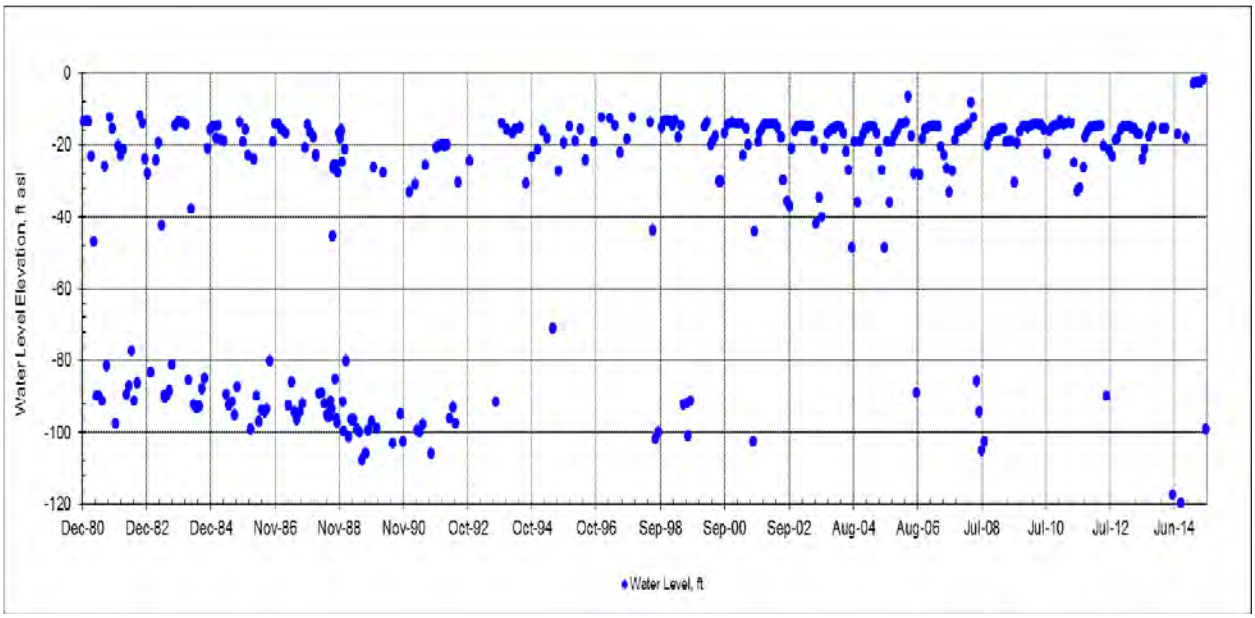


Figure 15C. Delucchi Lane Well - Water Levels

1.15 Longley Lane Well

Longley Lane Well is situated in the NE ¼ NE ¼ of Section 6, T. 18N., R. 20E., M.D.B.&M., or at a point from which the East ¼ corner of said Section 6 bears South 37° 00' 00" East, a distance of 1,772.76 feet, in Washoe County, Nevada.

During the first half of 2015, 24.4 acre-feet (8.0 MG) of water were injected into the Longley Lane Well. During the same period, 79.8 acre-feet (26.0 MG) were pumped from the well (Tables 1, 2A and 2B and Figure 16A).

Water level elevations and water levels for Longley Lane injection/production and monitoring wells are shown in Figures 16A and 16B, respectively.

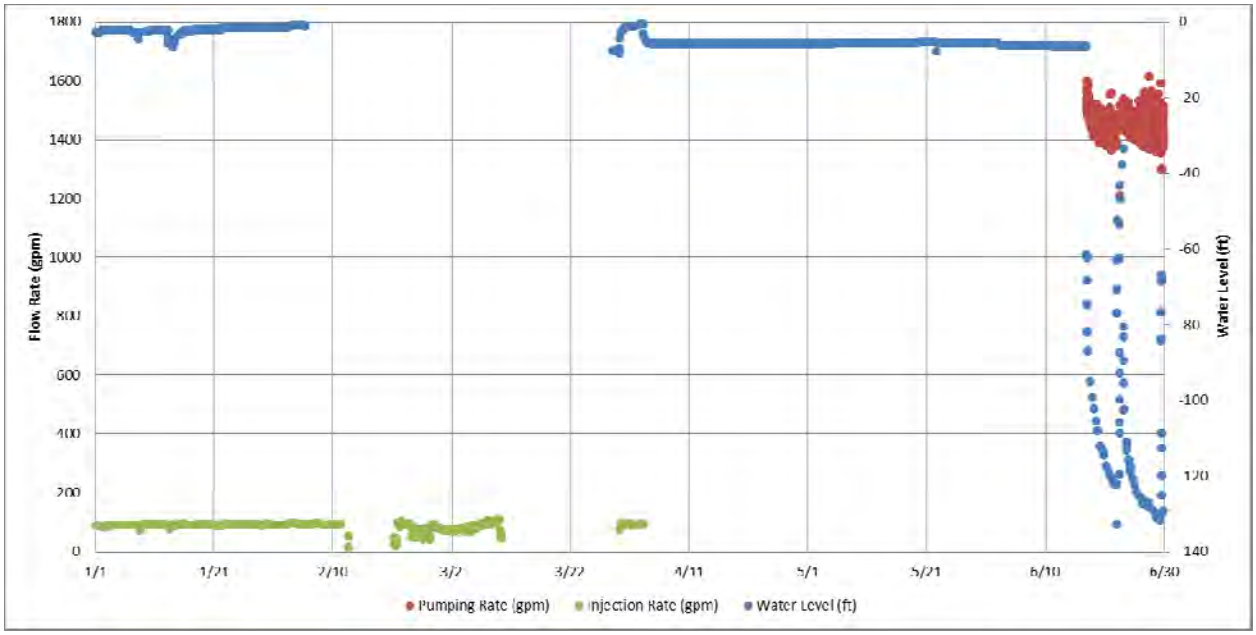


Figure 16A. Longley Lane Well – Flows Rates and Water Levels, 2015

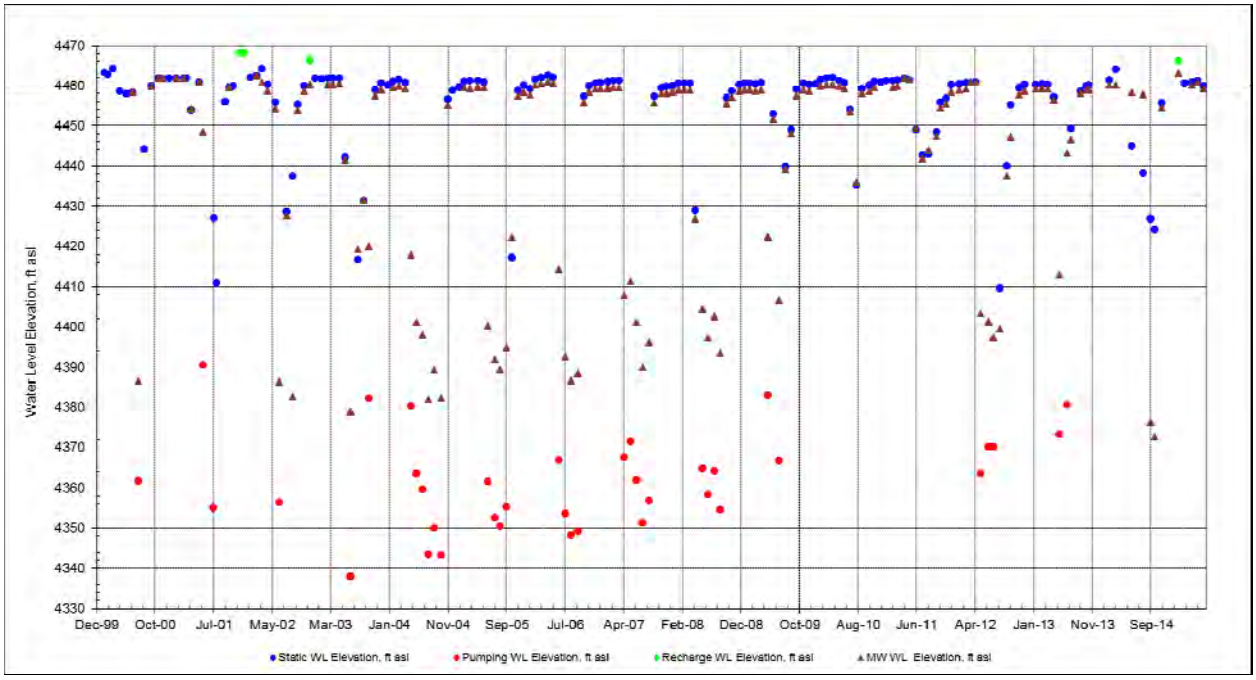


Figure 16B. Longley Lane Injection/Production and Monitoring Wells - Water Level Elevations

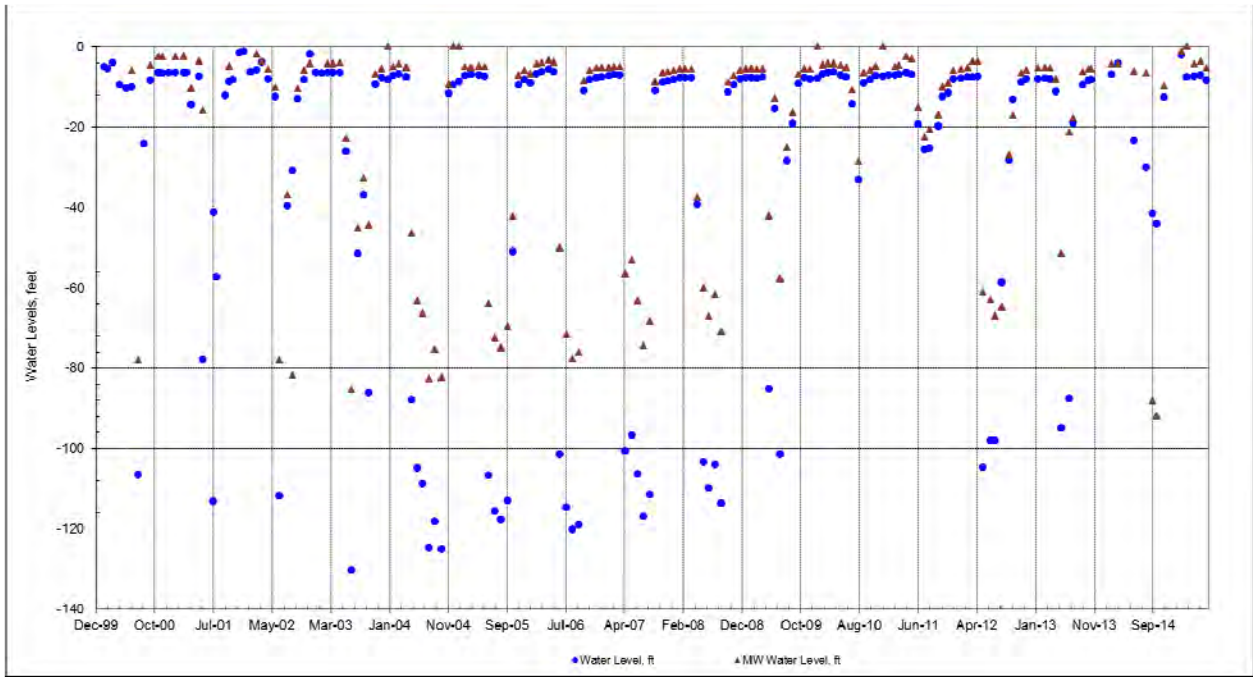


Figure 16C. Longley Lane Injection/Production and Monitoring Wells - Water Levels

1.16 Sierra Plaza Well

Sierra Plaza Well is situated in the NE ¼ SE ¼ of Section 31, T. 19N., R. 20E., M.D.B.&M., or at a point from which the East ¼ corner of Section 6, T. 18N., R.20E., bears South 14° 57'00" East, a distance of 14,933.74 feet in Washoe County, Nevada.

Sierra Plaza well was recharged for the first time during the first half of 2015. During this period, 89.6 acre-feet (29.2 MG) of water were injected into the Sierra Plaza Well. During the same period, 67.7 acre-feet (22.0 MG) were pumped from the well (Tables 1, 2A and 2B and Figure 17A).

Water level elevations and water levels for Sierra Plaza injection/production and monitoring wells are shown in Figures 17A and 17B, respectively.

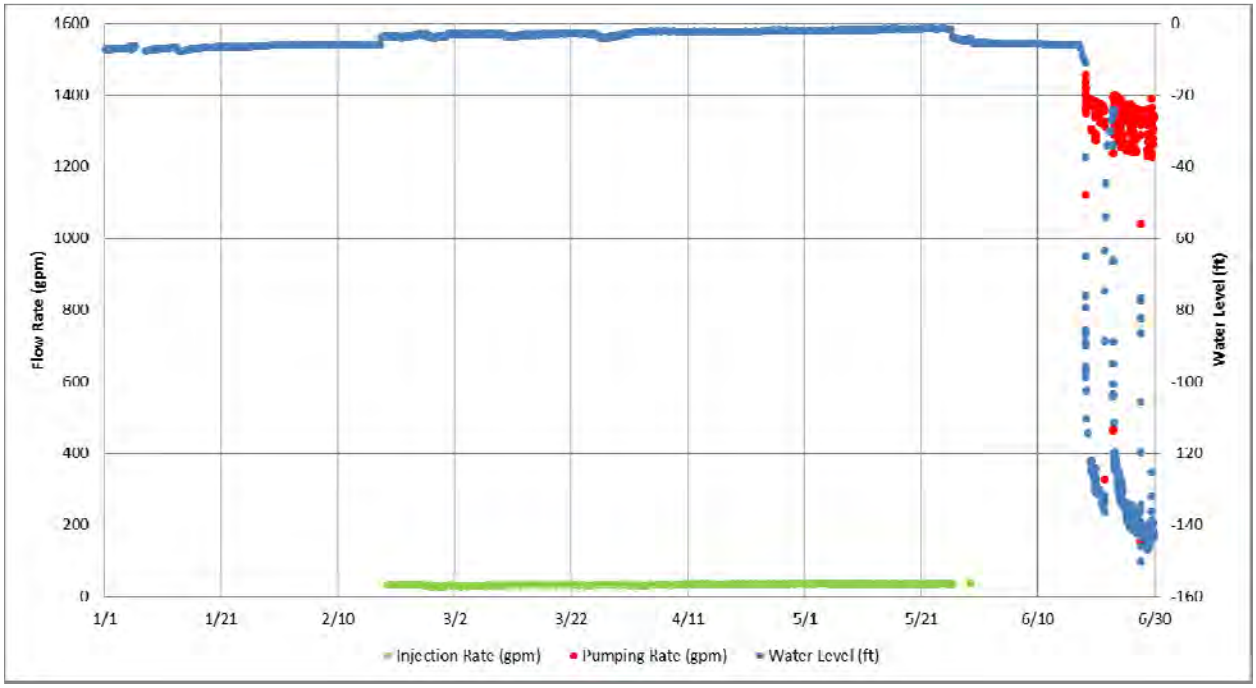


Figure 17A. Sierra Plaza Well – Flow Rates and Water Levels, 2015

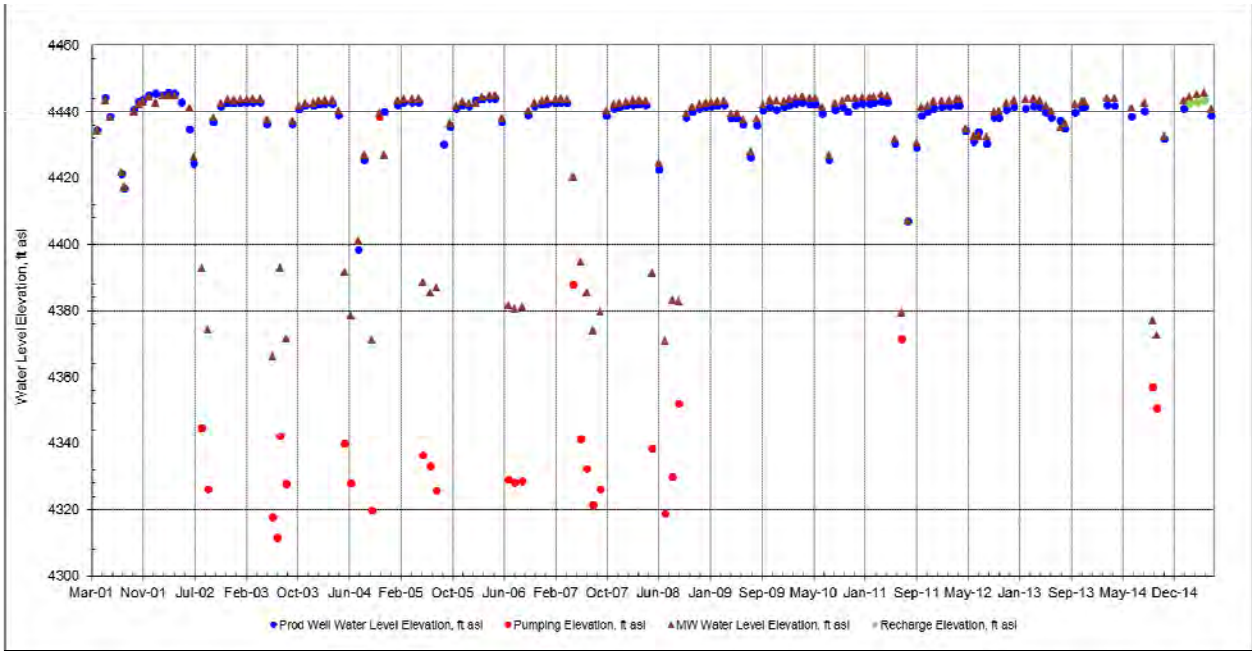


Figure 17B. Sierra Plaza Injection/Production and Monitoring Wells – Water Level Elevations

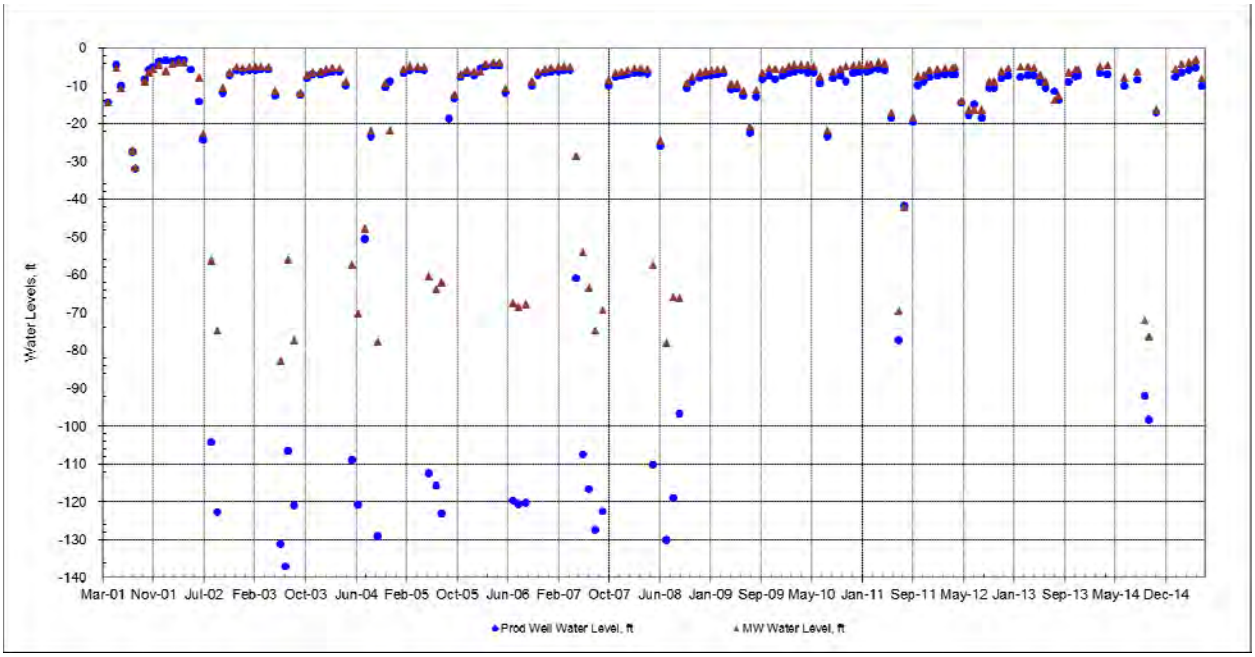


Figure 17C. Sierra Plaza Injection/Production and Monitoring Wells – Water Levels

2.0 WATER QUALITY

The injected water chemistry is shown in Appendix A with their accompanying UIC U230 Forms.

Appendix B shows the Disinfection By-Products (DBPs) concentrations for the first and second quarters, respectively, of the first half of 2015 in TMWA's West Lemmon Valley, Spanish Springs and Truckee Meadows basins distribution systems.

Residual chlorine from all the system water sampling points varies between 0.95 and 1.11 mg/L.

The chemistry of the extracted water, system DBPs and Total Coliforms meet or exceed the Nevada State Drinking Water Standards and does not show any adverse effects to the aquifer water quality from ASR activities. In addition to improving the water quantity of the basin, the water quality results are a secondary yet positive benefit of TMWA's ASR program to the Truckee Meadows basin aquifer.

3.0 CONCLUSION

The number of wells in which TMWA injects treated surface water into its Truckee Meadows wells depends on system operating requirements, facility maintenance schedules, need for water quality mitigation for each particular well, data collection and reporting requirements, and drought/non-drought year conditions. During the first half of 2015, TMWA injected water in fourteen wells: Fourth Street, Lakeside Drive, Hunter Lake, Sierra Plaza, Longley Lane, Delucchi, View Street, Greg Street, Holcomb Lane, 21st Street, Reno High, El Rancho Drive, Glen Hare, and Galletti Wells. A total of 2548.1 acre-feet (830.3 MG) of treated surface water were injected in the fourteen wells during the first half of 2015.

The chemistry of the extracted water meets the Nevada State Drinking Water Standards and does not indicate any adverse effects to the aquifer water quality from ASR activities. The system TTHM, HAA5, residual chlorine and Total Coliform concentrations all meet or exceed Nevada State Drinking Water Standards. In addition to improving the water quantity of the basin, the water quality results are a secondary yet positive benefit of TMWA's ASR program to the Truckee Meadows basin aquifer.

As shown in this report, TMWA's ASR program has successfully injected 25,108 acre-feet of water in the Truckee Meadows hydrographic basin since the program inception in 1993. By achieving its annual injection target, TMWA's ASR programs aim at enhancing drought supplies, provide opportunity to expand water supply service, and improve chemical quality of the groundwater in the Truckee Meadows hydrographic basin.

APPENDIX A: WATER QUALITY

Table A.1. Zone 1: 1Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Hunter Lake Well (HLW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production [Injection]	**Date Sampled :**	**3/26/2015** **1033 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	45.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.00766	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000346	EPA 200.8	ICP-MS
barium	mg/L	2	0.0185	EPA 200.8	ICP-MS
calcium	mg/L	-	10.0		
chloride	mg/L	400	9.69	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	0.00122	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.001	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.01	SM 4500 O C	
EC	µS/cm	at 25 degC	130	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	39.0		
iron	mg/L	0.6	<0.010	EPA 200.7	ICP
lead	mg/L	0.015	0.00311	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.40	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00355	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.62	EPA 150.1	
potassium	mg/L	-	1.5	EPA 200.7	ICP
sodium	mg/L	-	12	EPA 200.7	ICP
sulfate	mg/L	500	5.21	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.1		
total dissolved solids	mg/L	1000	84.7	EPA 160.1	
total suspended solids	mg/L	-	<5.0	EPA 160.2	
turbidity	NTU	-	0.21		
zinc	mg/L	5	0.00317	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 3/26/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Hunter Lake Well (HLW)		UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : 14,859,592.99N 2,271,273.25E		
City/Valley: Truckee Meadows		County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: February 1995		
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 480 feet		
Bottom depth of cement for last cemented casing string: 470 feet		
Screened or open hole interval (top/bottom depths): 210-300, 310-470 feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: Continuous recharge		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	3/20/15	Time Sampled :	1033 hrs
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 foot		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	Continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.62
~~S. Conductivity :~~ NTU : 0.21
Temperature : 11.1 C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES (☒) NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: [signature]	Date: 3/20/15

Attachments:

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Table A.2. Zone 2: 1Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**El Rancho Well (ERW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production **Injection**	**Date Sampled :**	**3/26/2015** **1155 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	46.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.0106	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000227	EPA 200.8	ICP-MS
barium	mg/L	2	0.02	EPA 200.8	ICP-MS
calcium	mg/L	-	9.60		
chloride	mg/L	400	9.70	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	0.00299	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	9.19	SM 4500 O C	
EC	µS/cm	at 25 degC	131	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	40.0		
iron	mg/L	0.6	<0.010	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.90	EPA 200.7	
manganese	mg/L	0.1	0.0166	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00339	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.64	EPA 150.1	
potassium	mg/L	-	1.5	EPA 200.7	ICP
sodium	mg/L	-	12	EPA 200.7	ICP
sulfate	mg/L	500	5.22	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.8		
total dissolved solids	mg/L	1000	84.9	EPA 160.1	
total suspended solids	mg/L	-	<5.0	EPA 160.2	
turbidity	NTU	-	0.66		
zinc	mg/L	5	0.00477	EPA 200.8	ICP-MS

Comments:

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Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 3/26/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: El Rancho Well (ERW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR20ES06	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: September 18, 1992	
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other: _____
Total depth of well: 375 feet	
Bottom depth of cement for last cemented casing string: 140 feet	
Screened or open hole interval (top/bottom depths): 360-299, 260-250, 207-142 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: Recharging all month	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	3/26/15	Time Sampled :	1155 hrs
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 foot		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.64
~~S. Conductivity :~~ NTU : 0.600
Temperature : 11.8 °C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: Will Raymond	Date: 3/26/15

Attachments:

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Table A.3. Zone 3: 1Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**South 21st Street Well (S21)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production [Injection]	**Date Sampled :**	**3/26/2015** **1220 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	47.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.00845	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000221	EPA 200.8	ICP-MS
barium	mg/L	2	0.019	EPA 200.8	ICP-MS
calcium	mg/L	-	8.80		
chloride	mg/L	400	9.70	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.001	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	9.29	SM 4500 O C	
EC	µS/cm	at 25 degC	130	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	38.0		
iron	mg/L	0.6	<0.010	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.90	EPA 200.7	
manganese	mg/L	0.1	0.00236	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00256	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.92	EPA 150.1	
potassium	mg/L	-	1.4	EPA 200.7	ICP
sodium	mg/L	-	12	EPA 200.7	ICP
sulfate	mg/L	500	5.24	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.2		
total dissolved solids	mg/L	1000	84.7	EPA 160.1	
total suspended solids	mg/L	-	<5.0	EPA 160.2	
turbidity	NTU	-	0.41		
zinc	mg/L	5	0.00377	EPA 200.8	ICP-MS

Comments:

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Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 3/26/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: South 21st Street Well		UIC Permit No.:UNEV92200
Is there any well name or identification at the wellhead?	☐ YES ☒ NO	If no, label should be placed on or near wellhead
Project/Facility Name:Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) :T19NR20ES07		
City/Valley:Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (X ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☐ Other ___Quarterly_____		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (X Municipal Water Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: April 1, 1991		
Diameter of casing: 16"	Type of Casing: (X Steel) PVC Other:_____	
Total depth of well: 250 feet		
Bottom depth of cement for last cemented casing string: 116 feet		
Screened or open hole interval (top/bottom depths): 245-180, 170-140, 130-120 feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: Recharging all month		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	3/26/15	Time Sampled :	1225 W3
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 ft		
Type of Sample (circle one) :	(X Grab) Composite ~~other~~ (specify):		
Collection method (circle one) :	well bailed (X water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.92
~~S. Conductivity :~~ NTU : 0.41
Temperature : 11.2

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**: As per Attachment B of the permit____

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded?	☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.:775-834-8138	eMail Address: wraymond@tmwa.com
Signature: W Raymond	Date: 3/26/15

Attachments:

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Table A.4. Zone 4: 1Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Lakeside Well (LKS)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production Injection	**Date Sampled :**	**3/26/2015** **1010 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	47.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.00755	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000346	EPA 200.8	ICP-MS
barium	mg/L	2	0.0177	EPA 200.8	ICP-MS
calcium	mg/L	-	10.8		
chloride	mg/L	400	10.1	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	0.00161	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	9.19	SM 4500 O C	
EC	µS/cm	at 25 degC	130	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	38.0		
iron	mg/L	0.6	<0.010	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	2.70	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00312	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.59	EPA 150.1	
potassium	mg/L	-	1.4	EPA 200.7	ICP
sodium	mg/L	-	12	EPA 200.7	ICP
sulfate	mg/L	500	5.19	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.2		
total dissolved solids	mg/L	1000	84.5	EPA 160.1	
total suspended solids	mg/L	-	<5.0	EPA 160.2	
turbidity	NTU	-	0.27		
zinc	mg/L	5	0.0034	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	3/26/15	Time Sampled :	10:10 hrs
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		
FIELD MEASUREMENTS pH : 7.59 ~~S. Conductivity :~~ NTU : 0.27 Temperature : 11.2 C			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES (☒) NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: Will Raymond	Date: 3/26/15

Attachments:

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Bureau of Water Pollution Control
Underground Injection Control Program
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Carson City Nevada 89701
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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 3/26/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Lakeside Drive Well (LKS)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR19ES35	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: October 15, 1991	
Diameter of casing: 12.75"	Type of Casing: (Steel) PVC Other:
Total depth of well: 400 feet	
Bottom depth of cement for last cemented casing string: 60 feet	
Screened or open hole interval (top/bottom depths): 400-180 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: continuously recharging	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

UIC Form 230 (06-01-10) **Page 1 of 2**

Table A.5. Zone 1: 2Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Hunter Lake Well (HLW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production [Injection]	**Date Sampled :**	**4/28/2015** **1420 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	50	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.0201	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000477	EPA 200.8	ICP-MS
barium	mg/L	2	<0.0010	EPA 200.8	ICP-MS
calcium	mg/L	-	9.6		
chloride	mg/L	400	9.0	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0010	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.0	SM 4500 O C	
EC	µS/cm	at 25 degC	131.5	SM 2510 B	
fluoride	mg/L	4	0.214	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	40		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.88	EPA 200.7	
manganese	mg/L	0.1	<0.0010	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.00010	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00433	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.41	EPA 150.1	
potassium	mg/L	-	1.4	EPA 200.7	ICP
sodium	mg/L	-	13	EPA 200.7	ICP
sulfate	mg/L	500	5.1	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.5		
total dissolved solids	mg/L	1000	85.6	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
turbidity	NTU	-	0.94		
zinc	mg/L	5	0.0021	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 4/28/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Hunter Lake Well (HLW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : 14,859,592.99N 2,271,273.25E	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: February 1995	
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other: _____
Total depth of well: 480 feet	
Bottom depth of cement for last cemented casing string: 470 feet	
Screened or open hole interval (top/bottom depths): 210-300, 310-470 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: Recharging all month	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES (☒) NO
Was well in an artesian condition prior to sampling? :	☐ YES (☒) NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 4/28/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Hunter Lake Well (HLW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : 14,859,592.99N 2,271,273.25E	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: February 1995	
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other:_____
Total depth of well: 480 feet	
Bottom depth of cement for last cemented casing string: 470 feet	
Screened or open hole interval (top/bottom depths): 210-300, 310-470 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: recharging all month	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

Table A.6. Zone 2: 2Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**View Street Well (VSW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production [Injection]	**Date Sampled :**	**4/22/2015** **1125 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	49	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000437	EPA 200.8	ICP-MS
barium	mg/L	2	0.0205	EPA 200.8	ICP-MS
calcium	mg/L	-	10.8		
chloride	mg/L	400	19.7	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0010	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0010	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.57	SM 4500 O C	
EC	µS/cm	at 25 degC	130	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	42		
iron	mg/L	0.6	<0.020	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.64	EPA 200.7	
manganese	mg/L	0.1	<0.0010	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.00010	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00425	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.31	EPA 150.1	
potassium	mg/L	-	1.5	EPA 200.7	ICP
sodium	mg/L	-	13	EPA 200.7	ICP
sulfate	mg/L	500	8.14	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	12.8		
total dissolved solids	mg/L	1000	84.5	EPA 160.1	
total suspended solids	mg/L	-	<5.0	EPA 160.2	
turbidity	NTU	-	0.20		
zinc	mg/L	5	0.00318	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 4/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: South 21st Street Well		UIC Permit No.:UNEV92200
Is there any well name or identification at the wellhead?	☐ YES ☒ NO	If no, label should be placed on or near wellhead
Project/Facility Name:Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) :T19NR20ES07		
City/Valley:Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (X ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☐ Other ___Quarterly_____		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (X Municipal Water Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: April 1, 1991		
Diameter of casing: 16"	Type of Casing: (X Steel) PVC Other:_____	
Total depth of well: 250 feet		
Bottom depth of cement for last cemented casing string: 116 feet		
Screened or open hole interval (top/bottom depths): 245-180, 170-140, 130-120 feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: recharging 14 OF previous 21 days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

UIC Form 230 (06-01-10) **Page 1 of 2**

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	4-22-15	Time Sampled :	1125 WS
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 ft		
Type of Sample (circle one) :	(X Grab) Composite ~~other~~ (specify):		
Collection method (circle one) :	well bailed (X water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was ~~discharged~~ / purged before collecting sample? :	Continuous recharge		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		
FIELD MEASUREMENTS pH : 7.31 ~~S. Conductivity :~~ NTU : 0.20 Temperature : 12.8			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**: As per Attachment B of the permit____			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES ☒ NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.:775-834-8138	eMail Address: wraymond@tmwa.com
Signature: WRaymond	Date: 4-22-15

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.7. Zone 3: 2Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**South 21st Street Well (S21)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production Injection	**Date Sampled :**	**4/22/2015** **1155 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	54	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.00086	EPA 200.8	ICP-MS
barium	mg/L	2	0.0237	EPA 200.8	ICP-MS
calcium	mg/L	-	14.0		
chloride	mg/L	400	11.9	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0010	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	0.00112	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.97	SM 4500 O C	
EC	µS/cm	at 25 degC	186	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	66		
iron	mg/L	0.6	<0.020	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	7.52	EPA 200.7	
manganese	mg/L	0.1	<0.0010	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.00010	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.00477	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.22	EPA 150.1	
potassium	mg/L	-	1.8	EPA 200.7	ICP
sodium	mg/L	-	14	EPA 200.7	ICP
sulfate	mg/L	500	40.3	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	12.0		
total dissolved solids	mg/L	1000	121	EPA 160.1	
total suspended solids	mg/L	-	<5.0	EPA 160.2	
turbidity	NTU	-	0.16		
zinc	mg/L	5	0.00411	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 4/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: View Street Well (VSW)		UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T19NR20ES06		
City/Valley: Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: January 4, 1969		
Diameter of casing: 18"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 530 feet		
Bottom depth of cement for last cemented casing string: 140 feet		
Screened or open hole interval (top/bottom depths): 518-502, 484-474, 468-450, 432-397, 390-356 (12"), 298-288, 284-244, 236-206, 190-182, 176-166, 162-148 (18") feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: Recharging for previous 22 days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

UIC Form 230 (06-01-10) **Page 1 of 2**

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	4/22/15	Time Sampled :	1155
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	Sample tap <1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		
FIELD MEASUREMENTS pH : 7.22 ~~S. Conductivity :~~ NTU : 0.16 Temperature : 12.0°C			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES (☒) NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: WRaymond	Date: 4/22/15

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.8. Zone 4: 2Q2015 Injected Water Chemistry

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Lakeside Well (LKS)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	Will Raymond
Type of Well :	Monitor Production Injection	**Date Sampled :**	**4/28/2015** **1355 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	50	SM 2320 B	
aluminum	mg/L	0.05-0.2	0.0203	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.000451	EPA 200.8	ICP-MS
barium	mg/L	2	0.0207	EPA 200.8	ICP-MS
calcium	mg/L	-	10.4		
chloride	mg/L	400	9.0	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	0.00111	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0010	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.8	SM 4500 O C	
EC	µS/cm	at 25 degC	132	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
hardness (as $CaCO_3$)	mg/L	-	40		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.39	EPA 200.7	
manganese	mg/L	0.1	<0.0010	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.00010	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.0043	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.81	EPA 150.1	
potassium	mg/L	-	1.4	EPA 200.7	ICP
sodium	mg/L	-	13	EPA 200.7	ICP
sulfate	mg/L	500	5.1	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.7		
total dissolved solids	mg/L	1000	85.6	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
turbidity	NTU	-	0.26		
zinc	mg/L	5	0.00276	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 4/28/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Lakeside Drive Well (LKS)		UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T19NR19ES35		
City/Valley: Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: October 15, 1991		
Diameter of casing: 12.75"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 400 feet		
Bottom depth of cement for last cemented casing string: 60 feet		
Screened or open hole interval (top/bottom depths): 400-180 feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: recharging all month		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	4/28/15	Time Sampled :	1355 hrs
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	continuously recharging		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.81
~~S. Conductivity :~~ NTU : 0.24
Temperature : 13.7

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES (☒) NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: WRaymond	Date: 4/28/15

Attachments:

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Table A.9. Zone 1: 2Q2015 Extracted Water Chemistry – Glen Hare

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Glen Hare Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	KB
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/23/2015** **1147 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	65.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.00122	EPA 200.8	ICP-MS
barium	mg/L	2	0.0270	EPA 200.8	ICP-MS
calcium	mg/L	-	16.8		
chloride	mg/L	400	9.61	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	10.1	SM 4500 O C	
EC	µS/cm	at 25 degC	195	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	73		
iron	mg/L	0.6	<0.020	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	7.50	EPA 200.7	
manganese	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0002	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.0100	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	0.380	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.45	EPA 150.1	
potassium	mg/L	-	2.00	EPA 200.7	ICP
sodium	mg/L	-	15.0	EPA 200.7	ICP
sulfate	mg/L	500	17.3	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.1		
total dissolved solids	mg/L	1000	127	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	66.0	EPA 524.2	
turbidity	NTU	-	0.45		
zinc	mg/L	5	<0.0100	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/23/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Glen Hare Well (GHW)		UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T19NR19E		
City/Valley: Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: July 2, 1999		
Diameter of casing: 18"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 470 feet		
Bottom depth of cement for last cemented casing string: 120 feet		
Screened or open hole interval (top/bottom depths): 441-421(16"), 411-246 (16"), 241-221 (16"), 200-180 ft		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: in production for 6 previous days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/23/15	Time Sampled :	1147
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	In production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.45
~~S. Conductivity :~~ NTU : 0.45
Temperature : 13.1

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature:	Date:

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.10. Zone 1: 2Q2015 Extracted Water Chemistry – Hunter Lake

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Hunter Lake Well (HLW)**	**Depth of sampled water's origin :**		
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe	
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude	Longitude
Well ID # :		**Sampler :**	WR/JG	
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/22/2015**	**1055 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM	

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	71.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.002	EPA 200.8	ICP-MS
barium	mg/L	2	0.024	EPA 200.8	ICP-MS
calcium	mg/L	-	16.0		
chloride	mg/L	400	11.0	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.001	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.30	SM 4500 O C	
EC	µS/cm	at 25 degC	260	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	64.3		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	5.90	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	0.460	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.13	EPA 150.1	
potassium	mg/L	-	2.10	EPA 200.7	ICP
sodium	mg/L	-	17.0	EPA 200.7	ICP
sulfate	mg/L	500	14.0	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.5		
total dissolved solids	mg/L	1000	110	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	64.0	EPA 524.2	
turbidity	NTU	-	0.23		
zinc	mg/L	5	<0.01	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
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901 S. Stewart St Ste 4001
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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Hunter Lake Well (HLW)		UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : 14,859,592.99N 2,271,273.25E		
City/Valley: Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: February 1995		
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 480 feet		
Bottom depth of cement for last cemented casing string: 470 feet		
Screened or open hole interval (top/bottom depths): 210-300, 310-470 feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: in production 7 of last 7 days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/22/15	Time Sampled :	1055
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 foot		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		
FIELD MEASUREMENTS pH : 7.13 ~~S. Conductivity :~~ NTU : 0.23 Temperature : 11.5°C			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES ☒ NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			
FORM PREPARATION			
Project Manager: Christian Kropf			
Company: Truckee Meadows Water Authority			
Telephone No.: 775-834-8016	eMail Address: ckropf@tmwa.com		
Signature:	Date:		
Qualified Sample Person: Will Raymond			
Company: Truckee Meadows Water Authority			
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com		
Signature: WRaymond	Date: 6/22/15		

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.11. Zone 1: 2Q2015 Extracted Water Chemistry – Reno High

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Reno High Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	WR/JG
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/22/2015** **1025 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	79.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	<0.001	EPA 200.8	ICP-MS
barium	mg/L	2	0.027	EPA 200.8	ICP-MS
calcium	mg/L	-	19.0		
chloride	mg/L	400	10.0	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	0.003	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	7.60	SM 4500 O C	
EC	µS/cm	at 25 degC	290	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	74.7		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	6.60	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.003	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	0.680	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.18	EPA 150.1	
potassium	mg/L	-	2.30	EPA 200.7	ICP
sodium	mg/L	-	17.0	EPA 200.7	ICP
sulfate	mg/L	500	20.0	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	12.5		
total dissolved solids	mg/L	1000	140	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	54.0	EPA 524.2	
turbidity	NTU	-	0.10		
zinc	mg/L	5	0.01	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Reno High Well (RHW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR19ES15	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: June 6, 1991	
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other: _____
Total depth of well: 456 feet	
Bottom depth of cement for last cemented casing string: 1750 feet	
Screened or open hole interval (top/bottom depths): 420-380, 370-240, 230-1800 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: In production for previous 6 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/22/15	Time Sampled :	1025 WS
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 foot		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	In production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.18
~~S. Conductivity :~~ NTU : 0.10
Temperature : 12.5

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: WRaymond	Date: 6/22/15

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.12. Zone 2: 2Q2015 Extracted Water Chemistry – Fourth Street

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Fourth Street Well**		**Depth of sampled water's origin :**		
Facility Owner:	Truckee Meadows Water Authority		**County:**	Washoe	
NDEP UIC Permit # :	UNEV92200		**Location :**	Latitude	Longitude
Well ID # :			**Sampler :**	JB/CM	
Type of Well :	Monitor [Production] Injection		**Date Sampled :**	**6/23/2015**	**0637 hrs**
			Name of Laboratory :	TMWA, Wetlab, SEM	

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	52	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	<0.0010	EPA 200.8	ICP-MS
barium	mg/L	2	<0.0215	EPA 200.8	ICP-MS
calcium	mg/L	-	11.2		
chloride	mg/L	400	9.85	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	10.4	SM 4500 O C	
EC	µS/cm	at 25 degC	140	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	50		
iron	mg/L	0.6	<0.020	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	5.30	EPA 200.7	
manganese	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0002	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.0100	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.89	EPA 150.1	
potassium	mg/L	-	2.00	EPA 200.7	ICP
sodium	mg/L	-	15.0	EPA 200.7	ICP
sulfate	mg/L	500	5.78	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.1		
total dissolved solids	mg/L	1000	89.2	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	69.0	EPA 524.2	
turbidity	NTU	-	0.21		
zinc	mg/L	5	<0.0100	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/23/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Fourth Street Well (FSW)		UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T19NR19ES12		
City/Valley: Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: October 26, 1971		
Diameter of casing: 18"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 456 feet		
Bottom depth of cement for last cemented casing string: 168 feet		
Screened or open hole interval (top/bottom depths): 456-438, 434-406, 396-350 (12☺, 344-334, 304-274, 270-250, 239-216, 213-176 (18") feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: in production for previous 5 days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES (☒) NO	
Was well in an artesian condition prior to sampling? :	☐ YES (☒) NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/23/15	Time Sampled :	0637 WJ
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.89
~~S. Conductivity :~~ NTU : 0.21
Temperature : 13.1°C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature:	Date:

Attachments:

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Table A.13. Zone 2: 2Q2015 Extracted Water Chemistry – View Street

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**View Street Well (VSW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	KB
Type of Well :	Monitor **Production** Injection	**Date Sampled :**	**6/23/2015** **1014 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	50.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.00213	EPA 200.8	ICP-MS
barium	mg/L	2	0.0206	EPA 200.8	ICP-MS
calcium	mg/L	-	10.8		
chloride	mg/L	400	9.58	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	9.95	SM 4500 O C	
EC	µS/cm	at 25 degC	135	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	41		
iron	mg/L	0.6	<0.020	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.40	EPA 200.7	
manganese	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0002	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.0100	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.38	EPA 150.1	
potassium	mg/L	-	1.6	EPA 200.7	ICP
sodium	mg/L	-	12	EPA 200.7	ICP
sulfate	mg/L	500	5.31	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	10.5		
total dissolved solids	mg/L	1000	87.9	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	60.0	EPA 524.2	
turbidity	NTU	-	0.28		
zinc	mg/L	5	<0.0100	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/23/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: View Street Well (VSW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR20ES06	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: January 4, 1969	
Diameter of casing: 18"	Type of Casing: (Steel) PVC Other:
Total depth of well: 530 feet	
Bottom depth of cement for last cemented casing string: 140 feet	
Screened or open hole interval (top/bottom depths): 518-502, 484-474, 468-450, 432-397, 390-356 (12"), 298-288, 284-244, 236-206, 190-182, 176-166, 162-148 (18") feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: producing water 6 of previous 7 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES (☒) NO
Was well in an artesian condition prior to sampling? :	☐ YES (☒) NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/23/15	Time Sampled :	1014
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	Sample tap <1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	IN production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.30
~~S. Conductivity :~~ NTU : 0.28
Temperature : 10.5

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature:	Date:

Attachments:

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Table A.14. Zone 2: 2Q2015 Extracted Water Chemistry – El Rancho

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**El Rancho Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	JB/CM
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/23/2015** **0655 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	53.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.00135	EPA 200.8	ICP-MS
barium	mg/L	2	0.0228	EPA 200.8	ICP-MS
calcium	mg/L	-	12.4		
chloride	mg/L	400	11.8	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	10.9	SM 4500 O C	
EC	µS/cm	at 25 degC	155	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	22.0	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	46		
iron	mg/L	0.6	0.240	EPA 200.7	ICP
lead	mg/L	0.015	0.00130	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.60	EPA 200.7	
manganese	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0002	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.0100	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.3	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.78	EPA 150.1	
potassium	mg/L	-	1.60	EPA 200.7	ICP
sodium	mg/L	-	13.0	EPA 200.7	ICP
sulfate	mg/L	500	10.0	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.2		
total dissolved solids	mg/L	1000	101	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	79.0	EPA 524.2	
turbidity	NTU	-	0.22		
zinc	mg/L	5	0.0106	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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Underground Injection Control Program
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Carson City Nevada 89701
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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/23/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: El Rancho Well (ERW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR20ES06	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: September 18, 1992	
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other:
Total depth of well: 375 feet	
Bottom depth of cement for last cemented casing string: 140 feet	
Screened or open hole interval (top/bottom depths): 360-299, 260-250, 207-142 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: In production 4 of previous 60 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES (☒) NO
Was well in an artesian condition prior to sampling? :	☐ YES (☒) NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/23/15	Time Sampled :	0655 WS
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 foot		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.78
~~S. Conductivity :~~ NTU : 0.22
Temperature : 13.2°C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature:	Date:

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.15. Zone 3: 2Q2015 Extracted Water Chemistry – Galletti Way

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Galletti Way Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	WR
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/25/2015** **1445 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	54.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.00121	EPA 200.8	ICP-MS
barium	mg/L	2	0.0242	EPA 200.8	ICP-MS
calcium	mg/L	-	11.0		
chloride	mg/L	400	9.80	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.30	SM 4500 O C	
EC	µS/cm	at 25 degC	160	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	42.0		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.60	EPA 200.7	
manganese	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0002	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.0100	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.05	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.09	EPA 150.1	
potassium	mg/L	-	1.5	EPA 200.7	ICP
sodium	mg/L	-	13	EPA 200.7	ICP
sulfate	mg/L	500	3.5	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.2		
total dissolved solids	mg/L	1000	106	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	53.0	EPA 524.2	
turbidity	NTU	-	0.89		
zinc	mg/L	5	<0.0100	EPA 200.8	ICP-MS

Comments:

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Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/25/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: Galletti Way Well (GWW)		UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead?	☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) : T19NR20ES07		
City/Valley: Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: January 7, 2000		
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other: _____	
Total depth of well: 250 feet		
Bottom depth of cement for last cemented casing string: 116 feet		
Screened or open hole interval (top/bottom depths): 240-210, 200-162, 148-120 feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: In production 6 of previous 10 days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/25/15	Time Sampled :	1445 WS
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 foot		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :			
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.09
~~S. Conductivity :~~ NTU : 0.89
Temperature : 11.2 C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES (☒) NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: WRaymond	Date: 6/25/15

Attachments:

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Table A.16. Zone 3: 2Q2015 Extracted Water Chemistry – Greg Street

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Greg Street Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/25/2015** **1445 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	51	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	<0.0010	EPA 200.8	ICP-MS
barium	mg/L	2	0.0211	EPA 200.8	ICP-MS
calcium	mg/L	-	10.0		
chloride	mg/L	400	9.90	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	0.00176	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.10	SM 4500 O C	
EC	µS/cm	at 25 degC	150	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	20.0	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	39.0		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.30	EPA 200.7	
manganese	mg/L	0.1	<0	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0050	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.0100	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.05	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.11	EPA 150.1	
potassium	mg/L	-	1.4	EPA 200.7	ICP
sodium	mg/L	-	12	EPA 200.7	ICP
sulfate	mg/L	500	4.0	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	14.3		
total dissolved solids	mg/L	1000	99.0	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	63.0	EPA 524.2	
turbidity	NTU	-	0.31		
zinc	mg/L	5	<0.0100	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/25/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Greg Street Well (GSW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR20ES8	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: October 15, 1991	
Diameter of casing: 12.75"	Type of Casing: (Steel) PVC Other: _____
Total depth of well: 400 feet	
Bottom depth of cement for last cemented casing string: 60 feet	
Screened or open hole interval (top/bottom depths): 400-180 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: day 1 of production for the year	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/25/15	Time Sampled :	1445
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		
FIELD MEASUREMENTS pH : 7.11 ~~S. Conductivity :~~ NTU : 0.31 Temperature : 14.3 C			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES ☒ NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature:	Date: 6/25/15

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.17. Zone 3: 2Q2015 Extracted Water Chemistry – South 21st Street

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**South 21st Street Well (S21)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	WR/JG
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/22/2015** **1130 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	56.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.001	EPA 200.8	ICP-MS
barium	mg/L	2	0.020	EPA 200.8	ICP-MS
calcium	mg/L	-	11.0		
chloride	mg/L	400	10.0	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.001	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.40	SM 4500 O C	
EC	µS/cm	at 25 degC	190	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	43.2		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.80	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	0.100	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.14	EPA 150.1	
potassium	mg/L	-	1.60	EPA 200.7	ICP
sodium	mg/L	-	14.0	EPA 200.7	ICP
sulfate	mg/L	500	4.60	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	11.1		
total dissolved solids	mg/L	1000	95.0	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	64.0	EPA 524.2	
turbidity	NTU	-	0.18		
zinc	mg/L	5	<0.01	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION		
Well Name & No.: South 21st Street Well		UIC Permit No.:UNEV92200
Is there any well name or identification at the wellhead?	☐ YES ☒ NO	If no, label should be placed on or near wellhead
Project/Facility Name:Truckee Meadows Water Authority		
Well Location (SectionTR or Lat/Long) :T19NR20ES07		
City/Valley:Truckee Meadows	County: Washoe	
Sample for (circle one): NEW WELL (X ROUTINE REPORTING) Other: _____		
Reporting Frequency: ☐ Semi-annually ☐ Annually ☐ Other Quarterly		
WELL or SAMPLE LOCATION INFORMATION		
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)		
Well Type: (X Municipal Water Well) Monitoring Geo-Prod Geo-Injection Geo-Observation		
Completion date of well: April 1, 1991		
Diameter of casing: 16"	Type of Casing: (X Steel) PVC Other:_____	
Total depth of well: 250 feet		
Bottom depth of cement for last cemented casing string: 116 feet		
Screened or open hole interval (top/bottom depths): 245-180, 170-140, 130-120 feet		
STATUS OF WELL		
Condition or Activity of well during past week/month, prior to sampling: in production 6 of previous 7 days		
Discuss any field conditions the Division should be aware of with regard to this sample:		
Was the well secured upon arrival?	☒ YES ☐ NO	
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO	
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO	
WATER LEVEL – WELL GAUGING		
Last date well gauged (mm/dd/yy) :	Depth to water - last event:	
Method used to gauge well? :	Cap Tube Tape Measure	
Measured Water Level :	surface	

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Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/22/15	Time Sampled :	1130 WS
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	1 ft		
Type of Sample (circle one) :	(X Grab) Composite ~~other~~ (specify):		
Collection method (circle one) :	well bailed (X water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	In production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		
FIELD MEASUREMENTS pH : 7.14 ~~S. Conductivity :~~ NTU : 0.18 Temperature : 11.1			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**: As per Attachment B of the permit____			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES ☒ NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.:775-834-8138	eMail Address: wraymond@tmwa.com
Signature: Will Raymond	Date: 6·22·15

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.18. Zone 4: 2Q2015 Extracted Water Chemistry – Longley Lane

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Longley Lane Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	**6/22/2015** **1345 hrs**
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**WR/JG**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	110	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.002	EPA 200.8	ICP-MS
barium	mg/L	2	0.072	EPA 200.8	ICP-MS
calcium	mg/L	-	17.0		
chloride	mg/L	400	5.00	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	0.001	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	5.00	SM 4500 O C	
EC	µS/cm	at 25 degC	270	SM 2510 B	
fluoride	mg/L	4	0.100	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	92.0		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	12.0	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	1.00	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.06	EPA 150.1	
potassium	mg/L	-	5.00	EPA 200.7	ICP
sodium	mg/L	-	11.0	EPA 200.7	ICP
sulfate	mg/L	500	3.80	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	15.0		
total dissolved solids	mg/L	1000	160	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	6.40	EPA 524.2	
turbidity	NTU	-	0.33		
zinc	mg/L	5	<0.01	EPA 200.8	ICP-MS

Comments:

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Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Longley Lane Well (LLW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : NE ¼, NE1/4, Sec 6, T18, N20E	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: January 18, 2000	
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other:
Total depth of well: 310'	
Bottom depth of cement for last cemented casing string: 115'	
Screened or open hole interval (top/bottom depths): 120'-135', 142'-172', 190'-215', 260'-290'	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: in production for previous 6 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/22/15	Time Sampled :	1345
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		
FIELD MEASUREMENTS pH : 7.06 ~~S. Conductivity :~~ NTU : 0.33 Temperature : 15.0 C			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES (☒) NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	email Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	email Address: wraymond@tmwa.com
Signature: WRaymond	Date: 6/22/15

Attachments:

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Table A.19. Zone 4: 2Q2015 Extracted Water Chemistry – Sierra Plaza

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Sierra Plaza Well (GOW)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	KB
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/23/2015** **1055 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	112	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.045	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.0010	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.00550	EPA 200.8	ICP-MS
barium	mg/L	2	0.0845	EPA 200.8	ICP-MS
calcium	mg/L	-	18.4		
chloride	mg/L	400	3.15	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.0500	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	5.67	SM 4500 O C	
EC	µS/cm	at 25 degC	222	SM 2510 B	
fluoride	mg/L	4	<0.2	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	93.0		
iron	mg/L	0.6	<0.020	EPA 200.7	ICP
lead	mg/L	0.015	<0.0010	EPA 200.8	ICP-MS
magnesium	mg/L	150	11.4	EPA 200.7	
manganese	mg/L	0.1	<0.0050	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0002	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.0100	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	0.464	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.2	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.57	EPA 150.1	
potassium	mg/L	-	4.60	EPA 200.7	ICP
sodium	mg/L	-	13.0	EPA 200.7	ICP
sulfate	mg/L	500	4.87	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	17.3		
total dissolved solids	mg/L	1000	144	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	5.7	EPA 524.2	
turbidity	NTU	-	0.19		
zinc	mg/L	5	<0.0100	EPA 200.8	ICP-MS

Comments:

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Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/23/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Sierra Plaza Well (GOW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : NE ¼, NE1/4, Sec 6, T18, N20E	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other: _____	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: November 14, 2000	
Diameter of casing: 16"	Type of Casing: (Steel) PVC Other: _____
Total depth of well: 315'	
Bottom depth of cement for last cemented casing string: 132'	
Screened or open hole interval (top/bottom depths): 134'-179', 193'-208', 265'-300'	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: producing water 5 of previous 6 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES (☒) NO
Was well in an artesian condition prior to sampling? :	☐ YES (☒) NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/23/15	Time Sampled :	1055
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		
FIELD MEASUREMENTS pH : 7.57 ~~S. Conductivity :~~ NTU : 0.19 Temperature : 17.3°C			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES ☒ NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	email Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	email Address: wraymond@tmwa.com
Signature:	Date:

Attachments:

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Table A.20. Zone 4: 2Q2015 Extracted Water Chemistry – Delucchi Lane

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Delucchi Lane Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	WR/JG
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/22/2015** **1400 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	62.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.002	EPA 200.8	ICP-MS
barium	mg/L	2	0.033	EPA 200.8	ICP-MS
calcium	mg/L	-	12.0		
chloride	mg/L	400	9.10	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	<0.001	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.20	SM 4500 O C	
EC	µS/cm	at 25 degC	180	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	4.20	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	47.0		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	4.20	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.05	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	6.94	EPA 150.1	
potassium	mg/L	-	1.80	EPA 200.7	ICP
sodium	mg/L	-	15.0	EPA 200.7	ICP
sulfate	mg/L	500	3.80	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	12.7		
total dissolved solids	mg/L	1000	110	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	44.0	EPA 524.2	
turbidity	NTU	-	0.24		
zinc	mg/L	5	<0.01	EPA 200.8	ICP-MS

Comments:

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Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

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UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Delucchi Lane Well (DLW)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : APN2546003	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: March 1972	
Diameter of casing: 14"	Type of Casing: (Steel) PVC Other:
Total depth of well: 323'	
Bottom depth of cement for last cemented casing string: 106'	
Screened or open hole interval (top/bottom depths): 114'-126', 130'-148', 160'-208', 232'-308'	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: IN Production 7 of previous 7 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES (☒ NO)
Was well in an artesian condition prior to sampling? :	☐ YES (☒ NO)
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

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Carson City Nevada 89701
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UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/22/15	Time Sampled :	1400 hr
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	IN production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES ☒ NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES ☒ NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	☒ YES ☐ NO		

FIELD MEASUREMENTS

pH : 6.94
~~S. Conductivity :~~ NTU : 0.24
Temperature : 12.7°C

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES ☒ NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	email Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	email Address: wraymond@tmwa.com
Signature: [signature]	Date: 6/22/15

Attachments:

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Table A.21. Zone 4: 2Q2015 Extracted Water Chemistry – Holcomb Lane

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Holcomb Lane Well**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	WR/JG
Type of Well :	Monitor [Production] Injection	**Date Sampled :**	**6/22/2015** **1415 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	58.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	<0.001	EPA 200.8	ICP-MS
barium	mg/L	2	0.021	EPA 200.8	ICP-MS
calcium	mg/L	-	10.0		
chloride	mg/L	400	9.20	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	0.005	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	7.90	SM 4500 O C	
EC	µS/cm	at 25 degC	170	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	<2	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	40.0		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.60	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	0.002	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	0.110	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.44	EPA 150.1	
potassium	mg/L	-	1.60	EPA 200.7	ICP
sodium	mg/L	-	14.0	EPA 200.7	ICP
sulfate	mg/L	500	3.30	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.1		
total dissolved solids	mg/L	1000	90.0	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	47.0	EPA 524.2	
turbidity	NTU	-	0.27		
zinc	mg/L	5	<0.01	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Holcomb Lane Well (HO1)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR19E	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: April 28, 1988	
Diameter of casing: 14"	Type of Casing: (Steel) PVC Other:
Total depth of well: 341 feet	
Bottom depth of cement for last cemented casing string: 128 feet	
Screened or open hole interval (top/bottom depths): 326-299, 289-257, 237-182, 178-148, 141-137	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: in production 6 of previous 60 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES (☒) NO
Was well in an artesian condition prior to sampling? :	☐ YES (☒) NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/22/15	Time Sampled :	1415
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		
FIELD MEASUREMENTS pH : 7.44 ~~S. Conductivity :~~ NTU : 0.27 Temperature : 13.1			
What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit			
** Other constituent listed must have prior UIC approval before using			
Were any holding times exceeded?	☐ YES (☒) NO		
In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value. **DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)**			
FORM PREPARATION			
Project Manager: Christian Kropf			
Company: Truckee Meadows Water Authority			
Telephone No.: 775-834-8016		eMail Address: : ckropf@tmwa.com	
Signature:		Date:	
Qualified Sample Person: Will Raymond			
Company: Truckee Meadows Water Authority			
Telephone No.: 775-834-8138		eMail Address: wraymond@tmwa.com	
Signature: WRaymond		Date: 6/22/15	

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

Table A.22. Zone 4: 2Q2015 Extracted Water Chemistry – Lakeside

Nevada Division of Environmental Protection
Underground Injection Control Program - Sampling and Baseline Report Form

Facility Name :	**Lakeside Well (LKS)**	**Depth of sampled water's origin :**	
Facility Owner:	Truckee Meadows Water Authority	**County:**	Washoe
NDEP UIC Permit # :	UNEV92200	**Location :**	Latitude Longitude
Well ID # :		**Sampler :**	WR/JG
Type of Well :	Monitor **Production** Injection	**Date Sampled :**	**6/22/2015** **1220 hrs**
		Name of Laboratory :	TMWA, Wetlab, SEM

UIC Sample List 1 Inorganic

Parameter	Units	DW Standards	Reported Values	EPA Method	Method Description
alkalinity (as $CaCO_3$)	mg/L	-	54.0	SM 2320 B	
aluminum	mg/L	0.05-0.2	<0.05	EPA 200.8	ICP-MS
antimony	mg/L	0.006	<0.001	EPA 200.8	ICP-MS
arsenic	mg/L	0.01	0.001	EPA 200.8	ICP-MS
barium	mg/L	2	0.020	EPA 200.8	ICP-MS
calcium	mg/L	-	11.0		
chloride	mg/L	400	9.50	EPA 300.0	Ion Chromatography
chromium	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
color	color units	15	<2		
copper	mg/L	1.3	0.003	EPA 200.8	ICP-MS
dissolved oxygen	mg/L	-	8.60	SM 4500 O C	
EC	µS/cm	at 25 degC	170	SM 2510 B	
fluoride	mg/L	4	<0.1	EPA 300.0	Ion Chromatography
haloacetic acids (HAA)	ug/L	60	5.80	EPA 552.2	
hardness (as $CaCO_3$)	mg/L	-	43.0		
iron	mg/L	0.6	<0.05	EPA 200.7	ICP
lead	mg/L	0.015	<0.001	EPA 200.8	ICP-MS
magnesium	mg/L	150	3.70	EPA 200.7	
manganese	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
mercury	mg/L	0.002	<0.0001	EPA 200.8	ICP-MS
nickel	mg/L	0.1	<0.001	EPA 200.8	ICP-MS
nitrate (as nitrogen)	mg/L	10	<0.05	EPA 300.0	Ion Chromatography
nitrite (as nitrogen)	mg/L	1	<0.05	EPA 300.0	Ion Chromatography
pH	standard units	6.5-8.5	7.37	EPA 150.1	
potassium	mg/L	-	1.80	EPA 200.7	ICP
sodium	mg/L	-	14.0	EPA 200.7	ICP
sulfate	mg/L	500	4.90	EPA 300.0	Ion Chromatography
temperature	degrees celsius	-	13.7		
total dissolved solids	mg/L	1000	93.0	EPA 160.1	
total suspended solids	mg/L	-	<5	EPA 160.2	
total trihalomethanes (TTHM)	ug/L	80	49.0	EPA 524.2	
turbidity	NTU	-	0.25		
zinc	mg/L	5	0.01	EPA 200.8	ICP-MS

Comments:

TMWA Rev 1/2011

Note: Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
Please indicate detection limit instead of stating "Non-Detect".
Metals shall be sampled and analyzed as total metals.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

This form is to be completed in the field while sampling to document the sampling location facts and events, and submitted with the sample results.

Sample Date: (mm/dd/yy) 6/22/15

Complete All Applicable Blanks – Water samples can be rejected if information not provided.

FACILITY AND PERMIT INFORMATION	
Well Name & No.: Lakeside Drive Well (LKS)	UIC Permit No.: UNEV92200
Is there any well name or identification at the wellhead? ☒ YES ☐ NO	If no, label should be placed on or near wellhead
Project/Facility Name: Truckee Meadows Water Authority	
Well Location (SectionTR or Lat/Long) : T19NR19ES35	
City/Valley: Truckee Meadows	County: Washoe
Sample for (circle one): NEW WELL (ROUTINE REPORTING) Other:	
Reporting Frequency: ☐ Semi-annually ☐ Annually ☒ Other Quarterly	
WELL or SAMPLE LOCATION INFORMATION	
(Note: If sample location is not a well (e.g. spring), please provide all relevant data on sample location in the space below)	
Well Type: (Water/Domestic Well) Monitoring Geo-Prod Geo-Injection Geo-Observation	
Completion date of well: October 15, 1991	
Diameter of casing: 12.75"	Type of Casing: (Steel) PVC Other:
Total depth of well: 400 feet	
Bottom depth of cement for last cemented casing string: 60 feet	
Screened or open hole interval (top/bottom depths): 400-180 feet	
STATUS OF WELL	
Condition or Activity of well during past week/month, prior to sampling: production started within last 7 days	
Discuss any field conditions the Division should be aware of with regard to this sample:	
Was the well secured upon arrival?	☒ YES ☐ NO
Was there any problems or damage to the well upon arrival	☐ YES ☒ NO
Was well in an artesian condition prior to sampling? :	☐ YES ☒ NO
WATER LEVEL – WELL GAUGING	
Last date well gauged (mm/dd/yy) :	Depth to water - last event:
Method used to gauge well? : Cap Tube Tape Measure	
Measured Water Level : surface	

UIC Form 230 (06-01-10) **Page 1 of 2**

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UIC Form U230 – Field Sampling & Monitoring Summary

SAMPLING INFORMATION			
Date sample collected (mm/dd/yy) :	6/22/15	Time Sampled :	1220 WS
Name of Sampler :	Will Raymond		
Location sample taken (be specific) "sample port in pipeline 10 feet from wellhead" :	<1 foot from wellhead on well discharge pipeline		
Type of Sample (circle one) :	(Grab) Composite other (specify):		
Collection method (circle one) :	well bailed (water pumped) artesian flow air/gas lift		
How much fluid (gallons or well volumes) was discharged / purged before collecting sample? :	in production		
Filtering Note: UIC requirements specify water samples shall not be filtered, unless previously approved. If filtration is approved, sample shall be filtered with a 1.0 micron filter, not 0.45 micron. If approved, document date of approval: _____			
Was the sample filtered? :	☐ YES (☒) NO		
Was conductivity measured during discharge to establish stabilized conditions?	☐ YES (☒) NO-stabilized conditions determined by pH and temp		
Was decontamination procedures (reference O & M?) followed during sampling of multiple wells	(☒) YES ☐ NO		

FIELD MEASUREMENTS

pH : 7.37
~~S. Conductivity :~~ NTU : 0.25
Temperature : 13.7

What UIC Sample List is required: UIC List 1 UIC List 2 UIC List 3 (Other**) As per Attachment B of permit

** Other constituent listed must have prior UIC approval before using

Were any holding times exceeded? ☐ YES (☒) NO

In Final sample documentation, ensure all results are reported with appropriate units. If measurements are below detection limits, indicate detection limit value.

DO NOT REPORT VALUES AS NON-DETECT OR ND, INSTEAD REPORT as <(*Detection Limit Value*)

FORM PREPARATION	
Project Manager: Christian Kropf	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8016	eMail Address: : ckropf@tmwa.com
Signature:	Date:
Qualified Sample Person: Will Raymond	
Company: Truckee Meadows Water Authority	
Telephone No.: 775-834-8138	eMail Address: wraymond@tmwa.com
Signature: Will Raymond	Date: 6/22/15

Attachments:

UIC Form 230 (06-01-10) **Page 2 of 2**

APPENDIX B: DISINFECTION BY-PRODUCTS

Table B.1. Disinfection By-Products (DBP) Report – 1st Half 2015: HAA5

HAA5
STAGE 2 DBPR QUARTERLY MONITORING REPORT
Locational Running Annual Average (LRAA); Operational Evaluation Level (OEL)

PUBLIC WATER SYSTEM NAME: Truckee Meadows Water Authority PUBLIC WATER SYSTEM ID: PWS 190C

	D	C	B	A				
	D = Prior to Quarter C Sample	C = Prior to Quarter B Sample	B = Prior to Quarter A Sample	A = Current Quarter Sample				
Current Reporting Quarter	Sample Date:	Sample Date:	Sample Date:	Sample Date:	HAA5 Maximum Contaminant Level (MCL) = 0.060 mg/L			
	8/12/2014	11/12/2014	2/17/2015	5/19/2015	LRAA (mg/L)	LRAA > 0.060 mg/L ?[1]	OEL (mg/L)	OEL > 0.060 mg/L ?[2]
Stage 2 Compliance Monitoring Location ID:	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	(A + B + C + D)/4	YES / NO	(2A + B + C)/4	YES / NO
777 Panther Dr	0.011	0.017	0.031	0.024	0.021	NO	0.024	NO
1390 Tarleton	0.018	0.022	0.033	0.026	0.025	NO	0.027	NO
4855 Turning Leaf Way	0.014	0.016	0.034	0.027	0.023	NO	0.026	NO
4725 Goodwin	0.021	0.009	0.036	0.038	0.026	NO	0.030	NO
1075 North Hills Blvd	0.009	0.018	0.026	0.028	0.020	NO	0.025	NO
1450 Viewcrest	0.011	0.018	0.043	0.023	0.024	NO	0.027	NO
1600 Grandview	0.014	0.017	0.022	0.026	0.020	NO	0.023	NO
2270 Saddle Tree Trail	0.011	0.022	0.032	0.027	0.023	NO	0.027	NO
5859 Solstice	0.008	0.008	0.037	0.023	0.019	NO	0.023	NO
Hunter Creek Reservoir	0.015	0.008	0.018	0.011	0.013	NO	0.012	NO
6060 Silver Lake Rd	0.012	0.016	0.022	0.033	0.021	NO	0.026	NO
240 W Moana	0.012	0.013	0.032	0.013	0.018	NO	0.018	NO

[1]**YES** is an MCL violation. Provide Tier 2 Public Notice within 30 days per 40 CFR Subpart Q. Per 40 CFR §141.31, provide NDEP a copy.
[2]**YES** will require an OEL per 40 CFR §141.626. Submit evaluation to NDEP within 90 days of LAB REPORT date.

Date:

Mail To:
Division of Environmental Protection
Bureau of Safe Drinking Water
901 South Stewart Street, Suite 4001
Carson City, NV 89701

FAX To:
(775) 687-5699
Email To:
E-data_BSDW@ndep.nv.gov

Phone Number:
Signature:
Print Name:

Form Due by the 10th of January, April, July and October

Table B.2. Disinfection By-Products (DBP) Report – 1st Half 2015: TTHM

TTHM
STAGE 2 DBPR QUARTERLY MONITORING REPORT
Locational Running Annual Average (LRAA); Operational Evaluation Level (OEL)

PUBLIC WATER SYSTEM NAME: Truckee Meadows Water Authority PUBLIC WATER SYSTEM ID: PWS 190C

	D	C	B	A				
	D = Prior to Quarter C Sample	C = Prior to Quarter B Sample	B = Prior to Quarter A Sample	A = Current Quarter Sample				
Current Reporting Quarter	Sample Date:	Sample Date:	Sample Date:	Sample Date:	TTHM Maximum Contaminant Level (MCL) = 0.080 mg/L			
	8/12/2014	11/12/2014	2/17/2015	5/19/2015	LRAA (mg/L)	LRAA > 0.080 mg/L ?[1]	OEL (mg/L)	Is OEL > 0.080 mg/L ?[2]
Stage 2 Compliance Monitoring Sample Point & Location ID:	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	Sample Result (mg/L)	(A + B + C + D)/4	YES / NO	(2A + B + C)/4	YES / NO
777 Panther Dr	0.015	0.022	0.038	0.032	0.027	NO	0.031	NO
1390 Tarleton	0.027	0.024	0.044	0.033	0.032	NO	0.034	NO
4855 Turning Leaf Way	0.018	0.021	0.038	0.033	0.028	NO	0.031	NO
4725 Goodwin	0.021	0.028	0.042	0.046	0.034	NO	0.041	NO
1075 North Hills Blvd	0.013	0.027	0.031	0.037	0.027	NO	0.033	NO
1450 Viewcrest	0.017	0.027	0.069	0.030	0.036	NO	0.039	NO
1600 Grandview	0.020	0.023	0.023	0.030	0.024	NO	0.027	NO
2270 Saddle Tree Trail	0.014	0.031	0.044	0.033	0.031	NO	0.035	NO
5859 Solstice	0.039	0.024	0.058	0.034	0.039	NO	0.038	NO
Hunter Creek Reservoir	0.023	0.011	0.014	0.011	0.015	NO	0.012	NO
6060 Silver Lake Rd	0.020	0.029	0.047	0.043	0.035	NO	0.041	NO
240 W Moana	0.019	0.018	0.031	0.014	0.021	NO	0.019	NO

[1]**YES** is an MCL violation. Provide Tier 2 Public Notice within 30 days per 40 CFR Subpart Q. Per 40 CFR §141.31, provide NDEP a copy.
[2]**YES** will require an OEL per 40 CFR §141.626. Submit evaluation to NDEP within 90 days of LAB REPORT date.

Date: _____
Phone Number: _____

Mail To:
Division of Environmental Protection
Bureau of Safe Drinking Water
901 South Stewart Street, Suite 4001
Carson City, NV 89701

FAX To:
(775) 687-5699
Email To:
E-data_BSDW@ndep.nv.gov

Signature: _____
Print Name: _____

Form Due by the 10th of January, April, July and October

Table B.3. Zone 5: 1Q 2015 Disinfectant Residual Data

DISINFECTANT RESIDUAL DATA QUARTERLY REPORT
2015

PUBLIC WATER SYSTEM NAME: Truckee Meadows Water Authority
PUBLIC WATER SYSTEM ID: NV0000190

QUARTER (Circle One)	ONE	TWO	THREE	FOUR
	January, February, March	April, May, June	July, August, September	October, November, December

First Month of Quarter: Monthly Summary			
Month:	January		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	1.11

Second Month of Quarter: Monthly Summary			
Month:	February		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	1.06

Third Month of Quarter: Monthly Summary			
Month:	March		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	1.11

Quarterly Summary			
Total Number of Samples Taken for this Quarter	540	AVERAGE of all disinfectant residuals for this quarter	1.09
HIGHEST Residual for this quarter	1.43		

Running Annual Average Summary[1]				
Quarter	A	B	C	D
Year-Quarter	**2nd 2014**	**3rd 2014**	**4th 2014**	**1st 2015**
Average for quarter	0.98	1.01	0.93	1.09
Running Annual Average (RAA)			(A+B+C+D)/4=	1.00

1- Running annual average is the average of the last 12 months of monthly averages and will be computed after 12 months of data are available.

Signature: Kelli Burgess Date: 04/01/15

Print Name: Kelli Burgess Phone Number: 775-834-8117

Mail To: Bureau of Health Protection Services
1179 Fairview Dr., Suite 101
Carson City, NV 89701
Form Due by the 10th of April, July, October, and January

Table B.3. Zone 5: 2Q 2015 Disinfectant Residual Data

DISINFECTANT RESIDUAL DATA QUARTERLY REPORT 2015

PUBLIC WATER SYSTEM NAME: Truckee Meadows Water Authority
PUBLIC WATER SYSTEM ID: NV0000[redacted]

QUARTER (Circle One)	ONE January, February, March	TWO April, May, June	THREE July, August, September	FOUR October, November, December

First Month of Quarter: Monthly Summary			
Month:	April		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	0.99

Second Month of Quarter: Monthly Summary			
Month:	May		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	0.95

Third Month of Quarter: Monthly Summary			
Month:	June		
Number of Samples Taken	180	AVERAGE of all disinfectant residuals for this month	0.98

Quarterly Summary			
Total Number of Samples Taken for this Quarter	540	AVERAGE of all disinfectant residuals for this quarter	0.97
HIGHEST Residual for this quarter	1.28		

Running Annual Average Summary[1]				
Quarter	A	B	C	D
Year-Quarter	**3rd 2014**	**4th 2014**	**1st 2015**	**2nd 2015**
Average for quarter	1.01	0.93	1.09	0.97
Running Annual Average (RAA)			(A+B+C+D)/4=	1.00

1- Running annual average is the average of the last 12 months of monthly averages and will be computed after 12 months of data are available.

Signature: Kelli Burgess Date: 07/08/15

Print Name: Kelli Burgess Phone Number: 775-834-8117

Mail To: Bureau of Health Protection Services
1179 Fairview Dr., Suite 101
Carson City, NV 89701
Form Due by the 10th of April, July, October, and January

APPENDIX 3-2

TROA and non-TROA
Water Supply
Report

TRUCKEE MEADOWS WATER AUTHORITY

STAFF REPORT

TO: Board of Directors
FROM: Bill Hauck, Senior Hydrologist
DATE: September 7, 2015
SUBJECT: **Presentation and Discussion of TROA Operations During Drought Periods**

FINDINGS

- Under the Truckee River Operating Agreement (TROA) operations, TMWA's projected upstream drought reserve storage is more than adequate to meet customer demand for an additional five (5) years at current demands with repetitive 2015 hydrology, and actually improves with each successive year under the modeled worse-case scenario.
- Under current non-TROA operations, TMWA's projected upstream drought reserves are adequate for another two years at the current demand levels with repetitive 2015 hydrology, but are projected to begin falling short by late September 2017 as reserves are used up. In year eight (8) of the modeled worse-than-worse-case drought, upstream reserves are projected to completely run out during the summer 2018. TMWA would not be able to meet customer demand in years 2018-2020 at current levels under a non-TROA operation.

INTRODUCTION

In order to test the robustness of the region's water supply (in particular the back-up water supply) a hypothetical, five-year worse-than-worse-case hydrologic scenario was developed and processed through a RiverWare Truckee River operations model with actual initial starting conditions, under both a TROA and non-TROA operating regime.

The last four years (2012, 2013, 2014, and 2015) have been the driest back-to-back winters in recorded history, producing the smallest amount of runoff ever seen over a four year period in the Truckee River system. Out of 115 years of actual hydrologic data available for the Truckee River, 2015 was the driest on record. It had the lowest recorded snowpack and the lowest recorded natural runoff. It was also 12% drier than the previous driest year on record which was 1977. Water year 2015 is by any definition the worst water year on record. Creating a hypothetical hydrology that repeats actual 2015 hydrologic conditions for an additional five (5) years could be considered a worse-than-worse-case drought.

What was developed then modeled is in essence a nine-year drought with actual conditions through the first four years (2012-2015) with a repeat of 2015 hydrology for an additional five years (2016-2020). The 9-year drought used for these purposes to test the resiliency of the region's water supply is over two times more severe than the drought of record (1987-1994) plus the additional dry year (1987) currently used for planning purposes. The hypothetical drought has a total April-July runoff volume of just 590 thousand acre-feet (KAF) over the nine-year period compared to an April-July runoff total of 1,271 KAF for the drought of record (with a repeat of 1987) for a total of nine years.

DISCUSSION

The hypothetical drought with actual initialized starting conditions were processed in a RiverWare operations model developed by US Bureau of Reclamation in consultation with the TROA parties to simulate Truckee River operations under both TROA and non-TROA conditions.

The elevation of Lake Tahoe would not be any different under a TROA or non-TROA scenario as the elevation of the lake is currently below its natural outlet. With a repeat of 2015 hydrology for another five years, the elevation of Tahoe would continue to decline under both a TROA and non-TROA condition so that by the end of the fifth modeled year (December 31, 2020) it would be almost eight (8) feet below its natural outlet elevation of 6223.00 feet. See Figure 1 below which shows the continued decline in Tahoe's elevation over the next five years.

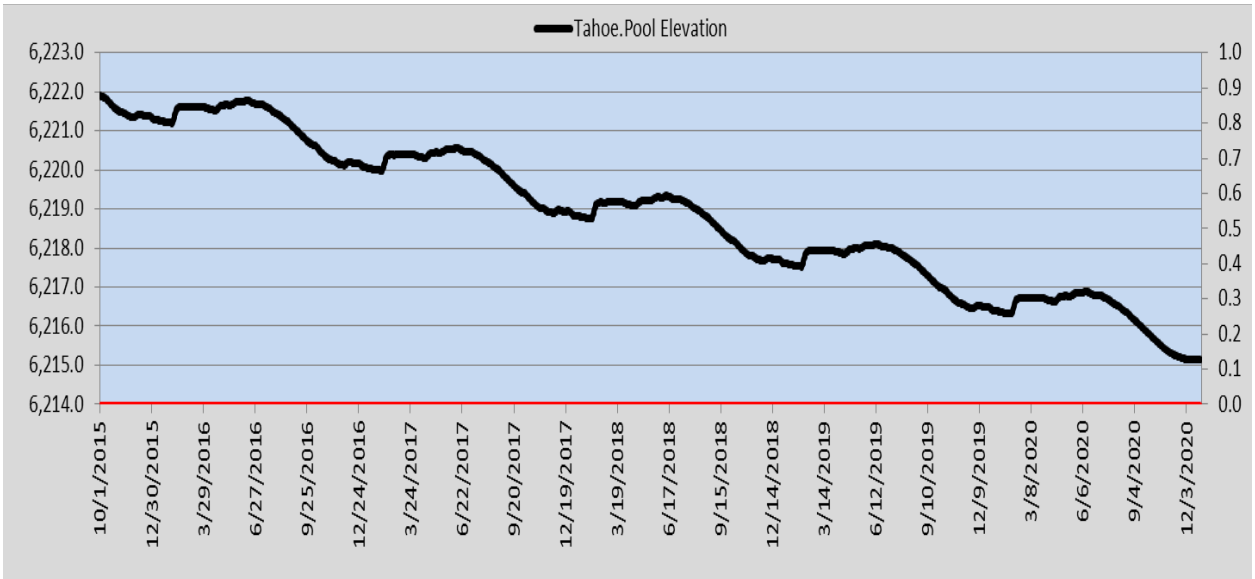

Figure 1. Lake Tahoe: TROA or non-TROA Scenario

The operation of Donner Lake would look very similar in either a TROA or non-TROA scenario also. The usable storage would continue to be released as part of TMWA's drought reserves to meet customer demand beginning on or about September 01 of each year. The lake would then be re-filled again in the spring so that by June 01 of each year storage would be approximately 80% of capacity. See Figure 2 which shows projected storage in acre-feet (2015-2020).

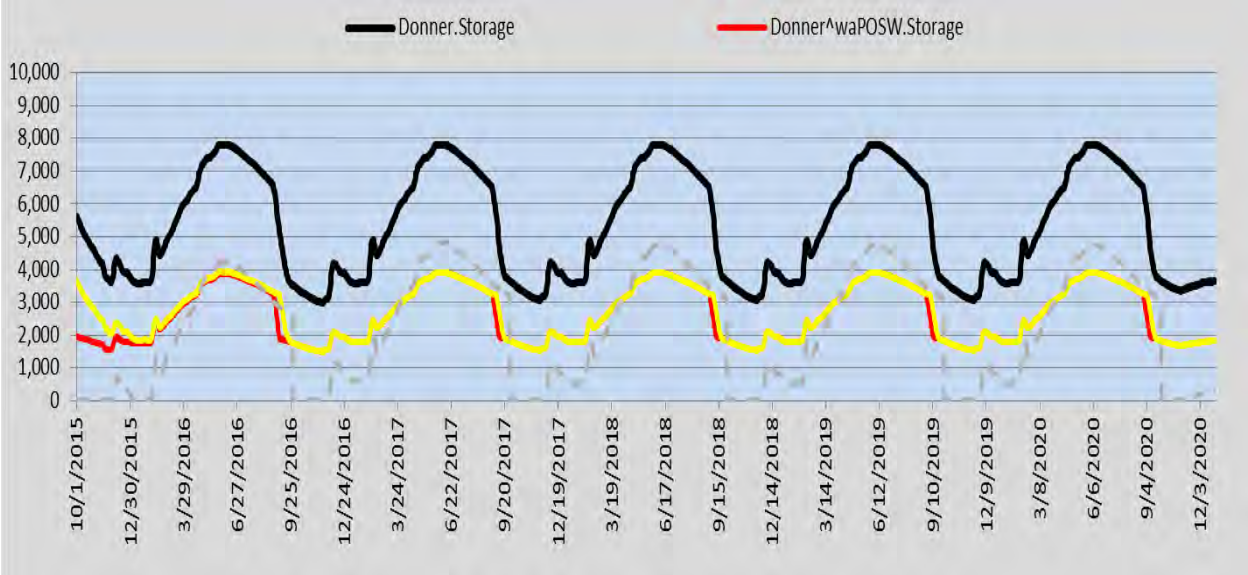

Figure 2. Donner Lake: TROA or non-TROA Scenario

Independence Lake would continue to be operated much like it has been to this point under a TROA scenario as well. See Figure 3 below which shows projected reservoir storage in acre-feet through 2020.

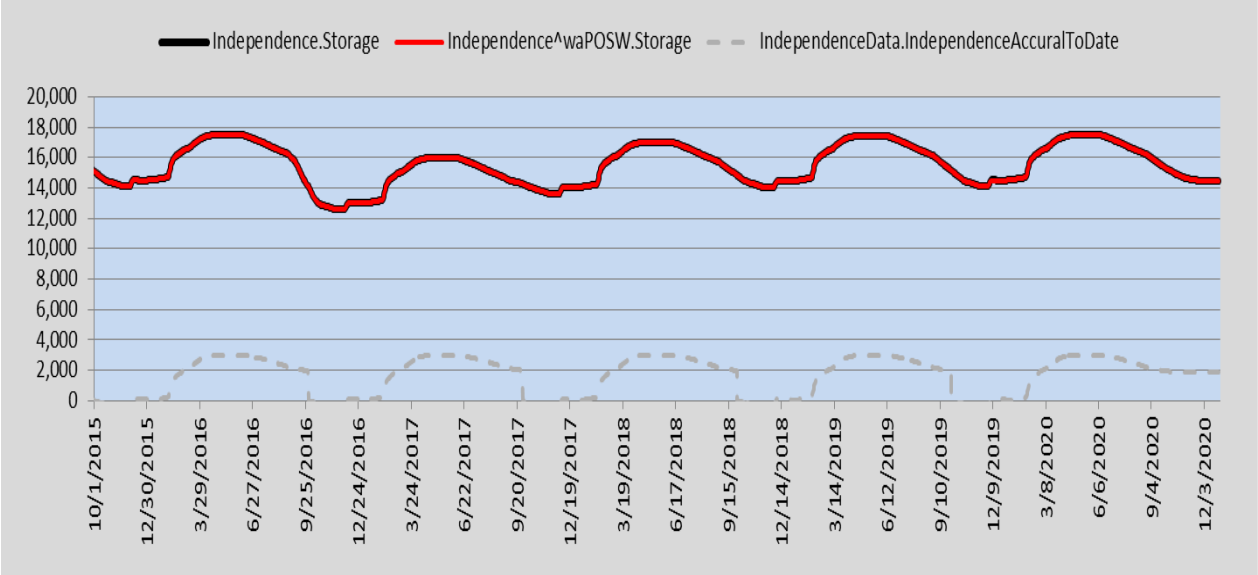

Figure 3. Independence Lake: TROA Scenario

The elevation of Independence Lake would be drawn down each fall as water is released to make room for upcoming spring runoff season and moved down into Stampede Reservoir. The lake would then be re-filled again each spring as usual.

Stampede Reservoir operations, however, would look significantly different under a TROA scheme. Under TROA (as conditions allow), TMWA will be able to begin holding back (in

Stampede Reservoir, among others) the consumptive use fraction of some of its previously unexercised water rights of up to 11,600 acre-feet per year. Figure 4 for example shows projected Stampede Reservoir storage for the next five years. The model shows that TMWA is able to store water throughout the entire planning window (2015-2020) building up drought reserves each year, and continuing to accrue more and more water each successive year.

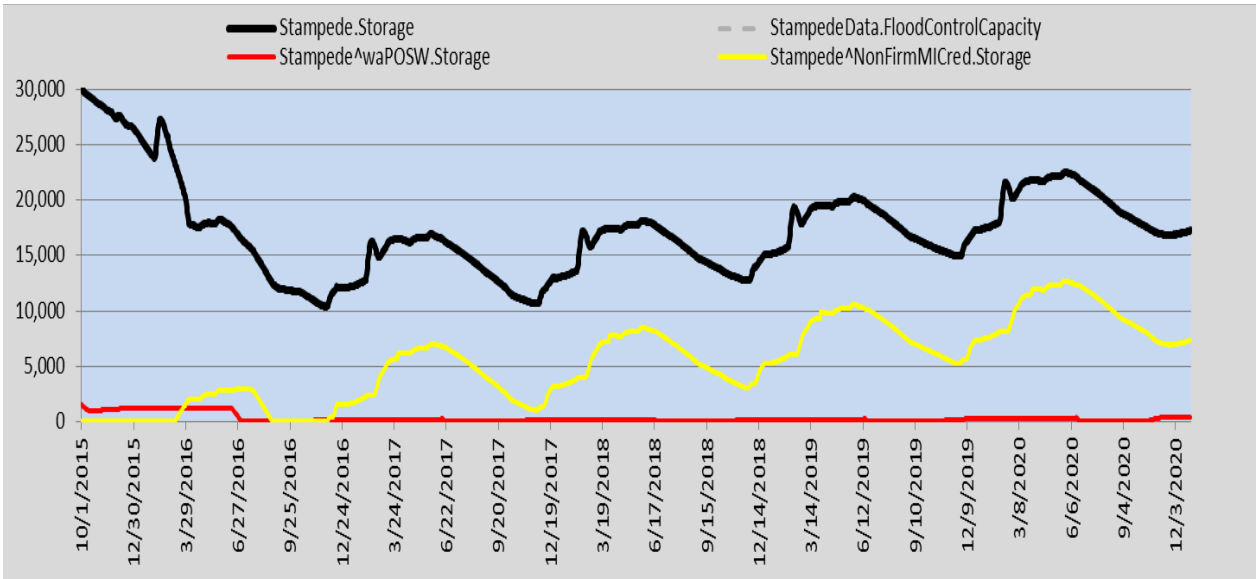

Figure 4. Stampede Reservoir: TROA Scenario

Between Stampede, Boca and Prosser reservoirs, the model results show that TMWA is able to establish the full 11,600 acre-feet each year. This is in addition to TMWA privately-owned water stored in Donner and Independence Lakes. Figure 5 illustrates this point and shows the cumulative surface water sources available each year through 2020 which TMWA would own and/or have available. It can be seen that throughout the course of the year TMWA fills, releases and re-fills these various buckets of water to create a water supply. And that in each year TMWA is using less drought reserve water than it requires or a portion of the total on-hand to meet customer demand, and is actually able continue to accrue and build-up storage, improving its upstream water supply position each year under a TROA operation.

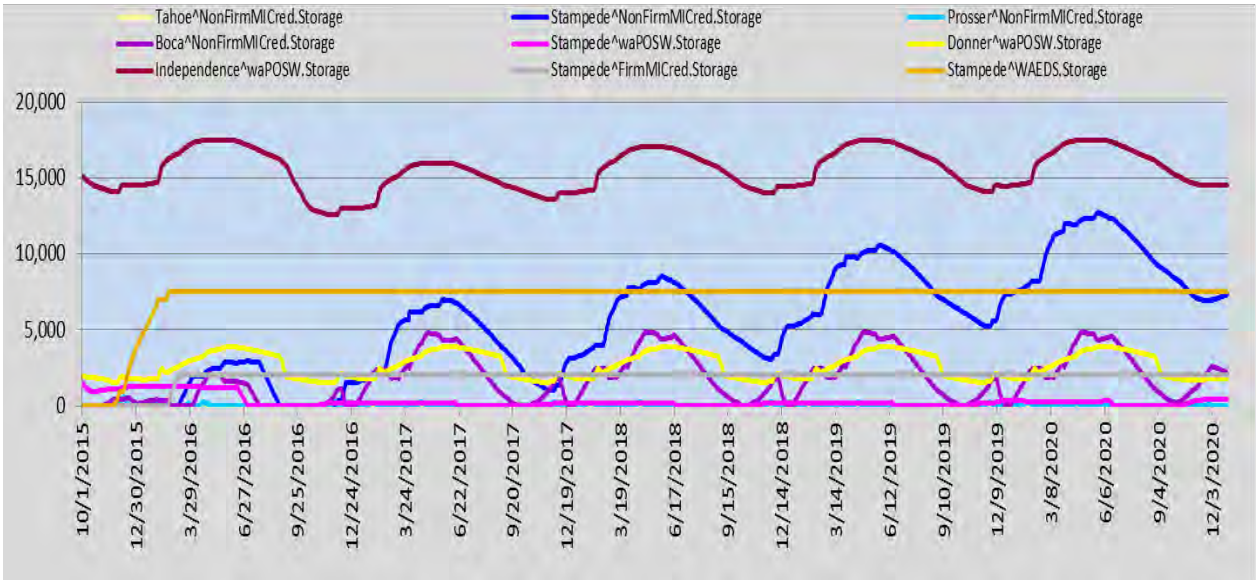

Figure 5. TMWA Total Surface Water Storage: TROA Scenario

Model results show that by the summer of 2020 (June 1st) TMWA would have over 46,000 acre-feet of combined stored surface water in reserve and available for backup (almost double what TMWA had going into the summer of 2015) at current demand levels. This occurs despite a repeat of the worst hydrological conditions for an additional four years (2016-2019). By the end of 2020 (Dec 31, 2020) TMWA would still have almost 34,000 acre-feet in reserve stored between Stampede and Boca Reservoirs and Independence Lake.

The non-TROA modeled scenario on the other hand, while quite resilient is not robust enough to withstand a repeat of 2015 hydrology for another five consecutive years. The results of the model show that TMWA can basically only make it through another two years at current demand levels. The model shows TMWA using roughly 12,000 acre-feet of Independence Lake storage next summer (2016) in order to meet customer demand. This would bring storage down to around 5,500 acre-feet just prior to the winter months of 2016/2017. See Figure 6. TMWA would go into the summer of 2017 with approximately 8,500 acre-feet of storage in Independence Lake which would then be used directly to meet customer demand starting on or about July 1, 2017.

The water stored in Independence Lake along with TMWA's drought reserves in Donner Lake would be relied upon heavily and begin to run out by the end of September 2017. Figure 7 shows that by October 1, 2017 the model predicts that TMWA has no surface water left in storage. Note that the water shown as "Donner^waPOSW" in Figure 7 on Oct 1 is what is defined as dead storage (i.e. water that cannot be released to meet demand because it is below the natural outlet of the lake).

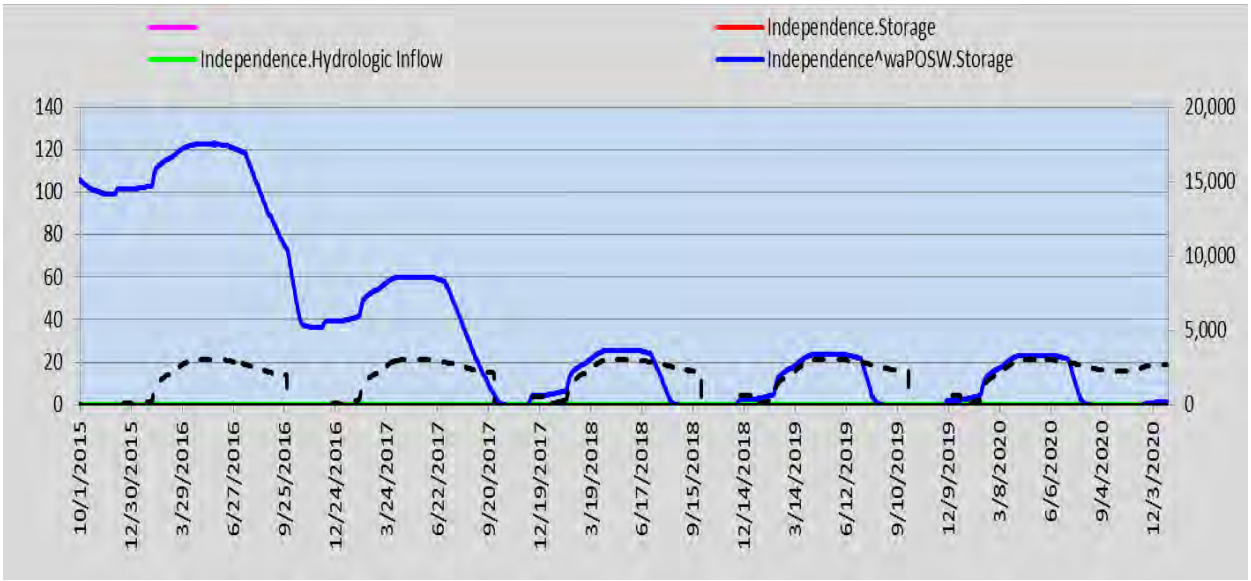

Figure 6. Independence Lake: non-TROA Scenario

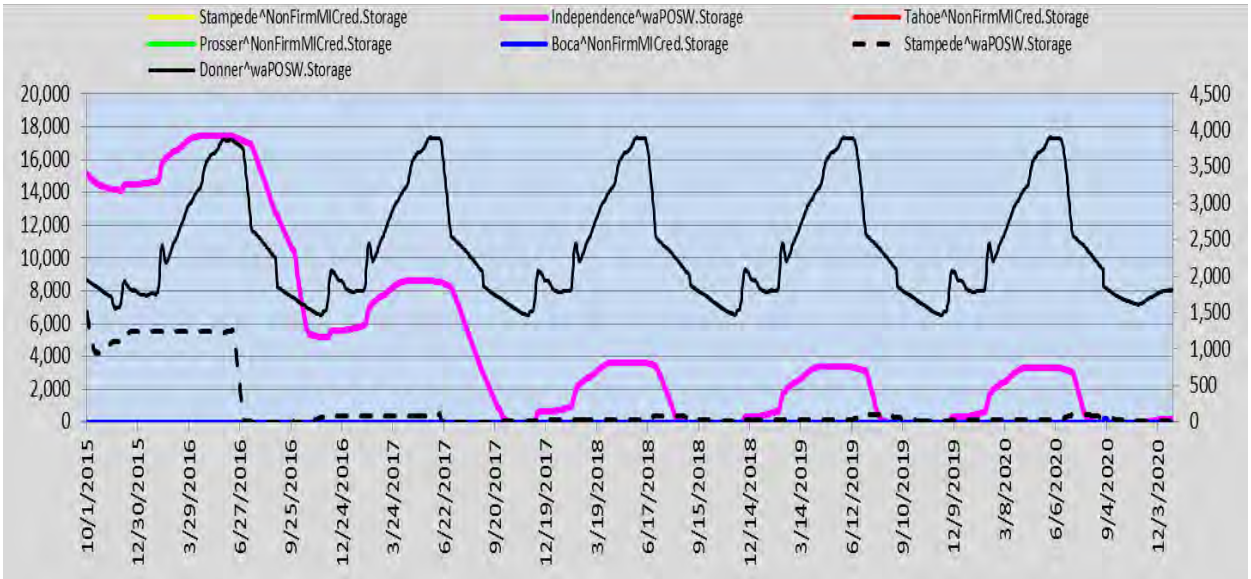

Figure 7. TMWA Total Surface Water Storage: non-TROA Scenario

SUMMARY

The results of the model runs show that with TROA the region can withstand a hypothetical drought more than 2 times as severe as the drought of record - the 1987-1994 drought plus additional dry year (1987) added onto the back end to create a nine-year event.

Under TROA operations, by the end of the nine-year simulated drought, the model shows that TMWA would still have almost twice as much upstream drought storage as it did going into the summer of 2015. The hypothetical hydrology created for this analysis repeated actual 2015 hydrology for an additional five years onto the end of the current four-year drought (2012-2015).

The additional 5 year worse-than-worse-case hydrology makes for a hypothetical drought unlike the Truckee River system has ever seen in recorded history.

Under a Non-TROA scenario the regional water supply would be able to hold up for another two years (through 2017) under modeled hydrological conditions. But by the October 1, 2017 TMWA would have exhausted its drought reserves. This means that TMWA would run out of drought storage by mid-summer 2018.

APPENDIX 3-3

Multi-Century Evaluation
Of
Sierra Nevada Snowpack

CORRESPONDENCE:

Multi-century evaluation of Sierra Nevada snowpack

To the Editor — California is currently experiencing a record-setting drought that started in 2012 and recently culminated in the first ever mandatory state-wide water restriction[1]. The snowpack conditions in the Sierra Nevada mountains present an ominous sign of the severity of this drought: the 1 April 2015 snow water equivalent (SWE) was at only 5% of its historical average[2]. In the Mediterranean climate of California, with 80% of the precipitation occurring during winter months, Sierra Nevada snowpack plays a critical role in replenishing the state's water reservoirs and provides 30% of its water supply[3]. As a result, a multi-year and severe snowpack decline can acutely impact human and natural systems, including urban and agricultural water supplies, hydroelectric power[4] and wildfire risk[5].

The exceptional character of the 2012–2015 drought has been revealed in millennium-length palaeoclimate records[6], but no long-term historical context is available for the recent snowpack decline. Here, we present an annually resolved reconstruction of 1 April SWE conditions over the whole Sierra Nevada range for the past 500 years (Fig. 1). We combined an extensive compilation of blue oak tree-ring series that reflects large-scale California winter precipitation anomalies[7] (Supplementary Information and Supplementary Fig. 1) with a tree-ring-based California February–March temperature record[8] in a reconstruction that explains 63% of the Sierra Nevada SWE variance over the instrumental period (Supplementary Table 1). Our reconstruction shows strong statistical skill (Supplementary Table 2), but underestimates anomalously high SWE values over the instrumental period (for example, in 1952 and 1969). However, SWE lows (for example, in 1934 and 1977) are reliably captured and our reconstruction reveals that the 2015 low is unprecedented in the context of the past 500 years (Fig. 1). Our error estimation indicates that there is a possibility that a few (primarily sixteenth century) years exceeded the 2015 low, but the estimated return interval for the 2015 SWE value — as calculated based on a generalized extreme value (GEV) distribution (Supplementary Information) — is 3,100 years and confirms its exceptional character. GEV-estimated return intervals

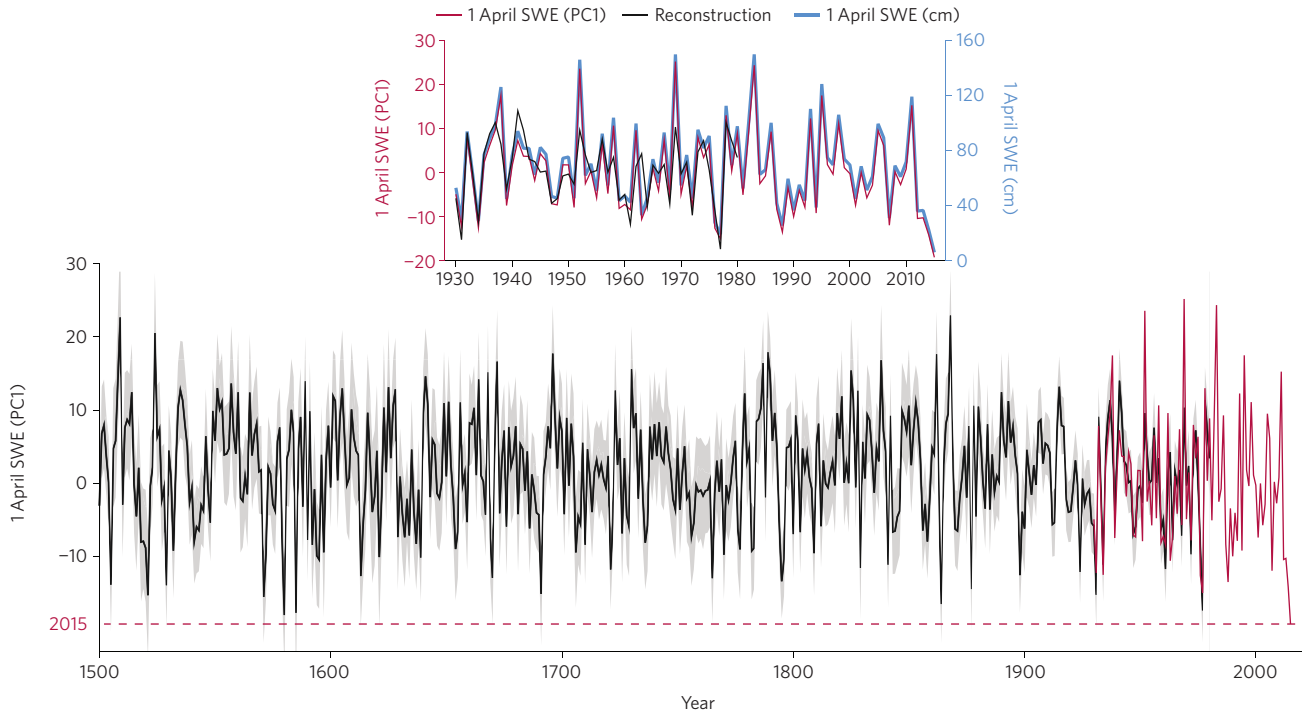

Figure 1 | Sierra Nevada 1 April snow water equivalent reconstruction (1500–1980). Bottom: instrumental (1930–2015; red curve) and reconstructed (1500–1980; black curve) first Principal Component (PC1) of Sierra Nevada 1 April snow water equivalent (SWE) values. The SWE reconstruction was calibrated against the PC1 of 1 April SWE measurements from 108 Sierra Nevada stations and explains 63% of its variance over the period of overlap (1930–1980; top). The 108-station average SWE value (in cm; 1930–2015) is plotted for comparison (blue curve; top). The grey shading around the reconstruction (bottom) indicates the combined error estimation (Supplementary Information). The 2015 SWE value is indicated by the red dashed line.

can have large confidence intervals (Supplementary Fig. 2), but the 2015 SWE value exceeds the 95% confidence interval for a 500-year return period (Supplementary Fig. 3). In comparison, the previous lowest SWE reading (in 1977) exceeds the 95% confidence interval for only a 60-year return period. We also find that the 2015 SWE value is strongly exceptional — exceeding the 95% confidence interval for a 1,000-year return period — at low-elevation Sierra Nevada sites where winter temperature has strong control over SWE[9], but less so at high-elevation sites, where it exceeds the 95% confidence interval for only a 95-year return period (Supplementary Information and Supplementary Fig. 2).

The 2015 record low snowpack coincides with record high California January–March temperatures[10] and highlights the modulating role of temperature extremes in Californian drought severity. Snowpack lows, among other drought metrics, are driven by the co-occurrence of precipitation deficits and high temperature extremes[11], and we find that the exacerbating effect of warm winter temperatures[12] is stronger at low than at high Sierra Nevada elevations. Anthropogenic warming is projected to further increase the probability of severe drought events[13], advance the timing of spring snowmelt and increase rain-to-snow ratios[14]. The ongoing and projected role of temperature in the amount and duration of California's primary natural water storage system thus foreshadows major future impacts on the state's water supplies. ❐

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Additional information

Supplementary information is available in the online version of the paper.

Author contributions

S.B., F.B. and V.T. conceived and designed the study, and wrote the Correspondence with input from E.R.W. and D.W.S. E.R.W. and D.W.S. contributed data and S.B. and F.B. performed the analyses with input from V.T. All authors contributed to the interpretation of the data set and discussion.

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