METHODS AND RESULTS FOR ESTIMATING GROUNDWATER PUMPED, RETURNED, AND CONSUMED FOR NON-IRRIGATION USES IN THE HARNEY BASIN, OREGON

State of Oregon

Water Resources Department

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Abstract

Groundwater discharge from wells for non-irrigation uses in the Harney Basin include discharge from municipal water system wells, community water system wells, rural domestic-household water wells, livestock water wells, and commercial-industrial water wells. This report documents the methodology, calculations, and results for estimating the groundwater discharge for each of these non-irrigation uses in the basin. Annual groundwater discharge from basin wells for all non-irrigation uses after 1999 is estimated as 6,937 acre-feet per year with about 87 percent (6,037 acre-feet) consumed and 13 percent (900 acre-feet) returned to groundwater. This annual groundwater discharge from basin wells for all non-irrigation uses is nearly five percent of the annual groundwater discharge from basin wells for all uses. Groundwater discharge for municipal uses (2,205 acre-feet per year) was determined from reported well meter readings. All municipal water is considered consumed, none returned to groundwater, given the use of sealed evaporation ponds for wastewater disposal by the municipalities. Groundwater discharge for 25 non-municipal community water systems registered with the Oregon Health Authority (80 acre-feet per year) was determined by using per household values calculated from the municipal system data for one community system serving 30 households and by using published coefficients for the other 24 community systems. About 19 acre-feet is calculated as consumed and 62 acre-feet is calculated as returned to groundwater. Groundwater discharge from rural domestic-household water wells (1,198 acre-feet per year) was determined using per household values calculated from the municipal system data and the number of domestic-household water well records filed at the Oregon Water Resources Department for domestic wells located outside of town boundaries. About 42 percent (508 acre-feet) is calculated as consumed and 58 percent (690 acre-feet) is calculated as returned to groundwater using a State of Washington recommended methodology. Groundwater discharge from livestock water wells (1,417 acre-feet per year) was determined using U.S. Department of Agriculture livestock census data for Harney County and the median daily water demand for cattle and sheep. All groundwater for livestock use is considered consumed. Groundwater discharge from commercial-industrial water wells (2,037 acre-feet) was determined from reported well meter readings and water right permitted discharge rates. About 93 percent (1,889 acre-feet) is consumed and about 7 percent (148 acre-feet) is returned to groundwater via an injection well. The results presented in this report are being used by a multi-year joint U.S. Geological Survey and Oregon Water Resources Department investigation to better define the basin's groundwater system, its water budget, and its response to groundwater development.

Introduction

This report presents estimates of annual groundwater discharge from wells for non-irrigation uses in the Harney Basin after 1999. The report is part of a multi-year joint U.S. Geological Survey (USGS) and Oregon Water Resources Department (OWRD) investigation to better define the basin's groundwater system, its water budget, and its response to groundwater development. Observed groundwater level declines and questions about groundwater resource sustainability prompted the investigation.

Groundwater discharged from wells in the Harney Basin is used for crop irrigation supply, public municipal supply, private and public community supply, rural domestic supply, livestock supply, and commercial-industrial supply. Groundwater pumpage from basin wells for crop irrigation use increased from 54,000 acre-feet per year in the early 1990s up to a 150,000 acre-feet maximum in 2017 (145,000 acre-feet per year average for 2017-2018). Groundwater discharged from wells in the basin for non-irrigation uses after 1999 is about 6,937 acre-feet per year with 900 acre-feet per year returned to groundwater and 6,037 acre-feet per year consumed. Non-irrigation groundwater usage is accounted in this report. Irrigation groundwater use is accounted in a separate report by Beamer and Hoskinson (2021).

Geographic Area

The 5,243 square-mile Harney Basin is located primarily in northern Harney County where it overlaps the north portion of the Malheur Lake Administrative Basin (figure 1). It is a closed surface water basin that drains to Malheur and Harney Lakes via three major surface water watersheds identified by the Oregon Water Resources Board (1967) as Silver Creek, Silvies River, and Donner und Blitzen River (table 1, figure 2). Most groundwater development in the basin has occurred within a 2,440 square-mile area unofficially named in this report as the "Greater Harney Valley Area" (figure 3). This area includes Harney Valley, the adjoining Silver Creek, Donner und Blitzen River, and Virginia valleys, and the lower elevation flanks of uplands facing those valleys. The area was delineated selecting twelve-digit hydrologic units from the USGS Watershed Boundary Dataset (WBD) located within those valleys and along the lower elevation portion of the upland flanks facing those valleys. Documentation of the WBD hydrologic units can be found in a techniques and methods report by the U.S. Geological Survey and U.S. Department of Agriculture (2013).

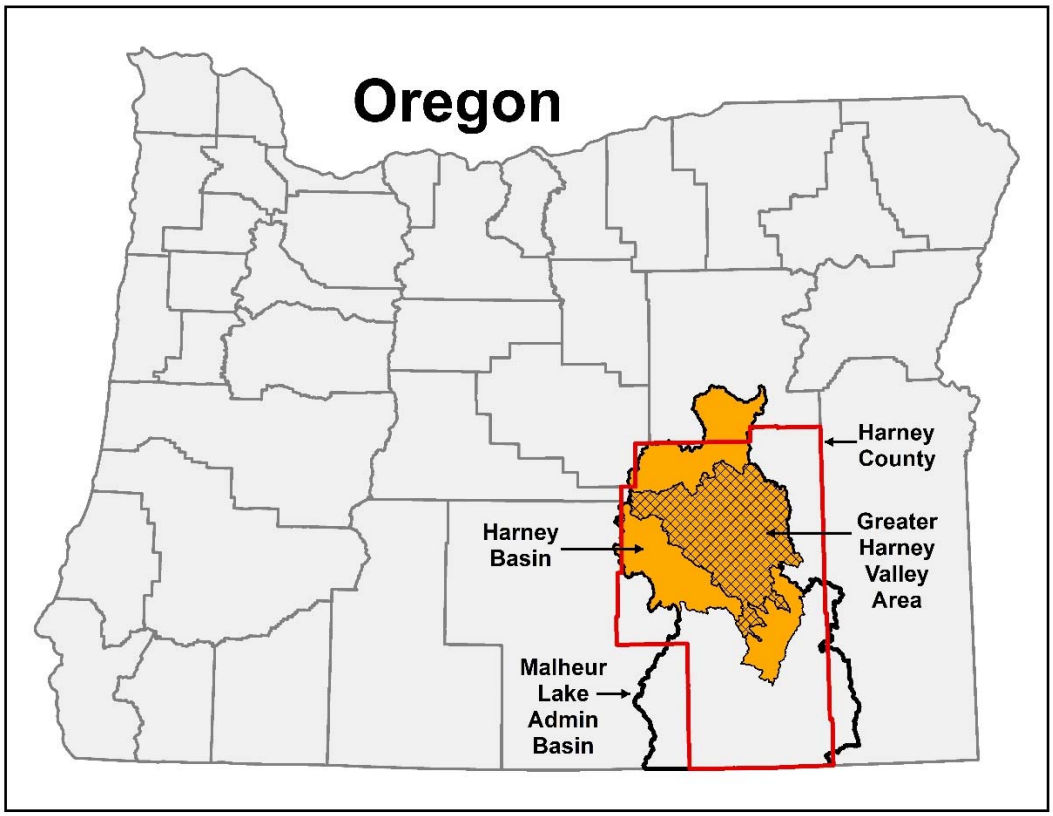

Figure 1. Locations of Harney County, Malheur Lake Administrative Basin, Harney Basin, and Greater Harney Valley Area

Table 1. Harney Basin surface water watersheds

Watershed[1]	Area[2] (acres)	Area[2] (square-miles)
Silvies River	1,381,270	2,158
Silver Creek	1,345,900	2,103
Donner und Blitzen River	628,515	982
Harney Basin Total	**3,355,685**	**5,243**
"Greater Harney Valley Area"[3]	**1,561,313**	**2,440**

[1]Each watershed was determined and adapted from Oregon Water Resources Board (1967)

[2]Each area value was obtained using GIS geometry calculation

[3]Harney Basin adjoining lowland valleys (Harney, Silver, Blitzen, Virginia) and bounding uplands

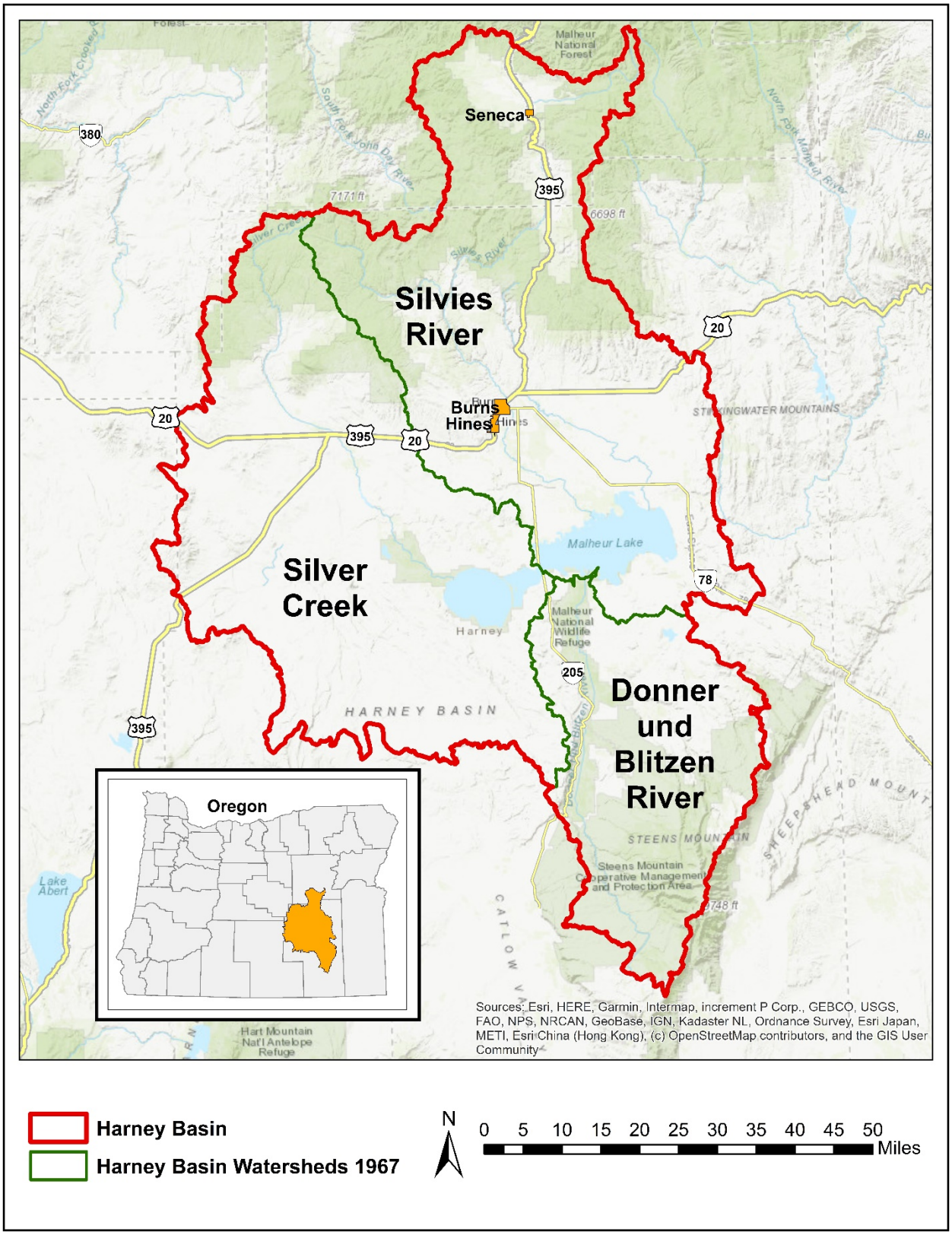

Figure 2. Harney Basin surface water watersheds

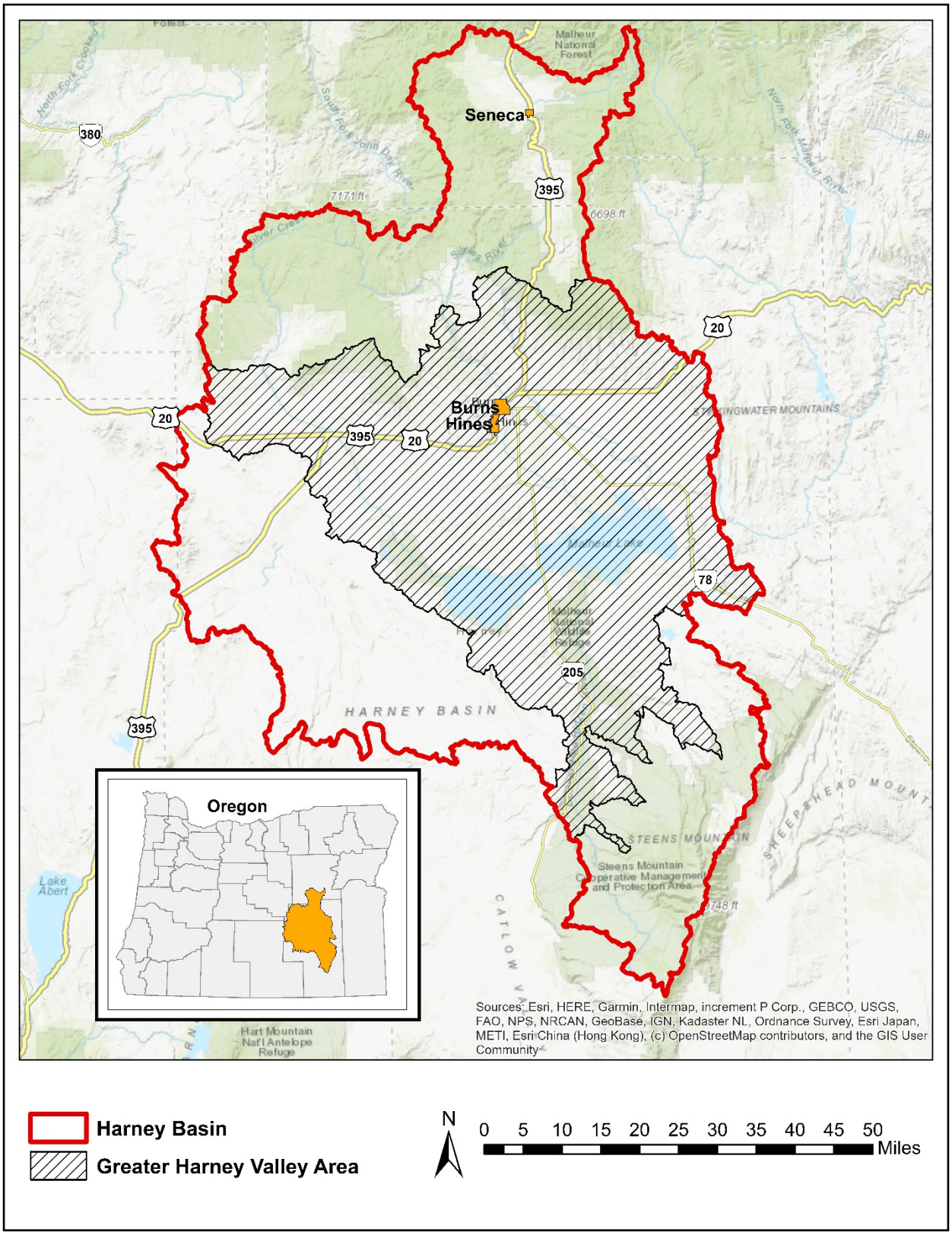

Figure 3. Greater Harney Valley Area

The joint USGS and OWRD investigation divided the Harney Basin into three water budget regions denoted North, West, and South (figure 4), which approximate the Silvies River, Silver Creek, and Donner und Blitzen watersheds, respectively. The water budget regions were further divided into lowland and upland areas solely for data presentation, discussion and general comparison purposes related to groundwater recharge and discharge (S.B. Gingerich, U.S. Geological Survey, written commun., 2020 and C.A. Garcia, U.S. Geological Survey, written commun., 2020, 2021). This report uses the three water budget regions and the lowland versus upland areas for consistency. The water budget region boundaries in the upland areas are mostly topographic and based on OWRD surface-water watershed boundaries (figure 2). The water budget region boundaries in the lowland areas are based on current understanding of groundwater-flow paths. The water budget region boundaries are not intended to represent definitive groundwater divides. The lowland areas (figure 4) generally correspond to the extent of Quaternary alluvium (about 2,000 square-miles) within the center of the basin including the floodplains of Silver Creek, Silvies River, and the Donner und Blitzen River and their tributaries. It also includes the extent of groundwater evapotranspiration (ET) areas as defined by the USGS (C.A. Garcia, U.S. Geological Survey, written commun., 2021). The uplands represent all other areas within the Harney Basin. None of the water budget lowland-upland boundaries represent hydraulic groundwater divides or groundwater flow boundaries.

Non-irrigation wells within 0.5 miles of the water budget lowland-upland "boundary" are counted as within the water budget lowland. This was done to incorporate wells on upland slopes adjacent and facing the lowlands where groundwater likely flows directly to the adjacent lowland.

Purpose

This report presents the methodologies used and the subsequent results obtained for reported and calculated groundwater discharge from wells for non-irrigation uses in the Harney Basin. Determining non-irrigation uses is part of the water budget portion of a multi-year joint USGS and OWRD investigation to better define the basin's groundwater system, water budget, and response to groundwater development. Non-irrigation uses addressed in this report are public municipal supply, private and public community supply, rural domestic supply, livestock supply, and commercial-industrial supply.

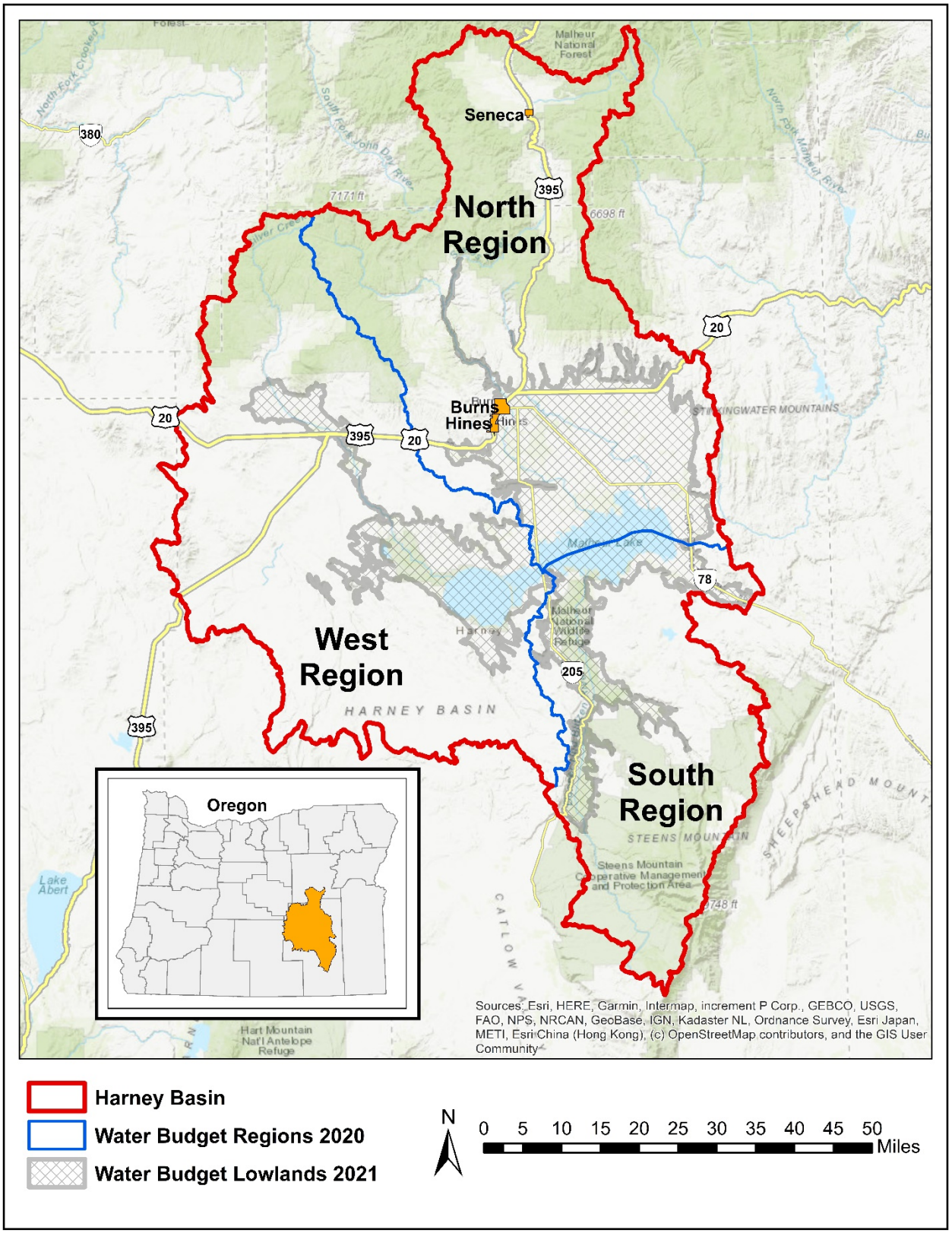

Figure 4. Harney Basin water budget regions and lowlands
[Used solely for data presentation, discussion and general comparison purposes]

Groundwater Discharge from Wells for Non-Irrigation Uses

Groundwater discharge from wells for non-irrigation uses in the Harney Basin include public municipal supply systems for the towns of Burns, Hines, and Seneca, private and public small community water systems, private rural domestic household systems, private and public livestock watering systems, and commercial-industrial systems. The estimated total annual groundwater discharge for non-irrigation uses in the basin after 1999 is about 6,937 acre-feet, with nearly 6,037 acre-feet consumed, and more than 900 acre-feet returned to groundwater (tables 2 and 3). More than 90 percent of the groundwater discharged and consumed for non-irrigation uses in the basin is estimated to occur in the water budget lowlands. More than 85 percent of the groundwater discharged and consumed for non-irrigation uses in the basin is estimated to occur in the north water budget region.

Table 2. Estimated annual groundwater pumped, returned, and consumed after 1999 for all non-irrigation uses in the Harney Basin, Oregon totaled by water budget region

Groundwater Use Non-Irrigation	Number of Wells Used	Groundwater Pumped (acre-feet)[1]	Groundwater Returned (acre-feet)[1]	Groundwater Consumed (acre-feet)[1]
All Non-Irrigation Use Totals[2]				
North Region Total	**1,240**	**6,061**	**735**	**5,326**
Region Lowland	1,069	5,764	668	5,096
Region Upland	171	298	67	230
West Region Total	**229**	**401**	**78**	**323**
Region Lowland	159	263	55	208
Region Upland	70	138	23	115
South Region Total	**268**	**474**	**86**	**388**
Region Lowland	215	367	77	290
Region Upland	53	108	9	98
Harney Basin Total	**1,737**	**6,937**	**900**	**6,037**
Basin Lowland	1,443	6,394	800	5,594
Basin Upland	294	543	100	443

Notes:

[1]Any apparent numerical inconsistencies of 1-acre-foot is due solely to rounding to nearest integer

[2]See appendix A2 to A6 and B2 to B9 and B15 to B19 for data details and sources

Table 3. Estimated annual groundwater pumped, returned, and consumed after 1999 for all non-irrigation uses in the Harney Basin, Oregon totaled by use

Groundwater Use Non-Irrigation	Number of Wells Used	Groundwater Pumped (acre-feet)[1]	Groundwater Returned (acre-feet)[1]	Groundwater Consumed (acre-feet)[1]
Public Municipal Supply[2]				
North Region	10	2,205	0	2,205
West Region	0	0	0	0
South Region	0	0	0	0
Harney Basin Total	10	2,205	0	2,205
Community Systems[3]				
North Region	14	58	42	16
West Region	6	10	9	1
South Region	9	12	10	1
Harney Basin Total	29	80	62	19
Rural Domestic[4]				
North Region	872	947	545	402
West Region	110	119	69	51
South Region	121	131	76	56
Harney Basin Total	1,103	1,198	690	508
Livestock[5]				
North Region	339	814	0	814
West Region	113	271	0	271
South Region	138	331	0	331
Harney Basin Total	590	1,417	0	1,417
Commercial-Industrial[6]				
North Region	5	2,037	148	1,889
West Region	0	0	0	0
South Region	0	0	0	0
Harney Basin Total	5	2,037	148	1,889
Totals				
North Region	1,240	6,061	735	5,326
West Region	229	401	78	323
South Region	268	474	86	388
Harney Basin Total	1,737	6,937	900	6,037

Notes:

[1]Any apparent numerical inconsistencies of 1-acre-foot is due solely to rounding to nearest integer

[2]See appendix A2 and B2 for data details and sources

[3]See appendix A3 and B3 to B5 for data details and sources

[4]See appendix A4 and B6 to B9 for data details and sources

[5]See appendix A5 and B15 for data details and sources

[6]See appendix A6 and B16 to B19 for data details and sources

Public Water Systems

This investigation found 28 public and privately owned Harney Basin public water systems noted as currently active within the Oregon Health Authority (2019a, 2019b) drinking water system database. Appendix A1 lists these systems. The list includes three municipal public water supply systems (Burns, Hines, and Seneca) served by 10 active wells total for non-irrigation uses and 25 non-municipal public and private community water supply systems served by 29 active wells total for non-irrigation uses. This investigation estimated groundwater discharge for non-irrigation uses by the three municipal water supply systems and by the 25 community water supply system as presented in the following sections.

Public Municipal Supply

Ten Harney Basin wells currently pump groundwater for non-irrigation municipal uses such as household use and business use. Table 4 summarizes the annual groundwater pumped, consumed, and returned to groundwater by basin and water budget regions, lowlands, and uplands.

The 10 non-irrigation municipal wells serve three towns in the basin's north water budget region. One well serves Seneca in the water budget uplands, four wells serve Hines, and five wells serve Burns in the water budget lowlands (appendix A2). Well information data presented in appendix A2 includes the assigned OWRD well identification, the OWRD well location data, and basic well information found on water well reports (Oregon Water Resources Department 2019a, 2019f). Excluded from appendix A2 are two municipal wells used to irrigate permitted acreage (Hines and Seneca golf courses). Permitted irrigation groundwater use is accounted in a separate report by Beamer and Hoskinson (2021).

The groundwater volume pumped from each municipal well is reported to OWRD (Oregon Water Resources Department 2019b, 2019c, 2019d). The reported water volume data for the 10 non-irrigation municipal wells was used to calculate the municipal non-irrigation groundwater use.

The annual groundwater volume pumped from the 10 wells for public municipal supply generally fluctuated from 2,000 to 2,500 acre-feet from water-year 1993 to 2010 and was generally near 2,000 acre-feet annually from water-year 2010 to 2018 (figure 5, appendix B1). The average total annual volume pumped is 2,175 acre-feet for the 1993 to 2018 water-year period (appendix B1) and 2,205 acre-feet for the two water-years corresponding to the 2000 and 2010 U.S. census (appendix B2). Calculations using the reported groundwater pumped data and the U.S. census

population and household data reported by the Portland State University Population Research Center (2019a, 2019b, 2019c) for water-years 2000 and 2010 indicate an average per capita use of 415 gallons per day and an average household use of 969 gallons per day, 0.09 acre-feet per month, 1.09 acre-feet annually (appendix B3). The monthly volume pumped varies seasonally (figure 6). The total non-irrigation municipal volume pumped is assumed to be completely consumed (table 4) given all pre-2020 wastewater discharged solely to evaporation ponds. This study assumes leakage detected at the Seneca pre-2020 ponds (J.W. Sterger, Oregon Department of Environmental Quality, written commun., 2020) discharged to the Silvies River (125 to 500-feet away) via lateral, shallow groundwater flow.

Table 4. Estimated annual groundwater pumped, returned, and consumed after 1999 for municipal non-irrigation uses in the Harney Basin, Oregon

Groundwater Use Non-Irrigation	Number of Wells Used	Groundwater Pumped (acre-feet)[1]	Groundwater Returned (acre-feet)[1]	Groundwater Consumed (acre-feet)[1]
Public Municipal Supply[2]				
North Region Total	**10**	**2,205**	**0**	**2,205**
Region Lowland	9	2,163	0	2,163
Region Upland	1	42	0	42
West Region Total	**0**	**0**	**0**	**0**
Region Lowland	0	0	0	0
Region Upland	0	0	0	0
South Region Total	**0**	**0**	**0**	**0**
Region Lowland	0	0	0	0
Region Upland	0	0	0	0
Harney Basin Total	**10**	**2,205**	**0**	**2,205**
Basin Lowland	9	2,163	0	2,163
Basin Upland	1	42	0	42

Notes:

[1]Any apparent numerical inconsistencies of 1-acre-foot is due solely to rounding to nearest integer

[2]See appendix A2 and B2 for data details and sources

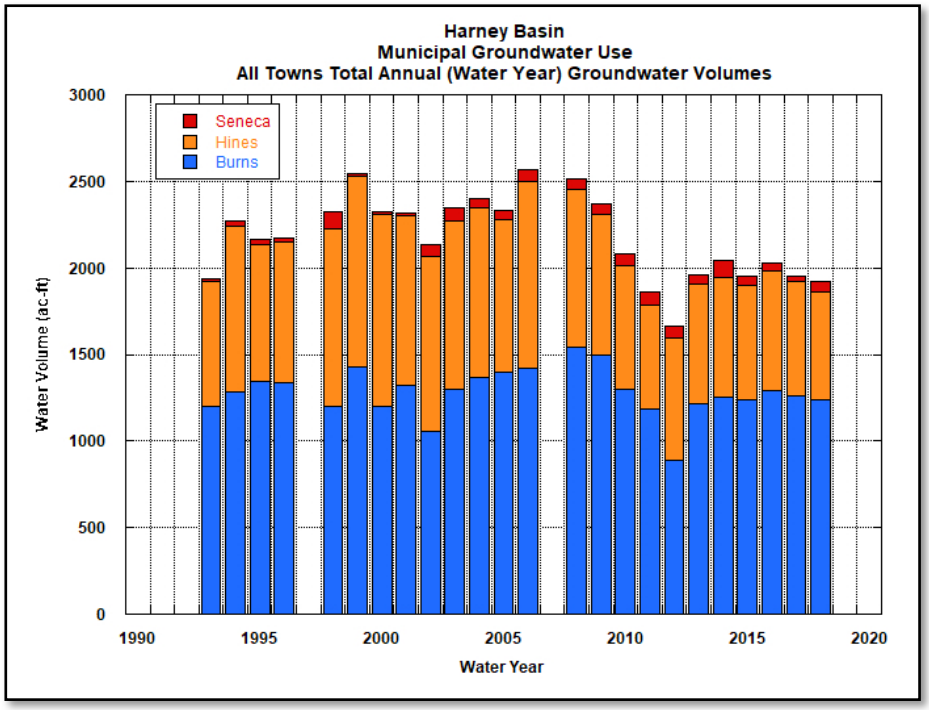

Figure 5. Harney Basin total annual municipal non-irrigation groundwater use (1990 to 2020) [Incomplete data 1985-1992, 1997, 2007, 2019-2020 as of 12 September 2019, appendix B1]

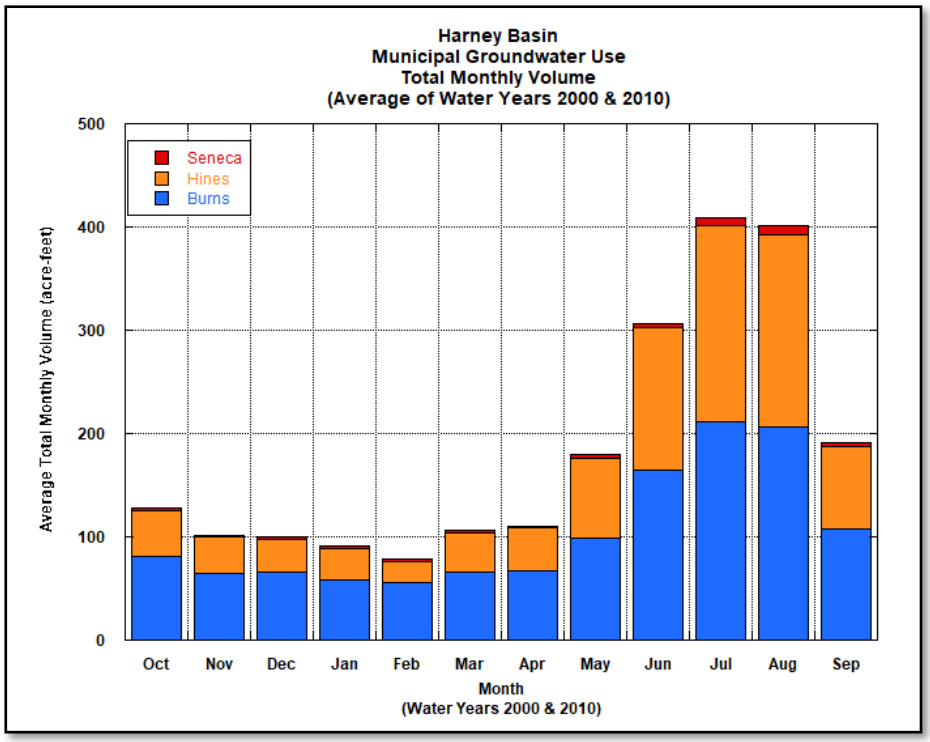

Figure 6. Harney Basin total monthly municipal non-irrigation groundwater use [Average of water years 2000 and 2010]

Community Water Systems

Twenty-five small community non-municipal, non-irrigation water systems in the Harney Basin supplied by 29 active wells are registered with the Oregon Health Authority (2019a and 2019b) (appendix A1). These water systems serve schools, motels, restaurants, stores, campgrounds, field stations, a rest stop, an airport, and an unincorporated neighborhood of 30 household connections. Table 5 summarizes the annual groundwater pumped, consumed, and returned to groundwater by basin and water budget regions, lowlands, and uplands. All 29 active community system wells are listed in appendix A3, and their locations are shown in figure 7.

Table 5. Estimated annual groundwater pumped, returned, and consumed after 1999 for community non-irrigation uses in the Harney Basin, Oregon

Groundwater Use Non-Irrigation	Number of Wells Used	Groundwater Pumped (acre-feet)[1]	Groundwater Returned (acre-feet)[1]	Groundwater Consumed (acre-feet)[1]
Community Systems[2]				
North Region Total	**14**	**58**	**42**	**16**
Region Lowland	9	58	42	16
Region Upland	5	1	1	0
West Region Total	**6**	**10**	**9**	**1**
Region Lowland	2	1	1	0
Region Upland	4	10	9	1
South Region Total	**9**	**12**	**10**	**1**
Region Lowland	9	12	10	1
Region Upland	0	0	0	0
Harney Basin Total	**29**	**80**	**62**	**19**
Basin Lowland	20	70	53	18
Basin Upland	9	10	9	1

Notes:

[1]Any apparent numerical inconsistencies of 1-acre-foot is due solely to rounding to nearest integer

[2]See appendix A3 and B3 to B5 for data details and sources

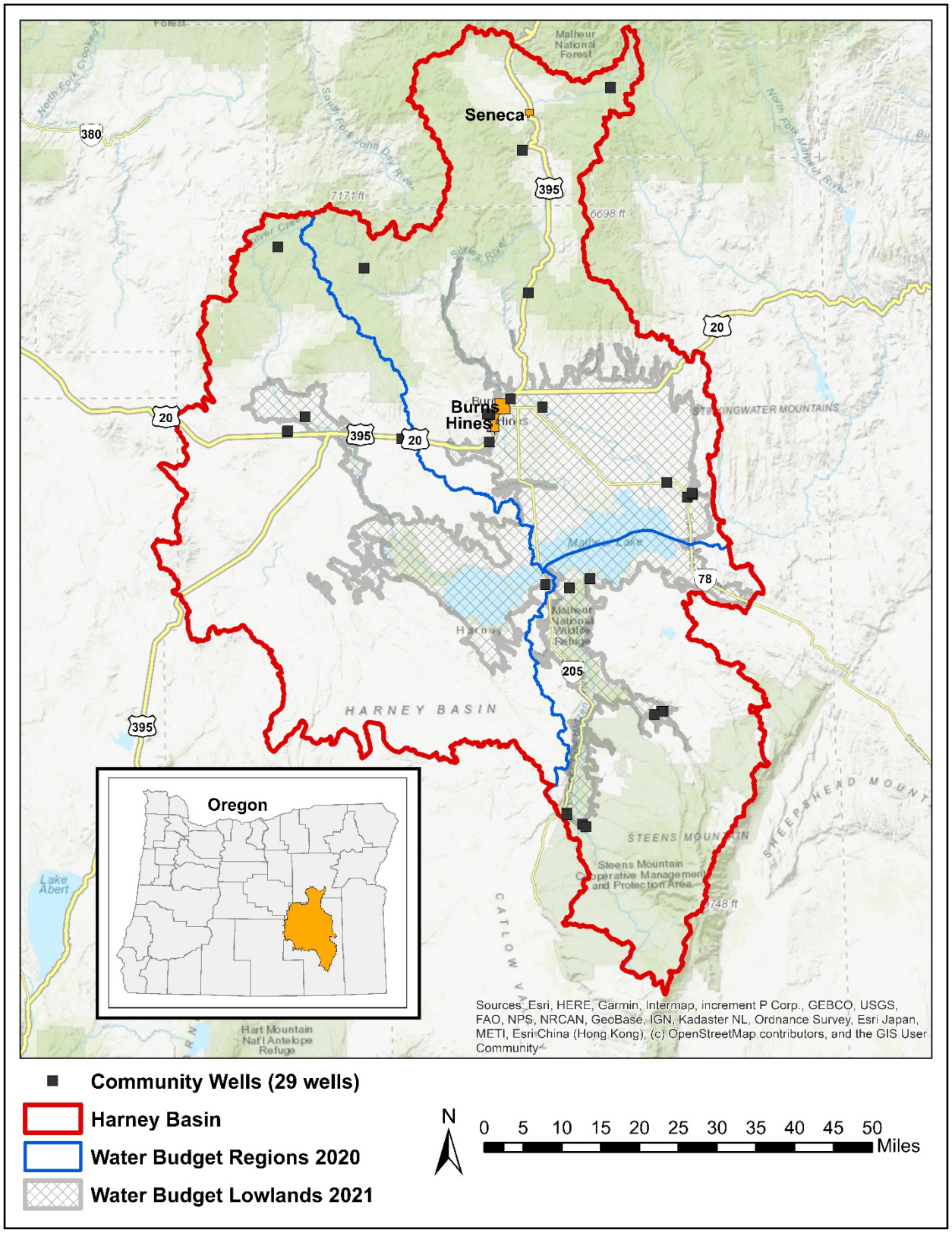

Figure 7. Distribution of Harney Basin community wells
[Some well symbols overlap. Wells listed in appendix A3.]

Only GH2O, Inc. with two wells (appendix A1, A3) serving an unincorporated neighborhood of 30 household connections adjacent to the town of Hines in the north watershed region was found to report groundwater use to the Oregon Water Resources Department (2019e) for water years 2013 to 2015 (appendix B4). Notes accompanying the reported data indicate flow meter readings were infrequent rather than monthly. Consequently, GH2O, Inc. evenly distributed the volume difference between meter readings over the intervening months. Analysis of the three-year GH2O, Inc. data indicates an annual average household use of 1.16 acre-feet (appendix B4, table B4-1), which is similar to the 1.09 acre-feet annually for the municipal water system households (appendix B3 and appendix B4, table B4-2, column B). Given the similar GH2O and municipal annual household volume and the infrequent GH2O flow meter readings, the municipal household volumes were considered a valid representation and used to calculate monthly and annual groundwater discharge volumes from the two GH2O, Inc. wells (appendix B4, table B4-2).

The calculated GH2O, Inc. monthly and annual groundwater volumes were divided into indoor use and outdoor use volumes and were further divided into indoor and outdoor use volumes consumed or returned to groundwater (appendix B4, table B4-2). The calculations used a 0.05 acre-feet per household upper limit for monthly indoor use based upon the average October to April municipal household volumes as shown in figure 8 and appendix B3. The calculations subsequently assigned monthly volumes exceeding 0.05 acre-feet per household to monthly outdoor use. Household indoor use and outdoor use volumes consumed and returned to groundwater were calculated using a State of Washington Department of Ecology (2018) recommended methodology. That methodology was determined from USGS groundwater models constructed for the State of Washington and published after 2000. Under this methodology, 10 percent of the indoor water use and 80 percent of the outdoor water use is considered consumed by humans and evapotranspiration respectively. The remaining 90 percent of the indoor water use and 20 percent of the outdoor water use is considered returned to groundwater via septic systems and deep percolation respectively. The average annual GH2O, Inc. groundwater pumped was estimated as about 33 acre-feet per year with about 14 acre-feet (42 percent) consumed by outdoor evapotranspiration and indoor human use, and about 19 acre-feet (58 percent) returned to groundwater via septic systems and deep percolation (appendix B4, table B4-2).

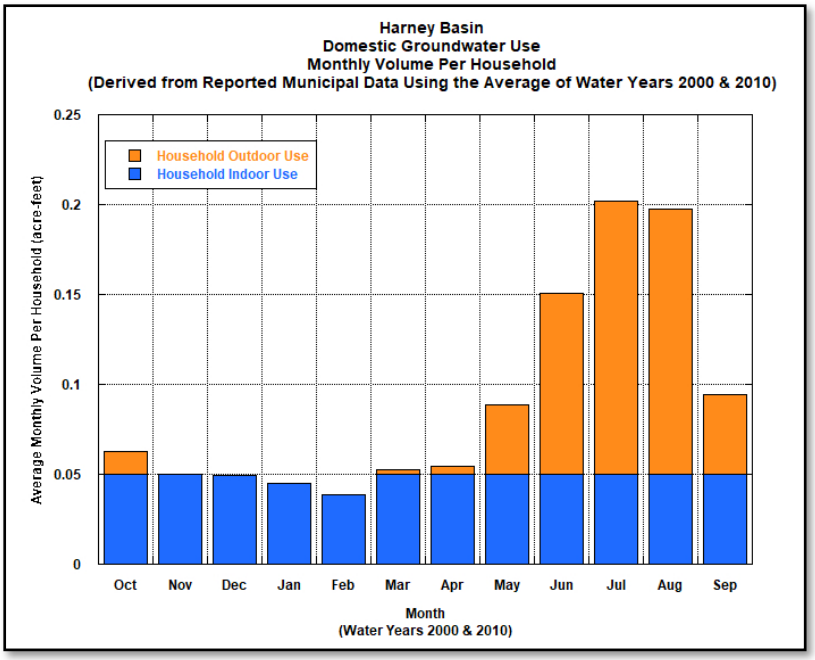

Figure 8. Harney Basin total monthly domestic household groundwater use
[From reported municipal data using the average of water years 2000 and 2010]

The annual groundwater volumes discharged from the other 27 wells serving the other 24 community water systems was calculated using published coefficients (Al-Kaisy and others, 2011 and Colorado WaterWise Council, 2007) converted to gallons per day per population served by different public facilities multiplied by the daily population served by each community water system and the days per year the system serves that population (see appendix A1 and B5). The calculations assume 10 percent of the groundwater volume discharged is consumed and the remaining 90 percent returns to groundwater via septic systems, equivalent to indoor water use.

Rural Domestic Water Systems

This investigation found 1,103 water well reports (well logs) on file at the Oregon Water Resources Department (2019f) for Harney Basin wells reportedly newly constructed, deepened, converted, altered, and/or abandoned for rural domestic use outside the town boundaries of Burns, Hines, and Seneca (figure 9, appendix A4). Some wells likely have more than one water well report due to driller revisits to deepen, convert, alter, and/or abandon. Not every well with one or more water well reports is in use. Conversely, other rural domestic wells likely have no water well report for various reasons and are not represented but may be in use.

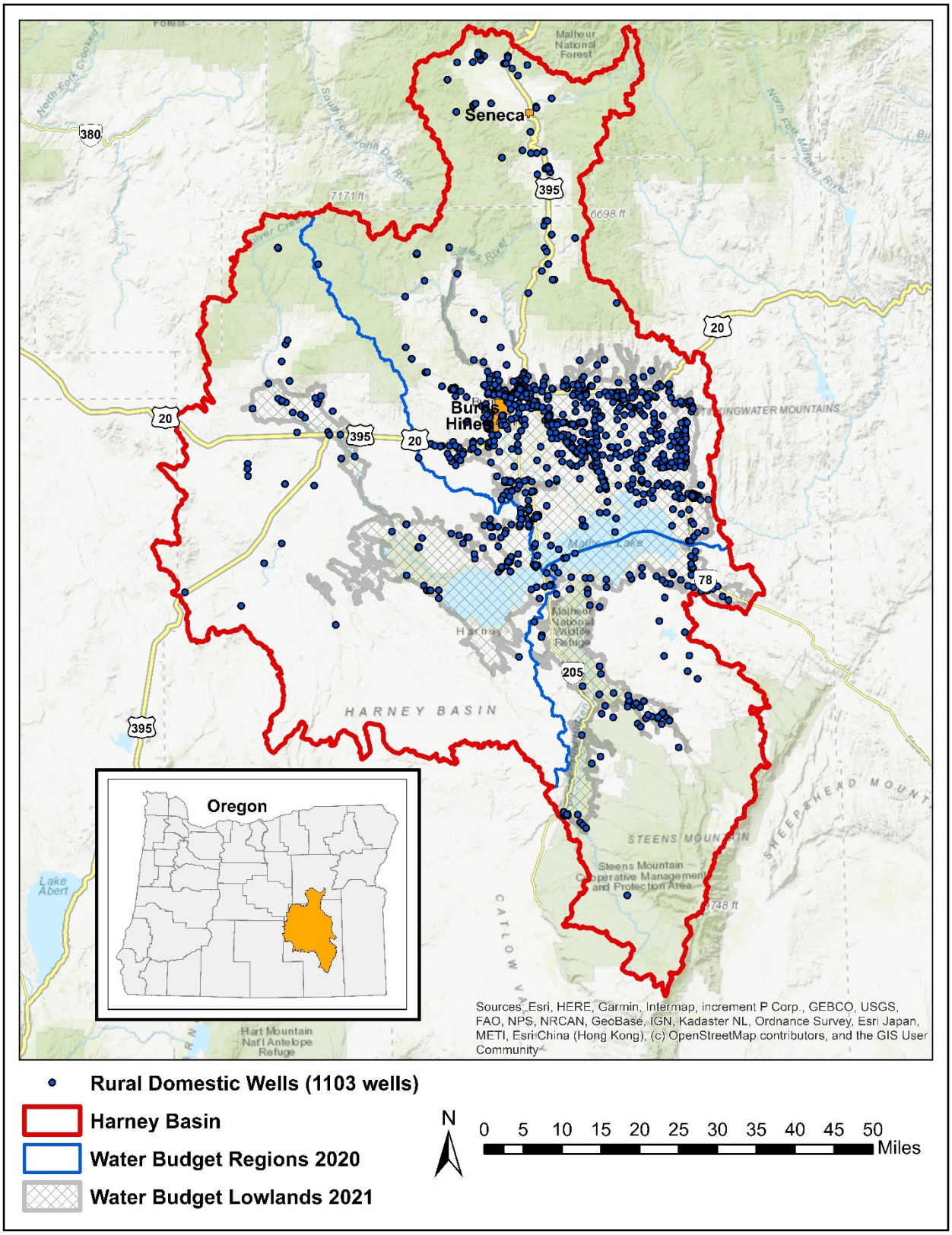

Figure 9. Distribution of Harney Basin rural domestic wells
[Some well symbols overlap. Wells listed in appendix A4.]

No direct measurement of groundwater discharge from Harney Basin wells for rural domestic use was found or conducted by this investigation. Instead, the rural domestic groundwater discharge in the basin and for each water budget region was calculated by assuming: a) all the rural domestic wells with water well reports are active and represent all the rural domestic households with wells; b) the monthly and annual average municipal household use values previously noted are valid for the rural domestic households; and c) the State of Washington Department of Ecology (2018) recommendations for determining groundwater consumed versus returned previously noted are valid for the rural domestic households. The calculation results are summarized in table 6 and shown in detail in appendices B6 to B9. The annual groundwater discharge from rural domestic wells for the entire Harney Basin was estimated as about 1,198 acre-feet with about 508 acre-feet (42 percent) consumed and 690 acre-feet (58 percent) returned to groundwater via septic systems and deep percolation. More than 75 percent of the groundwater discharged and consumed for rural domestic uses in the basin is estimated to occur in the water budget north region. More than 85 percent of the groundwater discharged and consumed for rural domestic uses in the basin is estimated to occur in the water budget lowlands.

For the sake of completeness and comparison, this investigation used a second methodology to calculate the annual and monthly rural domestic groundwater discharge in the basin and each water budget region (appendices B10 to B13). The second methodology used: a) the State of Nevada Division of Water Resources (2017) recommended annual volume per household (1.0 acre-feet); b) the number of rural domestic water well reports found (1,103 reports); and c) the State of Nevada assumption that all the groundwater volume discharged for rural household indoor and outdoor use is consumed. This investigation distributed the State of Nevada recommended annual volume of 1.0 acre-feet per household to monthly volumes using the monthly municipal per household volumes (appendix B3) converted to a fraction of 1.0 acre-feet.

A comparison of the results for the two methodologies (appendices B6 to B9 compared to B10 to B13) show similarities and differences. The total annual groundwater volume discharged for the entire basin, for each water budget region, and for each rural domestic household are similar (1,198 acre-feet per year and 1,103 acre-feet per year, respectively, for the basin and 1.09 acre-feet per year and 1.00 acre-feet per year, respectively, per household). The total annual groundwater volume consumed and returned to groundwater differ for the entire basin, for each water budget region, and for each rural domestic household. The first methodology shown in table

6 and appendices B6 to B9 calculated 42 percent of the annual groundwater volume consumed and 58 percent returned to groundwater. The second methodology shown in appendices B10 to B13 calculated 100 percent of the annual groundwater volume consumed and zero percent returned to groundwater. The first methodology, which accounts for groundwater volumes consumed and returned is considered more representative of Harney Basin rural domestic household groundwater use. than the second methodology. Hence, this investigation uses the first method results only to represent rural domestic household groundwater use.

Table 6. Estimated annual groundwater pumped, returned, and consumed after 1999 for rural domestic non-irrigation uses in the Harney Basin, Oregon

Groundwater Use Non-Irrigation	Number of Wells Used	Groundwater Pumped (acre-feet)[1]	Groundwater Returned (acre-feet)[1]	Groundwater Consumed (acre-feet)[1]
Rural Domestic[2]				
North Region Total	**872**	**947**	**545**	**402**
Region Lowland	765	831	478	352
Region Upland	107	116	67	49
West Region Total	**110**	**119**	**69**	**51**
Region Lowland	87	94	54	40
Region Upland	23	25	14	11
South Region Total	**121**	**131**	**76**	**56**
Region Lowland	106	115	66	49
Region Upland	15	16	9	7
Harney Basin Total	**1,103**	**1,198**	**690**	**508**
Basin Lowland	958	1,040	599	441
Basin Upland	145	157	91	67

Notes:

[1]Any apparent numerical inconsistencies of 1-acre-foot is due solely to rounding to nearest integer

[2]See appendix A4 and B6 to B9 for data details and sources

Livestock Water Systems

This investigation found 590 water well reports (well logs) on file at the Oregon Water Resources Department (2019f) for Harney Basin wells reportedly newly constructed, deepened, converted, altered, and/or abandoned for livestock use (figure 10, appendix A5). Some wells likely have more than one water well report due to driller revisits to deepen, convert, alter, and/or abandon. Not every livestock well with one or more water well reports is in use. Conversely, other livestock wells likely have no water well report for various reasons and are not represented but may be in use.

The annual groundwater discharge from livestock wells calculation used a per head of cattle and sheep coefficient and a total number of cattle and sheep to determine an annual volume that was divided by the number of livestock wells. The U.S. Department of Agriculture (2018, 2019a, and 2019b) estimated 105,000 cattle and 2,385 sheep reside in the entire Harney County. The total daily water demand per head of cattle can range from 4.0 to 20.6 gallons per day depending upon air temperature and the animal's weight and classification (National Academies of Sciences, Engineering, and Medicine, 2016, Winchester and Morris, 1956, appendix B14). The total daily water demand per head of sheep can range from 0.7 to 3.3 gallons per day (Lovelace, 2009). Assuming all the Harney County cattle and sheep reside within the Harney Basin (Harney County and Grant County portions), assuming all the livestock drink groundwater only (an undetermined percentage drink surface water), and using a median water-use coefficient per head of cattle (12 gallons per day per head) and sheep (2 gallons per day per head) as reported in Lovelace (2009), the estimated groundwater discharge for livestock is 1,417 acre-feet total annually for the Harney Basin or 2.40 acre-feet annual total for each livestock well in the basin (table 7, appendix B15).

When considering the distribution of the livestock wells (figure 10), more than 55 percent of the groundwater discharge for livestock in the basin is estimated to occur in the water budget north region, and more than 75 percent of the groundwater discharge for livestock in the basin is estimated to occur in the water budget lowlands (table 7, appendix B15). All the groundwater discharge for livestock is assumed to be consumed.

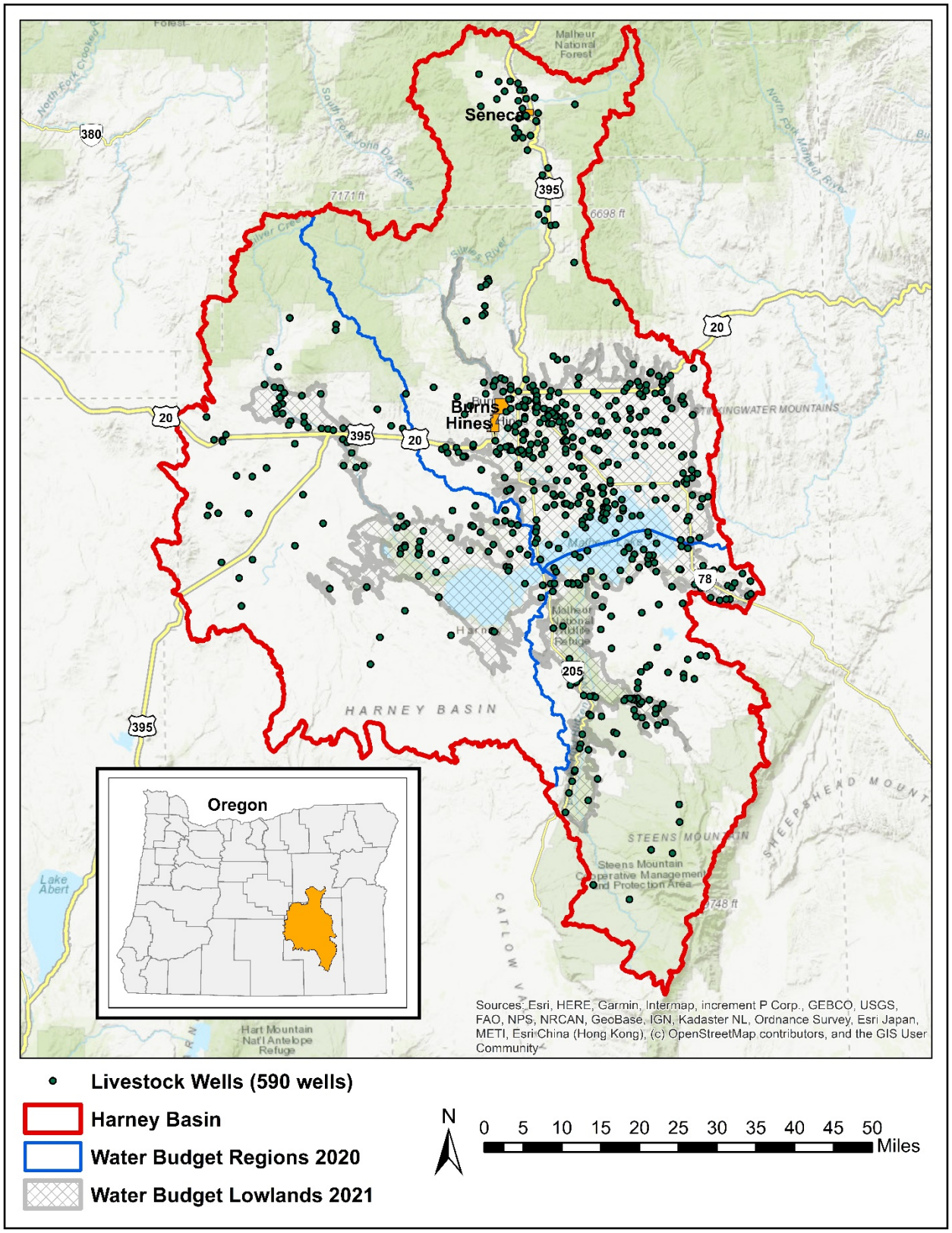

Figure 10. Distribution of Harney Basin livestock wells
[Some well symbols overlap. Wells listed in appendix A5.]

Table 7. Estimated annual groundwater pumped, returned, and consumed after 1999 for livestock non-irrigation uses in the Harney Basin, Oregon

Groundwater Use Non-Irrigation	Number of Wells Used	Groundwater Pumped (acre-feet)[1]	Groundwater Returned (acre-feet)[1]	Groundwater Consumed (acre-feet)[1]
Livestock[2]				
North Region Total	**339**	**814**	**0**	**814**
Region Lowland	281	675	0	675
Region Upland	58	139	0	139
West Region Total	**113**	**271**	**0**	**271**
Region Lowland	70	168	0	168
Region Upland	43	103	0	103
South Region Total	**138**	**331**	**0**	**331**
Region Lowland	100	240	0	240
Region Upland	38	91	0	91
Harney Basin Total	**590**	**1,417**	**0**	**1,417**
Basin Lowland	451	1,083	0	1,083
Basin Upland	139	334	0	334

Notes:

[1]Any apparent numerical inconsistencies of 1-acre-foot is due solely to rounding to nearest integer

[2]See appendix A5 and B15 for data details and sources

Commercial-Industrial Water Systems

This investigation found three facilities active after 1999 served by wells authorized by three Oregon groundwater rights signed after 1995 for commercial, industrial, or geothermal uses (appendix A6, B16 to 19, Oregon Water Resources Department 2021a, 2021b, 2021c). One right includes irrigation use also (appendix B16). All three facilities are located in the water budget lowland of the water budget north region (figure 11). Two facilities served by a single well each are located in Hines, and the third facility (appendix B18) served by three wells before 2020 and five wells after 2020 is located in Harney Valley about three miles northwest of Crane. The estimated maximum groundwater discharge for commercial-industrial use after excluding about 212 acre-feet of tail water used for irrigation from May through August is about 2,037 acre-feet total annually for the Harney Basin with about 148 acre-feet per year returned to groundwater via an injection well and about 1,889 acre-feet per year consumed (table 8, appendix B16 to 19).

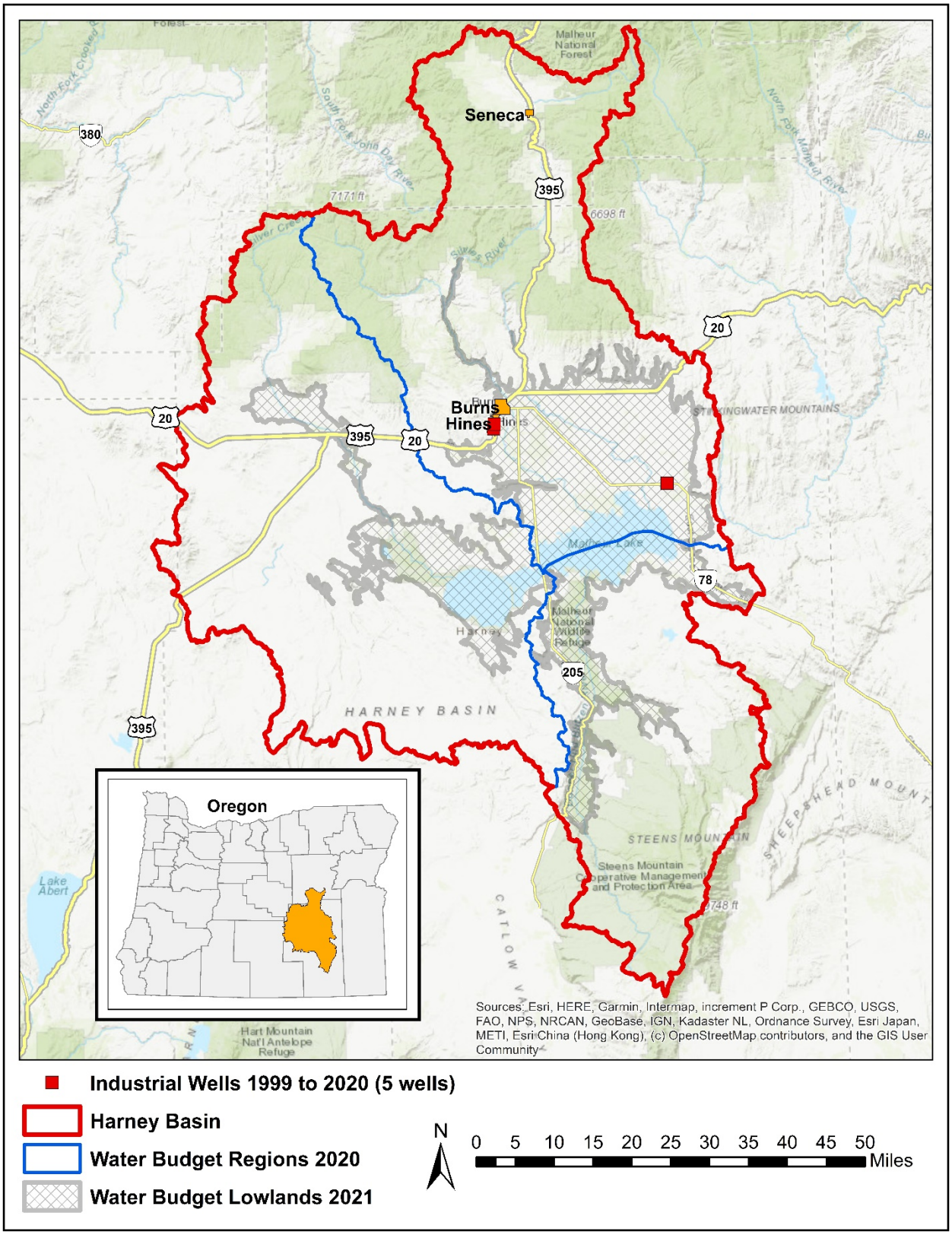

Figure 11. Distribution of Harney Basin commercial-industrial wells (1999 to 2020) [Some well symbols overlap. Wells listed in appendix A6.]

Table 8. Estimated annual groundwater pumped, returned, and consumed after 1999 for commercial-industrial non-irrigation uses in the Harney Basin, Oregon

Groundwater Use Non-Irrigation	Number of Wells Used	Groundwater Pumped (acre-feet)[1]	Groundwater Returned (acre-feet)[1]	Groundwater Consumed (acre-feet)[1]
Commercial-Industrial Supply[2]				
North Region Total	**5**	**2,037**	**148**	**1,889**
Region Lowland	5	2,037	148	1,889
Region Upland	0	0	0	0
West Region Total	**0**	**0**	**0**	**0**
Region Lowland	0	0	0	0
Region Upland	0	0	0	0
South Region Total	**0**	**0**	**0**	**0**
Region Lowland	0	0	0	0
Region Upland	0	0	0	0
Harney Basin Total	**5**	**2,037**	**148**	**1,889**
Basin Lowland	5	2,037	148	1,889
Basin Upland	0	0	0	0

Notes:

[1]Any apparent numerical inconsistencies of 1-acre-foot is due solely to rounding to nearest integer

[2]See appendix A6 and B16 to B19 for data details and sources

For comparative industrial use prior to 1999, this investigation found six groundwater rights related to the Hines Western Pine Company, Hines Lumber Company that operated from the 1930s to the 1980s in or near Hines, Seneca, and Silvies Valley (appendix 20, figure 12), all within the north water budget region. The groundwater rights allowed a mix of industrial, railroad, fire protection, domestic (City of Seneca), and irrigation groundwater use. Actual annual groundwater volumes discharged were not determined, but the maximum annual groundwater discharge volumes authorized were determined based on the maximum pumping rates authorized by the water rights (appendix 20). After excluding domestic (municipal) and irrigation uses, the calculated maximum total annual groundwater discharge volume authorized for commercial-industrial use in the 1980s was about 10,618 acre-feet per year (about 8,362 acre-feet per year in the lowland and 2,256 acre-feet per year in the upland) (appendix 20). The calculated maximum total annual groundwater discharge volume authorized before 1960 was about 5,227 acre-feet per year (about 3,584 acre-feet per year in the lowland and 1,643 acre-feet per year in the upland).

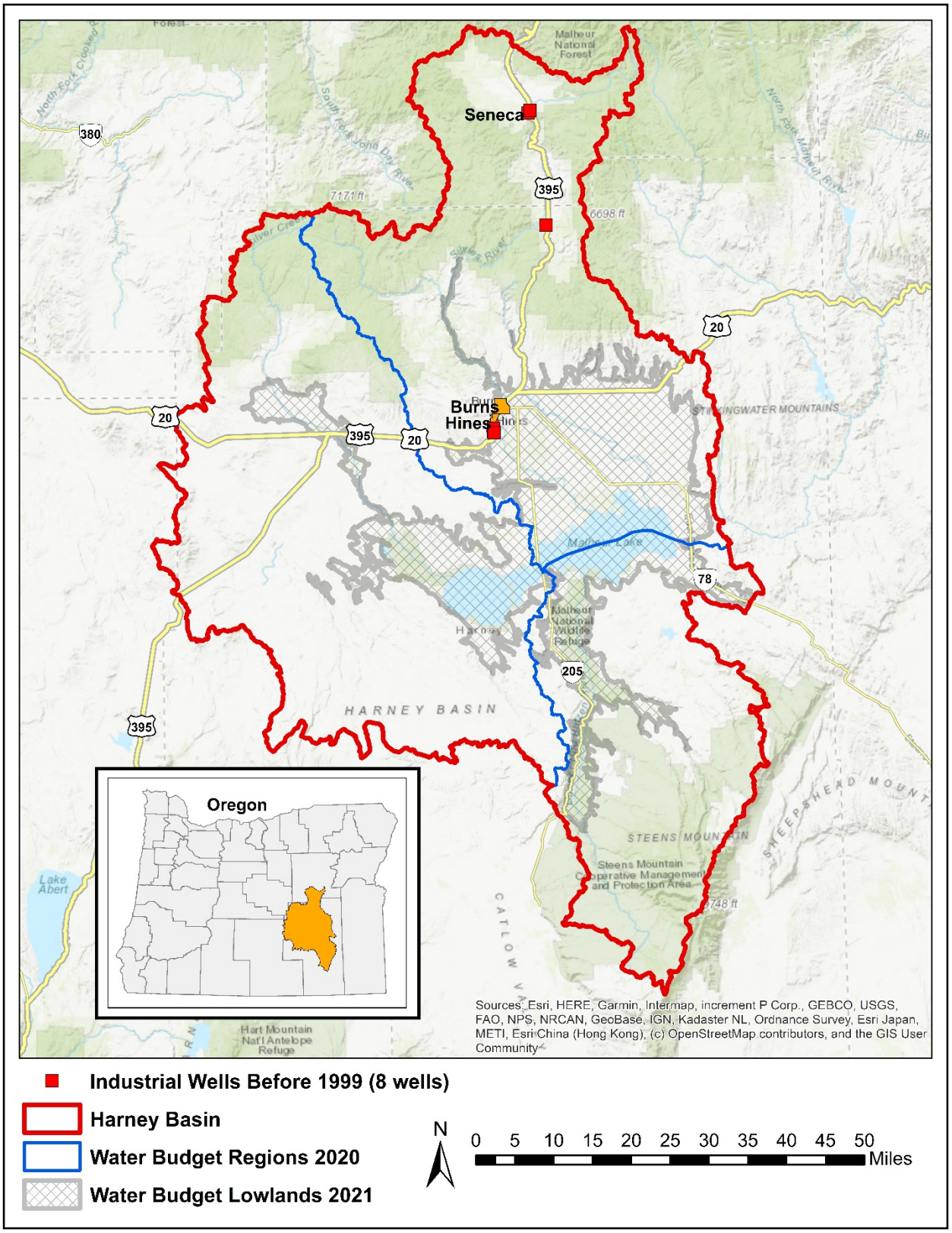

Figure 12. Distribution of Harney Basin commercial-industrial wells (before 1999)
[Some well symbols overlap. Wells listed in appendix A6.]

Conclusions and Recommendations

Annual groundwater discharge from Harney Basin wells for all non-irrigation uses after 1999 was estimated at about 6,937 acre-feet, with about 6,037 acre-feet consumed, and about 900 acre-feet per year returned to groundwater. This annual groundwater discharge from basin wells for all non-irrigation uses is nearly five percent of the annual groundwater discharge from basin wells for all uses.

The accuracy, uncertainty, and limitations related to the calculated groundwater discharge from basin wells for non-irrigation uses varies with the direct or indirect data available for each use and the subsequent methodology applied for the calculations. The greatest accuracy (least uncertainty) corresponds to the public municipal supply systems for the towns of Burns, Hines, and Seneca, who meter their wells and report the monthly volume discharged from each well. The same accuracy could be achieved for the other uses if totalizing flow meters yielding direct data were properly installed, maintained, read monthly, and reported annually for each well. Data dependent water management decisions, implementation, and compliance would benefit from the direct and more accurate monthly data.

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Appendix A: Tables listing municipal, community, rural domestic, livestock, and commercial-industrial wells found

Well Identification

The Oregon Water Resources Department (OWRD) and this appendix identify wells by the water well report number assigned by OWRD. Each number begins with four letters to identify the county in which the well is located and ends with a one to six-digit number. An example is HARN 52657 assigned to a 623-foot deep groundwater level observation well near Chain Lakes.

Some wells have multiple well reports. Every effort was made to identify and assign the number of the earliest report to the well. An example is HARN 51014 in northeast Harney Valley near Laton Point. There are currently three water well reports for this well: HARN 51014, HARN 51036, and HARN 52211. Water well report HARN 51014 is for the original newly constructed well in January 2004. This is the number assigned for well identification. HARN 51036 reports alterations done to the well in April 2004: enlarging the borehole diameter, replacing the original casing with larger diameter casing, and deepening the well 30 feet. HARN 52211 reports a deepening of the well 135 feet in May 2015. There may be rare instances where assigning the number of the earliest report did not occur.

Some wells have no water well report for various reasons. They were not included in the non-irrigation groundwater use analyses and are not included in this appendix. Two exceptions are a non-municipal community system well serving Diamond School and a commercial-industrial well serving Crystal Crane Hot Springs.

Well Locations

This appendix provides well locations using both the public land survey system (PLS or plss) (Figure A-1) and the Latitude-Longitude system. The location horizontal error is highly variable from less than 1-foot error for wells site-visited by the Harney Basin groundwater study with a Latitude-Longitude location established on-site with survey-grade global positioning system (GPS) units to more than 1-mile error for wells never visited by the Harney Basin groundwater study with unconfirmed reported public land survey system locations. In this appendix, the Latitude-Longitude location assigned to wells with reported PLS locations only is the center of the smallest PLS tract reported. They are flagged by a 9,999 feet horizontal error.

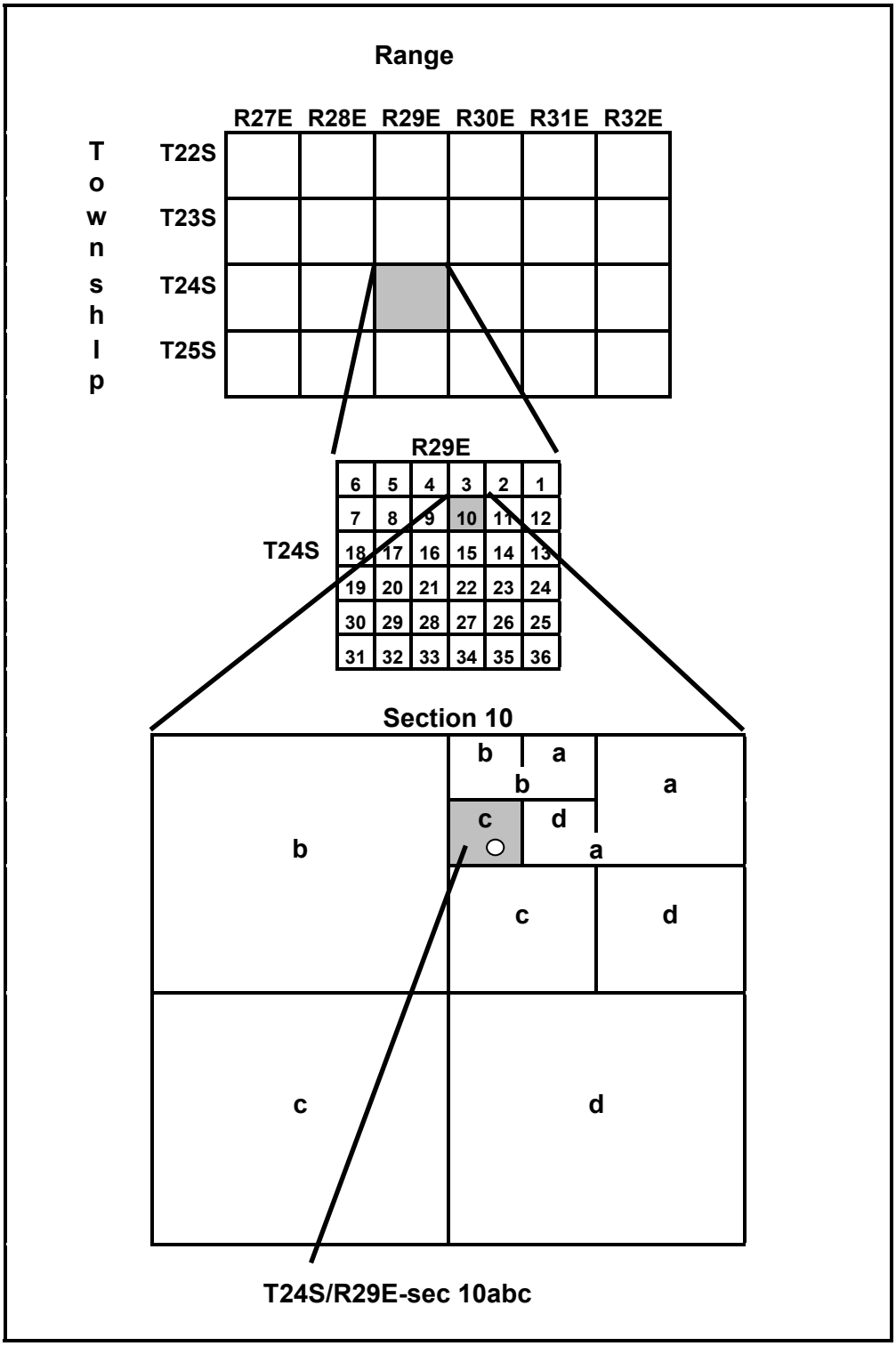

Figure A-1. Illustration of the public land survey system (PLS or plss) for well location

The PLS system provides locations by dividing land into subsequently smaller north-south, east-west grids. Townships are the largest grid tracts, generally 36 square-miles (6 miles by 6 miles). Each township is subdivided into 36 sections that are generally 1 square-mile (640 acres) each. Sections are subdivided into quarter sections (160 acres), which are further subdivided into quarter-quarter sections (40 acres) and subdivided again into quarter-quarter-quarter sections (10 acres). The PLS system identifies a well's location by listing land tracts by descending size. For example, figure A1 shows a well located at T24S/R29E-sec 10abc. This means the well is within:

- The 36 square-mile township identified as township 24 south and range 29 east;
- The 1 square-mile (640 acre) section identified as section 10;
- The northeast quarter section (160 acre) identified by the first letter (a);
- The northwest quarter-quarter section (40 acre) identified by the second letter (b); and
- The southwest quarter-quarter-quarter section (10 acre) identified by the third letter (c).

Harney Basin Public Water Systems

Appendix A1 lists 28 public and privately owned Harney Basin public water systems found as currently active within the Oregon Health Authority (2019a, 2019b) drinking water system database. The list includes 3 municipal systems (Burns, Hines, and Seneca) served by 10 active wells total and 25 non-municipal systems served by 29 active wells total.

Harney Basin Municipal Wells

Appendix A2 lists the 10 Harney Basin wells that currently pump groundwater for non-irrigation municipal uses such as household use and business use. The wells serve three towns in the basin's water budget north region. One well serves Seneca, four wells serve Hines, and five wells serve Burns. The groundwater volume pumped from each well is reported to OWRD (Oregon Water Resources Department 2019b, 2019c, 2019d). That water volume data was used to calculate the Harney Basin municipal groundwater use. Well information data in the appendix A2 table for the 10 wells listed includes the assigned OWRD well identification, the OWRD well location data, and basic well information found on water well reports (Oregon Water Resources Department 2019a, 2019f).

Excluded from appendix A2 are two municipal wells used to irrigate permitted acreage. Permitted irrigation groundwater use is outside the scope of this report. One well serves Hines and the other well serves Seneca. Both wells are used to irrigate golf courses.

Harney Basin Community Wells

Appendix A3 lists all 29 active non-municipal (community) public water system wells. The wells listed are the primary well identifier for the 29 wells. Several wells have multiple well reports for deepening, alteration, or other work. Nearly 50 percent are located in the basin's water budget north region area. The 29 wells serve households, motels, schools, churches, campgrounds, restaurants, offices, and a rest area. Well information data in the appendix A3 table includes the assigned OWRD well identification, the OWRD well location data, and basic well information found on water well reports (Oregon Water Resources Department 2019a, 2019f). The well serving Diamond School currently has no OWRD well identification nor a water well report.

Harney Basin Rural Domestic Wells

Appendix A4 lists 1,103 water well reports (well logs) on file at OWRD for Harney Basin wells reportedly newly constructed, deepened, converted, altered, and/or abandoned for domestic use outside the town boundaries of Burns, Hines, and Seneca (rural domestic wells). Some wells may have more than one water well report. Some existing rural domestic wells likely have no water well report for various reasons and are not represented. Well information data for the wells listed includes the assigned OWRD well identification, the OWRD well location data, and basic well information found on water well reports (Oregon Water Resources Department 2019a, 2019f).

Harney Basin Livestock Wells

Appendix A5 lists 590 water well reports (well logs) on file at OWRD for Harney Basin wells reportedly newly constructed, deepened, converted, altered, and/or abandoned for livestock use. Some wells may have more than one water well report. Some livestock wells likely have no water well report for various reasons and are not represented. Well information data for the wells listed includes the assigned OWRD well identification, the OWRD well location data, and basic well information found on water well reports (Oregon Water Resources Department 2019a, 2019f).

Harney Basin Commercial-Industrial Wells

Appendix A6 lists 15 wells related to active and formerly active facilities that have or had commercial and/or industrial groundwater rights (appendix B16 to B18 and B20). Eight wells relate to facilities that operated before 1999 from the 1930s to the 1980s (appendix B20). Seven wells relate to other facilities operating after 1999 (appendix B16 to B18). All the wells are located in the basin's water budget north region. The wells listed are the primary well identifier. Some wells have multiple well reports for deepening, alteration, or other work. For example, well GRAN 784 listed in appendix A6 was deepened. The water well report documenting that deepening (GRAN 785) is not shown in appendix A6. Well information data in the appendix A6 table includes the assigned OWRD well identification, the OWRD well location data, and basic well information found on water well reports (Oregon Water Resources Department 2019a, 2019f). One well serving Crystal Crane Hot Springs is not listed in appendix A6 given it currently has no OWRD well identification nor a water well report.

Appendix: A1

Table listing Harney Basin public water systems found in the Oregon Health Authority Drinking Water System database
(See notes at end of table)

Non-Municipal Public Water Systems

PWS ID	PWS Name	PWS Status	County	System Type	Owner Type	Active Wells	Connections	Population Served	Primary Source	OWRD Well Identification[d] County	OWRD Well Identification[d] Number
OR4195040	BLM BURNS DISTRICT OFFICE	A	Harney	NTNC	Private	1	3	70	GW	HARN	797
OR4190613	BLM CHICKAHOMINY CAMPGROUND	A	Harney	NP	Federal Government	2	1	15	GW	HARN	253
										HARN	50184
OR4193602	BLM PAGE SPRINGS REC SITE	A	Harney	NC	Federal Government	1	1	30	GW	HARN	1900
OR4195279	BURNS MUNICIPAL AIRPORT	A	Harney	NP	Local Government	1	1	16	GW	HARN	51126
OR4106236	CRANE LDS CHAPEL	A	Harney	NP	Private	1	1	12	GW	HARN	51828
OR4195062	CRANE STORE & CAFE	A	Harney	NP	Private	1	2	15	GW	HARN	1236
OR4190548	CRANE UNION HIGH/ELEM SD 1J	A	Harney	NTNC	Local Government	1	13	200	GW	HARN	51300
OR4195612	CRYSTAL CRANE HOT SPRINGS	A	Harney	NC	Private	1	3	50	GW	HARN	52601
OR4106197	DIAMOND SD #7	A	Harney	NP	State Government	1	1	17	GW	No well report	No well ID
OR4105665	FRENCHGLEN ELEM SD 16	A	Harney	NP	Local Government	1	4	14	GW	HARN	52077
OR4105730	G H2O INC	A	Harney	C	Private	2	30	65	GW	HARN	295
										HARN	50578
OR4191159	HORSESHOE INN	A	Harney	NP	Private	1	1	15	GW	HARN	352
OR4105773	HOTEL DIAMOND	A	Harney	NP	Private	2	1	20	GW	HARN	1592
										HARN	1941
OR4106016	MALHEUR FIELD STATION	A	Harney	NP	Private	1	14	22	GW	HARN	1464
OR4195132	THE NARROWS	A	Harney	NC	Private	1	1	40	GW	HARN	50795
OR4191105	ODOT HD SAGE HEN HILL REST AREA	A	Harney	NC	State Government	1	1	200	GW	HARN	277
OR4191028	OPRD FRENCHGLEN HOTEL	A	Harney	NC	State Government	1[a]	3	25	GW	HARN	52156
OR4194897	SILVIES VALLEY RANCH	A	Grant	NP	Private	2	12	24	GW	GRAN	51009
										GRAN	51302
OR4191161	STEENS MOUNTAIN WILDERNESS RESORT	A	Harney	NC	Private	1	42	30	GW	HARN	1653
OR4105051	SUNTEX ELEMENTARY SD 10	A	Harney	NP	Local Government	1	3	13	GW	HARN	244
OR4194298	USFS DELINTMENT LAKE EAST HP	A	Harney	NC	Federal Government	1	1	45	GW	HARN	1697
OR4192894	USFS FALLS CAMPGROUND	A	Harney	NP	Federal Government	1	1	10	GW	HARN	2020
OR4192581	USFS IDLEWILD CAMPGROUND	A	Harney	NP	Federal Government	1[b]	6	15	GW	HARN	51008
OR4105483	USFS PARISH CABIN CAMPGROUND	A	Grant	NP	Federal Government	1	4	15	GW	GRAN	50827
OR4193697	USFWS MALHEUR WILDLIFE REFUGE	A	Harney	NP	Federal Government	1	5	20	GW	HARN	50707
	Totals	**25**				**29**	**155**	**998**			

Municipal Public Water Systems

PWS ID	PWS Name	PWS Status	County	System Type	Owner Type	Active Wells	Connections	Population Served	Primary Source	OWRD Well Identification[d] County	OWRD Well Identification[d] Number
OR4100153	BURNS WATER DEPARTMENT	A	Harney	C	Local Government	5	1,500	3,000	GW	HARN	284
										HARN	285
										HARN	289
										HARN	290
										HARN	478
OR4100807	CITY OF SENECA	A	Grant	C	Local Government	1[c]	110	200	GW	GRAN	783
OR4100382	HINES WATER DEPARTMENT	A	Harney	C	Local Government	4	630	1,563	GW	HARN	297
										HARN	315
										HARN	52338
										HARN	52339
	Totals	**3**				**10**	**2,240**	**4,763**			

Notes:

[a]OPRD Frenchglen Hotel: 1 active well, 3 inactive emergency wells

[b]USFS Idlewild Campground: 1 active well, 1 inactive emergency spring

[c]Seneca: 1 active well, 1 inactive emergency well

[d]Wells listed in this column were identified by this author. They are for non-irrigation use only. Hines and Seneca have irrigation wells which are excluded from the table. Irrigation use is accounted in Beamer and Hoskinson (2021).

Abbreviations for Table:

A: active
C: community
GW: groundwater
NC: transient non-community
NP: non-EPA (state regulated)
NTNC: non-transient non-community
PWS ID: public water system identification in Oregon Health Authority Drinking Water System database
PWS Name: name of the public water system

Data Sources:

Oregon Health Authority 2019a, 2019b
Oregon Water Resources Department 2019a, 2019b, 2019c, 2019d, 2019f

Appendix A2:

Table listing municipal wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
															Well Work Done				
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
GRAN	783	GRAN0000783	16.00S/31.00E-34dd	44.13482411	-118.97922307	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	330.00	NULL	12/31/1930	UNKNOWN	1	0	0	0	0
HARN	284	HARN0000284	23.00S/30.00E-12ad	43.59222358	-119.06314903	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	251.00	251.00	12/31/1925	Community	1	0	0	0	0
HARN	285	HARN0000285	23.00S/30.00E-12ad	43.59285938	-119.06286496	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	253.00	253.00	12/31/1927	Community	1	0	0	0	0
HARN	289	HARN0000289	23.00S/30.00E-12dd	43.58663756	-119.06145075	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	304.00	304.00	12/10/1958	Community	0	0	0	1	0
HARN	290	HARN0000290	23.00S/30.00E-13bc	43.57927728	-119.07082469	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	356.00	356.00	04/30/1977	Community	1	0	0	0	0
HARN	297	HARN0000297	23.00S/30.00E-16dc	43.55873756	-119.08980691	300.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	345.00	345.00	04/28/1967	Community	1	0	0	0	0
HARN	315	HARN0000315	23.00S/30.00E-26ad	43.54700300	-119.08080100	200.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	173.00	173.00	NULL	Industrial	1	0	0	0	0
HARN	478	HARN0000478	23.00S/31.00E-18cb	43.58265383	-119.05592047	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	290.00	290.00	08/07/1974	Community	1	0	0	0	0
HARN	52338	HARN0052338	23.00S/30.00E-23db	43.56449100	-119.08964956	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	325.00	325.00	12/31/1929	Community	1	0	0	0	0
HARN	52339	HARN0052339	23.00S/30.00E-23ad	43.56175448	-119.08281280	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	400.00	400.00	12/31/1949	Community	1	0	0	0	0

Notes:
The well locations listed are the best location available for each well listed as of September 2019
See Appendix A1 for public water system (PWS) associated with each well listed
Entry Possible for Multiple Columns
NULL: nothing entered and/or not known, applies to multiple columns
OTH or OTHER: not identified, applies to Latitude-Longitude Method and Well Primary Use columns
UNKNOWN: not known, applies to multiple columns
Entry Possible for Horizontal Error
0.00 to 9,999.00 feet
9,999.00 is an entry flag indicating the horizontal error is unknown and/or is likely very large
Entry Possible for Location Origin
ODEQ: Oregon Department of Environmental Quality
OTH or OTHER: not identified
OWRD: Oregon Water Resources Department
USGS: U.S. Geological Survey
Entry Possible for Location Source at OWRD
FIELD SERVICES SECTION: well location determined at OWRD by Field Service reviews and/or projects and/or field work
GROUNDWATER SECTION: well location determined at OWRD by Groundwater Section reviews and/or projects and/or field work
WATER RIGHT: well location determined at OWRD using information within water right materials filed and/or recorded
WELL LOG: well location determined at OWRD using information within water well report filed and/or recorded
Entry Possible for Latitude-Longitude Method
1:125,000 MAP: well location determined using a 1:125,000 scale map
1:62,500 MAP: well location determined using a 1:62,500 scale map
1:24,000 MAP: well location determined using a 1:24,000 scale map
MAP SCALE UNKNOWN: well location determined using a map of an unknown, uncertain, and/or undetermined scale
GPS: well location determined in the field at the well site using an unspecified Global Position System (GPS) unit
GPS FIELD OFFICE: well location determined in the field at the well site by OWRD field sevices staff using available GPS capabilities
GPS IPAD: well location determined in the field at the well site using the GPS capabilities within an Apple i-Pad unit
GPS SURVEY GRADE: well location determined in the field at the well site using a survey grade GPS unit
WATER RIGHT APPLICATION MAP: well location determined at OWRD using information on a map accompanying a water right application
WATER RIGHT FINAL PROOF MAP: well location determined at OWRD using information on a final proof map accompanying documents to "prove" a water right eligible to receive a certificate
WATER RIGHT TRANSFER MAP: well location determined at OWRD using information on a map accompanying a water right transfer application
WATER RIGHT UNKNOWN SOURCE: well location determined at OWRD using unidentified information within water right materials filed and/or recorded
WELL LOG AND IMAGERY: well location determined at OWRD using GPS and/or PLS location information on a water well report along with aerial and/or satellite imagery (often georeferenced) to see and establish the well location
Entry Possible for Latitude-Longitude Method Comment
exempt_use_map: the well location was determined from an exempt use map submitted to owrd documenting a non-water right well location on a map that can vary in quality and accuracy
owrd_field_staff: owrd field staff determined the well location
owrd_groundwater_staff: owrd groundwater staff determined the well location
well_report_lat_long: well location latitude-longitude is from latitude-longitude recorded on the water well report
well_report_plss: well location latitude-longitude is the center of the center of the smallest public land survey system (Township/Range-Section quarter-quarter-quarter) acreage tract reported
Notes for Well Work Done:
Abandon Well: water well report (well log) listed documents the abandonment of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Alter Well: water well report (well log) listed documents the alteration of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Convert Well: water well report (well log) listed documents the conversion of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Deepen Well: water well report (well log) listed documents the deepening of an existing well (1 = box on report form checked, 0 = box on report form not checked)
New Well: water well report (well log) listed documents the construction of a new well (1 = box on report form checked, 0 = box on report form not checked)
Data Sources:
Oregon Water Resources Department 2019a, 2019b, 2019c, 2019d, 2019f

Appendix A3:

Table listing community wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
															Well Work Done				
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
GRAN	50827	GRAN0050827	16.00S/33.00E-16cd	44.17891000	-118.76437000	15.70	NULL	NULL	NULL	owrd_field_staff	161.00	161.00	08/07/2006	Community	1	0	0	0	0
GRAN	51009	GRAN0051009	17.00S/31.00E-27cc	44.06503256	-118.99580316	50.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	346.00	346.00	09/07/2009	Irrigation	1	0	0	0	0
GRAN	51302	GRAN0051302	17.00S/31.00E-27bc	44.06536000	-118.99596000	NULL	NULL	NULL	NULL	owrd_field_staff	366.00	NULL	05/23/2017	Domestic	1	0	0	0	0
HARN	244	HARN0000244	23.00S/26.00E-14bd	43.57405000	-119.56630000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	175.00	NULL	10/08/1987	Domestic	1	0	0	0	0
HARN	253	HARN0000253	23.00S/26.00E-28bc	43.54613000	-119.61314000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	195.00	200.00	06/20/1973	OTHER	1	0	0	0	0
HARN	277	HARN0000277	23.00S/28.00E-35ac	43.53140200	-119.31933900	250.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	497.00	497.00	02/21/1969	OTHER	1	0	0	0	0
HARN	295	HARN0000295	23.00S/30.00E-14cd	43.57332000	-119.09188000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	260.00	260.00	10/15/1965	Domestic	1	0	0	0	0
HARN	352	HARN0000352	23.00S/31.00E-5cc	43.60187981	-119.03784020	5,280.00	NULL	NULL	NULL	well_report_plss	265.00	NULL	05/26/1969	Domestic	0	1	0	0	0
HARN	797	HARN0000797	24.00S/30.00E-2db	43.52270124	-119.09528380	100.00	OWRD	GROUNDWATER SECTION	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	190.00	NULL	09/12/1987	Industrial	1	0	0	0	0
HARN	1236	HARN0001236	25.00S/33.00E-12ad	43.41259056	-118.59019164	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	54.00	54.00	09/08/1936	UNKNOWN	1	0	0	0	0
HARN	1464	HARN0001464	27.00S/31.00E-9bb	43.24730000	-118.89654000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	130.00	130.00	05/10/1986	Community	1	0	0	0	0
HARN	1592	HARN0001592	29.00S/33.00E-32aa	43.01404484	-118.66399092	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	08/29/1989	Domestic	1	0	0	0	0
HARN	1653	HARN0001653	32.00S/32.50E-7dd	42.80761973	-118.87422317	5,280.00	NULL	NULL	NULL	well_report_plss	325.00	NULL	11/25/1971	OTHER	1	0	0	0	0
HARN	1697	HARN0001697	19.00S/26.00E-29ca	43.89120000	-119.63121000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	104.00	104.00	10/10/1984	Domestic	1	0	0	0	0
HARN	1900	HARN0001900	32.00S/32.50E-17db	42.80200000	-118.86630000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	272.00	272.00	10/01/1991	Domestic	1	0	0	0	0
HARN	1941	HARN0001941	29.00S/33.00E-32ba	43.01406608	-118.66891210	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	07/01/1992	Irrigation	1	0	0	0	0
HARN	2020	HARN0002020	20.00S/28.00E-7cc	43.84985000	-119.41034000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	120.00	120.00	11/12/1993	OTHER	1	0	0	0	0
HARN	50184	HARN0050184	23.00S/26.00E-28ab	43.54917627	-119.61174440	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	243.00	243.00	05/11/1997	CAMPGROUND	1	0	0	0	0
HARN	50578	HARN0050578	23.00S/30.00E-14bc	43.57503000	-119.09931000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	405.00	405.00	09/18/2000	Domestic	1	0	0	0	0
HARN	50707	HARN0050707	26.00S/32.00E-35cd	43.26419000	-118.84334000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	111.00	111.00	09/05/2001	Community	1	0	0	0	0
HARN	50795	HARN0050795	27.00S/30.00E-2da	43.25474161	-118.95798040	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	175.00	175.00	04/13/2002	Community	1	0	0	0	0
HARN	51008	HARN0051008	20.00S/31.00E-27cd	43.79951000	-118.98760000	14.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	310.00	310.00	12/03/2003	Domestic	1	0	0	0	0
HARN	51126	HARN0051126	23.00S/31.00E-12dc	43.58564000	-118.95622000	10.40	NULL	NULL	NULL	owrd_field_staff	285.00	NULL	11/18/2004	Unknown	1	0	0	0	0
HARN	51300	HARN0051300	25.00S/34.00E-7dd	43.41767000	-118.57545000	10.00	NULL	NULL	NULL	owrd_field_staff	300.00	300.00	08/30/2006	Community	1	0	0	0	0
HARN	51828	HARN0051828	25.00S/34.00E-7ba	43.41987000	-118.57819000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	312.00	312.00	12/21/2011	Domestic	1	0	0	0	0
HARN	52077	HARN0052077	32.00S/32.00E-2ac	42.82806000	-118.91482000	16.10	NULL	NULL	NULL	owrd_field_staff	220.00	NULL	06/30/2014	Domestic	1	0	0	0	0
HARN	52156	HARN0052156	32.00S/32.00E-2ad	42.82557000	-118.91464000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	280.00	280.00	02/17/2015	Community	1	0	0	0	0
HARN	52601	HARN0052601	24.00S/33.00E-34ac	43.44064000	-118.64153000	NULL	NULL	NULL	NULL	owrd_field_staff	192.00	NULL	09/21/2016	Domestic	1	0	0	0	0
NLOG	999999	NLOG0999999	30.00S/33.00E-31bd	43.00833200	-118.68629900	300.00	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Appendix A3:

Table listing community wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
															Well Work Done				
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	New Well	Deepen Well	Convert Well	Alter Well	Abandon Well

Notes:
The OWRD well identifications listed are the primary well identifier for the 29 non-municipal community wells. Several wells have multiple well reports for deepening, alteration, or other work.
The well locations listed are the best location available for each well listed as of September 2019
See Appendix A1 for public water system (PWS) associated with each well listed
Entry Possible for Multiple Columns
NULL: nothing entered and/or not known, applies to multiple columns
OTH or OTHER: not identified, applies to Latitude-Longitude Method and Well Primary Use columns
UNKNOWN: not known, applies to multiple columns
Entry Possible for Horizontal Error
0.00 to 9,999.00 feet
9,999.00 is an entry flag indicating the horizontal error is unknown and/or is likely very large
Entry Possible for Location Origin
ODEQ: Oregon Department of Environmental Quality
OTH or OTHER: not identified
OWRD: Oregon Water Resources Department
USGS: U.S. Geological Survey
Entry Possible for Location Source at OWRD
FIELD SERVICES SECTION: well location determined at OWRD by Field Service reviews and/or projects and/or field work
GROUNDWATER SECTION: well location determined at OWRD by Groundwater Section reviews and/or projects and/or field work
WATER RIGHT: well location determined at OWRD using information within water right materials filed and/or recorded
WELL LOG: well location determined at OWRD using information within water well report filed and/or recorded
Entry Possible for Latitude-Longitude Method
1:125,000 MAP: well location determined using a 1:125,000 scale map
1:62,500 MAP: well location determined using a 1:62,500 scale map
1:24,000 MAP: well location determined using a 1:24,000 scale map
MAP SCALE UNKNOWN: well location determined using a map of an unknown, uncertain, and/or undetermined scale
GPS: well location determined in the field at the well site using an unspecified Global Position System (GPS) unit
GPS FIELD OFFICE: well location determined in the field at the well site by OWRD field sevices staff using available GPS capabilities
GPS IPAD: well location determined in the field at the well site using the GPS capabilities within an Apple i-Pad unit
GPS SURVEY GRADE: well location determined in the field at the well site using a survey grade GPS unit
WATER RIGHT APPLICATION MAP: well location determined at OWRD using information on a map accompanying a water right application
WATER RIGHT FINAL PROOF MAP: well location determined at OWRD using information on a final proof map accompanying documents to "prove" a water right eligible to receive a certificate
WATER RIGHT TRANSFER MAP: well location determined at OWRD using information on a map accompanying a water right transfer application
WATER RIGHT UNKNOWN SOURCE: well location determined at OWRD using unidentified information within water right materials filed and/or recorded
WELL LOG AND IMAGERY: well location determined at OWRD using GPS and/or PLS location information on a water well report along with aerial and/or satellite imagery (often georeferenced) to see and establish the well location
Entry Possible for Latitude-Longitude Method Comment
exempt_use_map: the well location was determined from an exempt use map submitted to owrd documenting a non-water right well location on a map that can vary in quality and accuracy
owrd_field_staff: owrd field staff determined the well location
owrd_groundwater_staff: owrd groundwater staff determined the well location
well_report_lat_long: well location latitude-longitude is from latitude-longitude recorded on the water well report
well_report_plss: well location latitude-longitude is the center of the center of the smallest public land survey system (Township/Range-Section quarter-quarter-quarter) acreage tract reported
Notes for Well Work Done:
Abandon Well: water well report (well log) listed documents the abandonment of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Alter Well: water well report (well log) listed documents the alteration of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Convert Well: water well report (well log) listed documents the conversion of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Deepen Well: water well report (well log) listed documents the deepening of an existing well (1 = box on report form checked, 0 = box on report form not checked)
New Well: water well report (well log) listed documents the construction of a new well (1 = box on report form checked, 0 = box on report form not checked)
Data Sources:
Oregon Water Resources Department 2019a, 2019e, 2019f

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done				
															New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
GRAN	56	GRAN0000056	16.00S/31.00E-35aa	44.14649459	-118.95883349	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	07/13/1991	Domestic	1	0	0	0	0
GRAN	675	GRAN0000675	15.00S/31.00E-31ca	44.22769920	-119.03976315	5,280.00	NULL	NULL	NULL	well_report_plss	375.00	NULL	08/03/1993	Domestic	1	0	0	0	0
GRAN	683	GRAN0000683	17.00S/31.00E-35bb	44.05978790	-118.97423872	5,280.00	NULL	NULL	NULL	well_report_plss	400.00	NULL	11/05/1993	Domestic	1	0	0	0	0
GRAN	686	GRAN0000686	16.00S/30.00E-31bd	44.13928306	-119.16560375	5,280.00	NULL	NULL	NULL	well_report_plss	144.00	NULL	10/29/1993	Domestic	1	0	0	0	0
GRAN	763	GRAN0000763	15.00S/30.00E-26cb	44.24216535	-119.09041416	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	06/19/1978	Domestic	1	0	0	0	0
GRAN	764	GRAN0000764	15.00S/30.00E-27bd	44.23852431	-119.10052585	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	04/27/1988	Domestic	1	0	0	0	0
GRAN	765	GRAN0000765	15.00S/30.00E-27cd	44.23490243	-119.10052094	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	10/26/1985	Domestic	1	0	0	0	0
GRAN	766	GRAN0000766	15.00S/30.00E-27ba	44.24578377	-119.10052354	5,280.00	NULL	NULL	NULL	well_report_plss	153.00	NULL	09/18/1980	Domestic	0	1	0	0	0
GRAN	767	GRAN0000767	15.00S/30.00E-27ba	44.24578377	-119.10052354	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	09/16/1975	Domestic	1	0	0	0	0
GRAN	768	GRAN0000768	15.00S/30.00E-27db	44.24215059	-119.10560162	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	07/02/1977	Domestic	1	0	0	0	0
GRAN	769	GRAN0000769	15.00S/30.00E-31ba	44.23122516	-119.16125401	5,280.00	NULL	NULL	NULL	well_report_plss	66.00	NULL	06/15/1982	Domestic	1	0	0	0	0
GRAN	770	GRAN0000770	15.00S/30.00E-33ba	44.23123739	-119.12067114	5,280.00	NULL	NULL	NULL	well_report_plss	188.00	NULL	08/02/1974	Domestic	1	0	0	0	0
GRAN	773	GRAN0000773	15.00S/31.00E-31da	44.22769473	-119.03470639	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	10/13/1967	Domestic	1	0	0	0	0
GRAN	774	GRAN0000774	15.00S/31.00E-34bd	44.22407373	-118.97935930	5,280.00	NULL	NULL	NULL	well_report_plss	280.00	NULL	10/26/1976	Domestic	1	0	0	0	0
GRAN	776	GRAN0000776	NULL	44.19926454	-119.18682657	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	06/30/1967	Domestic	1	0	0	0	0
GRAN	779	GRAN0000779	16.00S/30.00E-28dd	44.15031500	-119.12207000	250.00	OWRD	GROUNDWATER SECTION	1:24,000 MAP	owrd_groundwater_staff	0.00	NULL	NULL	Domestic	1	0	0	0	0
GRAN	780	GRAN0000780	16.00S/30.00E-25bc	44.15398266	-119.07483938	5,280.00	NULL	NULL	NULL	well_report_plss	35.00	NULL	06/28/1974	Domestic	1	0	0	0	0
GRAN	781	GRAN0000781	16.00S/31.00E-9ba	44.20478665	-119.00417923	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	06/07/1980	Domestic	1	0	0	0	0
GRAN	786	GRAN0000786	16.00S/32.00E-30aa	44.16108125	-118.91828452	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	05/03/1979	Domestic	1	0	0	0	0
GRAN	800	GRAN0000800	18.00S/31.00E-12aa	44.03041700	-118.93786100	50.00	OWRD	FIELD SERVICES SECTION	GPS FIELD OFFICE	owrd_groundwater_staff	130.00	130.00	05/19/1966	Domestic	1	0	0	0	0
GRAN	802	GRAN0000802	18.00S/32.00E-7ab	44.03110582	-118.93026056	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	09/04/1989	Domestic	1	0	0	0	0
GRAN	816	GRAN0000816	19.00S/31.00E-12dd	43.93313750	-118.94001402	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	08/27/1992	Domestic	1	0	0	0	0
GRAN	50248	GRAN0050248	15.00S/30.00E-22dc	44.24942078	-119.10559378	5,280.00	NULL	NULL	NULL	well_report_plss	227.00	NULL	07/14/1999	Domestic	1	0	0	0	0
GRAN	50891	GRAN0050891	15.00S/31.00E-29cb	44.24221561	-119.02954442	5,280.00	NULL	NULL	NULL	well_report_plss	102.00	NULL	06/25/2007	Domestic	1	0	0	0	0
GRAN	50896	GRAN0050896	15.00S/30.00E-27db	44.24215059	-119.10560162	5,280.00	NULL	NULL	NULL	well_report_plss	142.00	NULL	08/01/2007	Domestic	0	1	0	1	0
GRAN	50920	GRAN0050920	15.00S/31.00E-29bc	44.23859485	-119.02956935	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	10/18/2007	Domestic	1	0	0	0	0
GRAN	50932	GRAN0050932	18.00S/31.00E-11dd	44.02014531	-118.95858564	5,280.00	NULL	NULL	NULL	well_report_plss	143.00	NULL	05/07/2008	Domestic	1	0	0	0	0
GRAN	50933	GRAN0050933	18.00S/32.00E-6dc	44.03473969	-118.93029603	5,280.00	NULL	NULL	NULL	well_report_plss	303.00	NULL	05/08/2008	Domestic	1	0	0	0	0
GRAN	50934	GRAN0050934	17.00S/31.00E-25ad	44.06237000	-118.94098000	18.40	NULL	NULL	NULL	owrd_field_staff	155.00	NULL	05/09/2008	Domestic	1	0	0	0	0
GRAN	50939	GRAN0050939	18.00S/32.00E-7bd	44.02390186	-118.92515219	5,280.00	NULL	NULL	NULL	well_report_plss	163.00	NULL	07/08/2008	Domestic	1	0	0	0	0
GRAN	50941	GRAN0050941	17.00S/31.00E-14cb	44.09951916	-118.97432427	5,280.00	NULL	NULL	NULL	well_report_plss	405.00	NULL	07/14/2008	Domestic	1	0	0	0	0
GRAN	50942	GRAN0050942	17.00S/31.00E-14cb	44.09951916	-118.97432427	5,280.00	NULL	NULL	NULL	well_report_plss	405.00	NULL	07/19/2008	Domestic	1	0	0	0	0
GRAN	51008	GRAN0051008	17.00S/31.00E-25ad	44.06217000	-118.94099000	11.10	NULL	NULL	NULL	owrd_field_staff	340.00	NULL	08/29/2009	Domestic	0	1	0	0	0
GRAN	51061	GRAN0051061	18.00S/31.00E-12aa	44.03168692	-118.93656960	100.00	NULL	NULL	NULL	exempt_use_map	310.00	NULL	04/09/2011	Domestic	1	0	0	0	0
GRAN	51097	GRAN0051097	15.00S/30.00E-27ab	44.24562466	-119.10734993	250.00	NULL	NULL	NULL	exempt_use_map	124.00	NULL	08/17/2011	Domestic	1	0	0	0	0
GRAN	51180	GRAN0051180	16.00S/31.00E-35aa	44.14397000	-118.95824000	18.20	NULL	NULL	NULL	owrd_field_staff	350.00	NULL	03/15/2014	Domestic	1	0	0	0	0
GRAN	51181	GRAN0051181	17.00S/31.00E-31ac	44.05251417	-119.04955345	5,280.00	NULL	NULL	NULL	well_report_plss	530.00	NULL	04/30/2014	Domestic	1	0	0	0	0
GRAN	51182	GRAN0051182	17.00S/31.00E-35aa	44.05986178	-118.95919265	5,280.00	NULL	NULL	NULL	well_report_plss	315.00	NULL	05/07/2014	Domestic	1	0	0	0	0
GRAN	51269	GRAN0051269	18.00S/32.00E-7ab	44.03111000	-118.92830000	99.00	NULL	NULL	NULL	exempt_use_map	214.00	NULL	03/22/2016	Domestic	1	0	0	0	0
GRAN	51274	GRAN0051274	16.00S/31.00E-5aa	44.21810879	-119.01920389	5,280.00	NULL	NULL	NULL	well_report_plss	300.00	NULL	06/16/2016	Domestic	0	1	0	0	0
GRAN	51302	GRAN0051302	17.00S/31.00E-27bc	44.06536000	-118.99596000	0.00	NULL	NULL	NULL	owrd_field_staff	366.00	NULL	05/23/2017	Domestic	1	0	0	0	0
GRAN	51303	GRAN0051303	16.00S/30.00E-27bc	44.15366825	-119.11697352	99.00	NULL	NULL	NULL	exempt_use_map	160.00	NULL	06/13/2017	Domestic	1	0	0	0	0
GRAN	51356	GRAN0051356	16.00S/30.00E-27bc	44.15410105	-119.11519178	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	NULL	Domestic	0	0	0	0	0
HARN	2	HARN0000002	23.00S/33.00E-25ad	43.54178596	-118.59184677	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	03/17/1990	Domestic	1	0	0	0	0
HARN	4	HARN0000004	25.00S/31.00E-30dd	43.36926229	-119.04196578	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	04/02/1990	Domestic	1	0	0	0	0
HARN	6	HARN0000006	19.00S/26.00E-29ca	43.88980000	-119.62975000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	104.00	104.00	10/11/1984	Domestic	1	0	0	0	0
HARN	8	HARN0000008	19.00S/29.00E-32cb	43.87566000	-119.27279000	15.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	200.00	200.00	09/10/1968	Domestic	1	0	0	0	0
HARN	9	HARN0000009	19.00S/31.00E-13ca	43.92449000	-118.94418000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	74.00	74.00	03/25/1963	Domestic	1	0	0	0	0
HARN	13	HARN0000013	19.00S/32.00E-19bd	43.90762824	-118.92487413	5,280.00	NULL	NULL	NULL	well_report_plss	265.00	NULL	09/30/1968	Domestic	1	0	0	0	0
HARN	26	HARN0000026	20.00S/30.00E-8ab	43.83800800	-119.16933500	250.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	95.00	NULL	08/11/1978	Domestic	1	0	0	0	0
HARN	53	HARN0000053	NULL	43.76507096	-119.12822676	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	06/06/1959	Domestic	0	0	0	1	0
HARN	55	HARN0000055	21.00S/31.00E-21dd	43.64329900	-119.00800900	250.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	215.00	NULL	11/15/1970	Domestic	1	0	0	0	0
HARN	63	HARN0000063	22.00S/26.00E-8ca	43.67891283	-119.62439790	5,280.00	NULL	NULL	NULL	well_report_plss	194.00	NULL	10/01/1980	Domestic	1	0	0	0	0
HARN	70	HARN0000070	22.00S/30.00E-1aa	43.69956459	-119.06142136	5,280.00	NULL	NULL	NULL	well_report_plss	136.00	NULL	09/06/1966	Domestic	1	0	0	0	0
HARN	74	HARN0000074	22.00S/30.00E-26ac	43.63341836	-119.09116080	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	12/28/1984	Domestic	1	0	0	0	0
HARN	76	HARN0000076	NULL	43.63546714	-119.06918366	5,280.00	NULL	NULL	NULL	well_report_plss	375.00	NULL	06/07/1979	Domestic	1	0	0	0	0
HARN	78	HARN0000078	22.00S/30.00E-25ca	43.63739315	-119.06651363	5,280.00	NULL	NULL	NULL	well_report_plss	242.00	NULL	10/27/1976	Domestic	1	0	0	0	0
HARN	82	HARN0000082	22.00S/30.00E-35bb	43.62562592	-119.09846718	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	120.00	120.00	06/19/1975	Domestic	1	0	0	0	0
HARN	83	HARN0000083	22.00S/30.00E-35cd	43.61594949	-119.08672980	5,280.00	NULL	NULL	NULL	well_report_plss	280.00	NULL	08/10/1970	Domestic	1	0	0	0	0
HARN	87	HARN0000087	22.00S/30.00E-36dd	43.61593325	-119.06182505	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	08/14/1966	Domestic	1	0	0	0	0
HARN	89	HARN0000089	22.00S/31.00E-18ca	43.66671983	-119.04702848	5,280.00	NULL	NULL	NULL	well_report_plss	410.00	NULL	10/08/1981	Domestic	1	0	0	0	0
HARN	90	HARN0000090	22.00S/31.00E-21dd	43.64497106	-119.00263665	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	05/20/1986	Domestic	1	0	0	0	0
HARN	91	HARN0000091	22.00S/31.00E-21da	43.65220306	-119.00258680	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	08/15/1977	Domestic	1	0	0	0	0
HARN	93	HARN0000093	22.00S/31.00E-21ad	43.64858710	-119.00261174	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	08/01/1970	Domestic	1	0	0	0	0
HARN	96	HARN0000096	22.00S/31.00E-25ba	43.64156538	-118.94782379	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	NULL	10/11/1969	Domestic	1	0	0	0	0
HARN	98	HARN0000098	22.00S/31.00E-25ac	43.63426045	-118.95282620	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	04/10/1967	Domestic	1	0	0	0	0
HARN	103	HARN0000103	22.00S/31.00E-28cb	43.63765790	-119.01778689	5,280.00	NULL	NULL	NULL	well_report_plss	285.00	NULL	12/07/1987	Domestic	1	0	0	0	0
HARN	105	HARN0000105	NULL	43.63577091	-119.01016094	5,280.00	NULL	NULL	NULL	well_report_plss	300.00	NULL	11/06/1979	Domestic	1	0	0	0	0
HARN	108	HARN0000108	NULL	43.63577091	-119.01016094	5,280.00	NULL	NULL	NULL	well_report_plss	300.00	NULL	12/02/1973	Domestic	1	0	0	0	0
HARN	109	HARN0000109	22.00S/31.00E-28cc	43.63021883	-119.01780095	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	08/23/1978	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	111	HARN0000111	22.00S/31.00E-31cc	43.61594066	-119.05708247	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	09/10/1987	Domestic	1	0	0	0	0
HARN	112	HARN0000112	NULL	43.63584753	-119.03004795	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	05/08/1964	Domestic	1	0	0	0	0
HARN	113	HARN0000113	22.00S/31.00E-31ac	43.61958896	-119.05235138	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	08/31/1981	Domestic	1	0	0	0	0
HARN	116	HARN0000116	22.00S/31.00E-32cd	43.61594223	-119.02755652	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	07/18/1962	Domestic	1	0	0	0	0
HARN	118	HARN0000118	22.00S/31.00E-33cc	43.61588685	-119.01754677	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	09/08/1986	Domestic	1	0	0	0	0
HARN	120	HARN0000120	22.00S/31.00E-33ac	43.61950256	-119.01271402	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	04/05/1982	Domestic	1	0	0	0	0
HARN	121	HARN0000121	NULL	43.62127115	-119.01000999	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	02/02/1975	Domestic	1	0	0	0	0
HARN	122	HARN0000122	22.00S/31.00E-33bb	43.62846266	-119.01571957	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	320.00	320.00	06/14/1979	Domestic	1	0	0	0	0
HARN	123	HARN0000123	22.00S/31.00E-33aa	43.62675653	-119.00256861	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	10/23/1975	Domestic	1	0	0	0	0
HARN	124	HARN0000124	22.00S/31.00E-33cc	43.61588685	-119.01754677	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/02/1974	Domestic	1	0	0	0	0
HARN	126	HARN0000126	NULL	43.62472326	-119.01645829	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	310.00	310.00	11/05/1972	Domestic	1	0	0	0	0
HARN	127	HARN0000127	22.00S/31.00E-33aa	43.62675653	-119.00256861	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	10/27/1977	Domestic	1	0	0	0	0
HARN	128	HARN0000128	22.00S/31.00E-33bb	43.62658077	-119.01779212	5,280.00	NULL	NULL	NULL	well_report_plss	195.00	NULL	12/18/1973	Domestic	1	0	0	0	0
HARN	135	HARN0000135	22.00S/31.00E-34ca	43.62323291	-118.98758393	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	07/04/1966	Domestic	1	0	0	0	0
HARN	136	HARN0000136	22.00S/31.00E-34cc	43.61597460	-118.99751893	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	09/22/1977	Domestic	1	0	0	0	0
HARN	138	HARN0000138	22.00S/31.00E-35bb	43.62687482	-118.97769642	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	03/03/1980	Domestic	1	0	0	0	0
HARN	141	HARN0000141	22.00S/31.00E-36bc	43.61971587	-118.95780168	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	09/12/1986	Domestic	1	0	0	0	0
HARN	150	HARN0000150	22.00S/31.00E-36cc	43.61606490	-118.95776720	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	04/27/1976	Domestic	1	0	0	0	0
HARN	151	HARN0000151	22.00S/31.00E-36ab	43.62699274	-118.95282411	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	04/26/1976	Domestic	1	0	0	0	0
HARN	152	HARN0000152	22.00S/32.00E-11cc	43.67261657	-118.85930665	5,280.00	NULL	NULL	NULL	well_report_plss	500.00	NULL	09/12/1988	Domestic	1	0	0	0	0
HARN	167	HARN0000167	22.00S/32.00E-27dd	43.62983246	-118.86460456	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	09/05/1974	Domestic	1	0	0	0	0
HARN	168	HARN0000168	22.00S/32.00E-27dd	43.62983246	-118.86460456	5,280.00	NULL	NULL	NULL	well_report_plss	170.00	NULL	08/31/1974	Domestic	1	0	0	0	0
HARN	170	HARN0000170	22.00S/32.00E-31bd	43.61956129	-118.92936752	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	09/05/1979	Domestic	1	0	0	0	0
HARN	172	HARN0000172	NULL	43.62136453	-118.93112684	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	04/05/1971	Domestic	1	0	0	0	0
HARN	175	HARN0000175	NULL	43.62075866	-118.89229214	5,280.00	NULL	NULL	NULL	well_report_plss	96.00	NULL	08/11/1979	Domestic	1	0	0	0	0
HARN	176	HARN0000176	NULL	43.62075866	-118.89229214	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	04/27/1965	Domestic	1	0	0	0	0
HARN	179	HARN0000179	22.00S/32.00E-35dd	43.61530457	-118.84447283	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	02/20/1990	Domestic	1	0	0	0	0
HARN	180	HARN0000180	22.00S/32.00E-35dd	43.61530457	-118.84447283	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	02/18/1990	Domestic	1	0	0	0	0
HARN	182	HARN0000182	22.00S/32.00E-35bd	43.61899936	-118.84948666	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	06/05/1972	Domestic	1	0	0	0	0
HARN	184	HARN0000184	22.00S/32.00E-36ba	43.62512736	-118.83162958	400.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	44.00	44.00	NULL	Domestic	1	0	0	0	0
HARN	192	HARN0000192	23.00S/31.00E-16bc	43.57636009	-119.01760120	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	40.00	01/19/1977	Domestic	1	0	0	0	0
HARN	194	HARN0000194	NULL	43.66366105	-118.81448021	5,280.00	NULL	NULL	NULL	well_report_plss	218.00	NULL	11/07/1963	Domestic	1	0	0	0	0
HARN	200	HARN0000200	22.00S/32.50E-27dc	43.62966506	-118.76065894	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	04/21/1966	Domestic	1	0	0	0	0
HARN	201	HARN0000201	22.00S/32.50E-30ca	43.63683818	-118.81556981	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	08/01/1961	Domestic	1	0	0	0	0
HARN	205	HARN0000205	22.00S/32.50E-36ab	43.62585037	-118.72074265	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	03/20/1981	Domestic	1	0	0	0	0
HARN	208	HARN0000208	NULL	43.62034128	-118.71827623	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	10/12/1963	Domestic	1	0	0	0	0
HARN	216	HARN0000216	22.00S/32.50E-36ab	43.62585037	-118.72074265	5,280.00	NULL	NULL	NULL	well_report_plss	14.00	NULL	NULL	Domestic	1	0	0	0	0
HARN	217	HARN0000217	22.00S/33.00E-19cd	43.63954987	-118.69598098	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	05/31/1982	Domestic	0	0	0	1	0
HARN	221	HARN0000221	22.00S/33.00E-28cd	43.62510634	-118.65613857	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/01/1974	Domestic	1	0	0	0	0
HARN	228	HARN0000228	22.00S/33.00E-33aa	43.62149209	-118.65115178	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	04/15/1963	Domestic	1	0	0	0	0
HARN	229	HARN0000229	22.00S/33.00E-34dd	43.61049914	-118.63152803	5,280.00	NULL	NULL	NULL	well_report_plss	78.00	NULL	11/26/1977	Domestic	1	0	0	0	0
HARN	231	HARN0000231	22.00S/33.00E-34aa	43.62141247	-118.63131037	5,280.00	NULL	NULL	NULL	well_report_plss	22.00	22.00	NULL	Domestic	1	0	0	0	0
HARN	235	HARN0000235	NULL	43.60463375	-119.62670924	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	01/04/1980	Domestic	0	1	0	0	0
HARN	236	HARN0000236	NULL	43.60463375	-119.62670924	5,280.00	NULL	NULL	NULL	well_report_plss	170.00	NULL	09/26/1979	Domestic	1	0	0	0	0
HARN	237	HARN0000237	23.00S/26.00E-5bb	43.61005426	-119.63423925	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	08/29/1977	Domestic	0	1	0	0	0
HARN	244	HARN0000244	23.00S/26.00E-14bd	43.57405000	-119.56630000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	175.00	NULL	10/08/1987	Domestic	1	0	0	0	0
HARN	245	HARN0000245	23.00S/26.00E-14bb	43.57951706	-119.57656088	100.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	135.00	135.00	04/15/1964	Domestic	1	0	0	0	0
HARN	259	HARN0000259	23.00S/27.00E-6db	43.60681702	-119.52941248	5,280.00	NULL	NULL	NULL	well_report_plss	143.00	NULL	08/29/1955	Domestic	1	0	0	0	0
HARN	265	HARN0000265	NULL	43.54690618	-119.50701136	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	09/06/1968	Domestic	1	0	0	0	0
HARN	280	HARN0000280	23.00S/30.00E-2bb	43.61240854	-119.09664965	5,280.00	NULL	NULL	NULL	well_report_plss	265.00	NULL	10/08/1981	Domestic	1	0	0	0	0
HARN	281	HARN0000281	23.00S/30.00E-5db	43.60834755	-119.15100501	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	08/24/1978	Domestic	1	0	0	0	0
HARN	292	HARN0000292	NULL	43.57816681	-119.08947456	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	05/15/1968	Domestic	1	0	0	0	0
HARN	294	HARN0000294	23.00S/30.00E-14dc	43.57275571	-119.09208356	5,280.00	NULL	NULL	NULL	well_report_plss	278.00	NULL	02/13/1968	Domestic	1	0	0	0	0
HARN	295	HARN0000295	23.00S/30.00E-14cd	43.57332000	-119.09188000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	260.00	260.00	10/15/1965	Domestic	1	0	0	0	0
HARN	298	HARN0000298	NULL	43.56341777	-119.14947873	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	05/13/1966	Domestic	0	1	0	0	0
HARN	299	HARN0000299	23.00S/30.00E-22dd	43.55829048	-119.10211850	5,280.00	NULL	NULL	NULL	well_report_plss	195.00	NULL	12/21/1973	Domestic	1	0	0	0	0
HARN	303	HARN0000303	23.00S/30.00E-23dc	43.55817736	-119.09212411	5,280.00	NULL	NULL	NULL	well_report_plss	155.00	NULL	08/14/1967	Domestic	1	0	0	0	0
HARN	307	HARN0000307	23.00S/30.00E-24aa	43.56944190	-119.06189009	250.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	215.00	218.00	08/08/1963	Domestic	1	0	0	0	0
HARN	310	HARN0000310	23.00S/30.00E-26ab	43.55453785	-119.09213184	5,280.00	NULL	NULL	NULL	well_report_plss	74.00	NULL	10/19/1980	Domestic	1	0	0	0	0
HARN	316	HARN0000316	NULL	43.56149000	-119.15216800	500.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	1,224.00	1,224.00	01/17/1959	Domestic	1	0	0	0	0
HARN	318	HARN0000318	23.00S/30.00E-35da	43.53635383	-119.08216219	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	08/02/1979	Domestic	1	0	0	0	0
HARN	319	HARN0000319	23.00S/30.00E-35ca	43.53636267	-119.08718411	5,280.00	NULL	NULL	NULL	well_report_plss	64.00	NULL	02/17/1977	Domestic	1	0	0	0	0
HARN	324	HARN0000324	23.00S/31.00E-1ad	43.60510551	-118.94297537	5,280.00	NULL	NULL	NULL	well_report_plss	265.00	NULL	12/12/1980	Domestic	0	1	0	0	0
HARN	325	HARN0000325	23.00S/31.00E-1ad	43.60485878	-118.94129556	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	265.00	265.00	12/12/1980	Domestic	1	0	0	0	0
HARN	333	HARN0000333	23.00S/31.00E-3bd	43.60531982	-118.98773070	5,280.00	NULL	NULL	NULL	well_report_plss	235.00	NULL	03/20/1990	Domestic	1	0	0	0	0
HARN	334	HARN0000334	23.00S/31.00E-3ba	43.61243987	-118.98762751	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	05/31/1988	Domestic	1	0	0	0	0
HARN	336	HARN0000336	23.00S/31.00E-3ba	43.61243987	-118.98762751	5,280.00	NULL	NULL	NULL	well_report_plss	88.00	NULL	10/26/1986	Domestic	1	0	0	0	0
HARN	338	HARN0000338	23.00S/31.00E-3bc	43.60530834	-118.99762262	5,280.00	NULL	NULL	NULL	well_report_plss	122.00	122.00	NULL	Domestic	1	0	0	0	0
HARN	340	HARN0000340	23.00S/31.00E-3bc	43.60530834	-118.99762262	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	08/25/1969	Domestic	1	0	0	0	0
HARN	341	HARN0000341	23.00S/31.00E-3ba	43.61243987	-118.98762751	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	04/24/1961	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	343	HARN0000343	23.00S/31.00E-3ba	43.61243987	-118.98762751	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	04/20/1961	Domestic	1	0	0	0	0
HARN	344	HARN0000344	23.00S/31.00E-4ac	43.60545715	-119.01267444	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	10/13/1968	Domestic	1	0	0	0	0
HARN	345	HARN0000345	NULL	43.60709141	-119.01005729	5,280.00	NULL	NULL	NULL	well_report_plss	41.00	41.00	NULL	Domestic	1	0	0	0	0
HARN	348	HARN0000348	23.00S/31.00E-4ab	43.61242574	-119.01253260	5,280.00	NULL	NULL	NULL	well_report_plss	96.00	NULL	08/25/1955	Domestic	1	0	0	0	0
HARN	349	HARN0000349	NULL	43.60709141	-119.01005729	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	09/08/1965	Domestic	1	0	0	0	0
HARN	350	HARN0000350	23.00S/31.00E-5cb	43.60894027	-119.03759202	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	02/21/1987	Domestic	1	0	0	0	0
HARN	351	HARN0000351	23.00S/31.00E-5cc	43.60187981	-119.03784020	5,280.00	NULL	NULL	NULL	well_report_plss	213.00	NULL	03/13/1969	Domestic	1	0	0	0	0
HARN	352	HARN0000352	23.00S/31.00E-5cc	43.60187981	-119.03784020	5,280.00	NULL	NULL	NULL	well_report_plss	265.00	NULL	05/26/1969	Domestic	0	1	0	0	0
HARN	353	HARN0000353	NULL	43.60982598	-119.03782606	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	214.00	214.00	05/22/1962	Domestic	1	0	0	0	0
HARN	355	HARN0000355	23.00S/31.00E-5db	43.60896619	-119.03266083	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	09/22/1981	Domestic	0	0	0	1	0
HARN	360	HARN0000360	23.00S/31.00E-5cb	43.60894027	-119.03759202	5,280.00	NULL	NULL	NULL	well_report_plss	59.00	NULL	06/13/1974	Domestic	1	0	0	0	0
HARN	361	HARN0000361	23.00S/31.00E-5ba	43.61244657	-119.02758486	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	12/05/1973	Domestic	1	0	0	0	0
HARN	362	HARN0000362	23.00S/31.00E-5ab	43.61216187	-119.03315075	1,000.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	42.00	42.00	08/12/1930	Domestic	1	0	0	0	0
HARN	364	HARN0000364	23.00S/31.00E-6bb	43.61231310	-119.05705195	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	09/02/1982	Domestic	1	0	0	0	0
HARN	365	HARN0000365	23.00S/31.00E-6bb	43.61231310	-119.05705195	5,280.00	NULL	NULL	NULL	well_report_plss	98.00	NULL	09/16/1982	Domestic	1	0	0	0	0
HARN	366	HARN0000366	23.00S/31.00E-6ca	43.60882173	-119.04736810	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	08/03/1981	Domestic	1	0	0	0	0
HARN	368	HARN0000368	NULL	43.60703573	-119.04975254	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	07/22/1964	Domestic	1	0	0	0	0
HARN	369	HARN0000369	23.00S/31.00E-6bd	43.60524423	-119.04736268	5,280.00	NULL	NULL	NULL	well_report_plss	104.00	NULL	05/24/1975	Domestic	1	0	0	0	0
HARN	370	HARN0000370	NULL	43.60703573	-119.04975254	5,280.00	NULL	NULL	NULL	well_report_plss	142.00	NULL	03/17/1962	Domestic	1	0	0	0	0
HARN	371	HARN0000371	NULL	43.61423888	-119.05916976	600.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	14.00	14.00	NULL	Domestic	1	0	0	0	0
HARN	372	HARN0000372	23.00S/31.00E-6ba	43.61238878	-119.04739270	5,280.00	NULL	NULL	NULL	well_report_plss	109.00	NULL	09/05/1973	Domestic	1	0	0	0	0
HARN	375	HARN0000375	23.00S/31.00E-6db	43.60876290	-119.05220399	5,280.00	NULL	NULL	NULL	well_report_plss	129.00	NULL	02/01/1975	Domestic	1	0	0	0	0
HARN	377	HARN0000377	23.00S/31.00E-6cb	43.60868596	-119.05694984	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	11/04/1966	Domestic	1	0	0	0	0
HARN	379	HARN0000379	23.00S/31.00E-6cb	43.60868596	-119.05694984	5,280.00	NULL	NULL	NULL	well_report_plss	64.00	NULL	06/04/1965	Domestic	1	0	0	0	0
HARN	380	HARN0000380	23.00S/31.00E-6cb	43.60868596	-119.05694984	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	08/14/1965	Domestic	1	0	0	0	0
HARN	382	HARN0000382	23.00S/31.00E-6cb	43.60868596	-119.05694984	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	03/13/1965	Domestic	1	0	0	0	0
HARN	384	HARN0000384	23.00S/31.00E-6da	43.60889340	-119.04249428	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	10/19/1965	Domestic	1	0	0	0	0
HARN	385	HARN0000385	23.00S/31.00E-6dd	43.60180735	-119.04267916	5,280.00	NULL	NULL	NULL	well_report_plss	81.00	NULL	09/02/1967	Domestic	1	0	0	0	0
HARN	386	HARN0000386	NULL	43.60703573	-119.04975254	5,280.00	NULL	NULL	NULL	well_report_plss	14.00	NULL	NULL	Domestic	1	0	0	0	0
HARN	388	HARN0000388	23.00S/31.00E-7ba	43.59810694	-119.04743181	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	07/23/1979	Domestic	1	0	0	0	0
HARN	397	HARN0000397	23.00S/31.00E-7ba	43.59810694	-119.04743181	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	12/12/1974	Domestic	1	0	0	0	0
HARN	404	HARN0000404	NULL	43.59289637	-119.03034221	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	140.00	NULL	Domestic	1	0	0	0	0
HARN	405	HARN0000405	23.00S/31.00E-8bb	43.59830378	-119.03790346	5,280.00	NULL	NULL	NULL	well_report_plss	106.00	NULL	01/05/1978	Domestic	1	0	0	0	0
HARN	408	HARN0000408	23.00S/31.00E-9cb	43.59477513	-119.01782405	5,280.00	NULL	NULL	NULL	well_report_plss	53.00	NULL	10/24/1976	Domestic	1	0	0	0	0
HARN	409	HARN0000409	23.00S/31.00E-9cc	43.58749411	-119.01930014	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	25.00	25.00	08/08/1930	Domestic	1	0	0	0	0
HARN	410	HARN0000410	23.00S/31.00E-9dd	43.58752324	-119.00253654	5,280.00	NULL	NULL	NULL	well_report_plss	43.00	43.00	NULL	Domestic	1	0	0	0	0
HARN	418	HARN0000418	NULL	43.59280271	-118.99018734	5,280.00	NULL	NULL	NULL	well_report_plss	51.00	NULL	11/05/1959	Domestic	1	0	0	0	0
HARN	419	HARN0000419	23.00S/31.00E-10ad	43.59097347	-118.98278613	5,280.00	NULL	NULL	NULL	well_report_plss	210.00	NULL	03/13/1976	Domestic	1	0	0	0	0
HARN	420	HARN0000420	23.00S/31.00E-10dd	43.58739822	-118.98278024	5,280.00	NULL	NULL	NULL	well_report_plss	195.00	NULL	05/24/1963	Domestic	1	0	0	0	0
HARN	422	HARN0000422	23.00S/31.00E-10ad	43.59097347	-118.98278613	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	09/26/1968	Domestic	1	0	0	0	0
HARN	423	HARN0000423	23.00S/31.00E-11dc	43.58719303	-118.97285705	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	03/24/1988	Domestic	1	0	0	0	0
HARN	424	HARN0000424	NULL	43.59254388	-118.97032352	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	130.00	07/16/1979	Domestic	1	0	0	0	0
HARN	425	HARN0000425	NULL	43.59254388	-118.97032352	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	03/30/1976	Domestic	1	0	0	0	0
HARN	426	HARN0000426	NULL	43.59254388	-118.97032352	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	06/19/1975	Domestic	1	0	0	0	0
HARN	427	HARN0000427	23.00S/31.00E-11ab	43.59799736	-118.97285341	5,280.00	NULL	NULL	NULL	well_report_plss	54.00	NULL	06/12/1975	Domestic	1	0	0	0	0
HARN	428	HARN0000428	NULL	43.59254388	-118.97032352	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	10/01/1970	Domestic	1	0	0	0	0
HARN	429	HARN0000429	NULL	43.59254388	-118.97032352	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	07/22/1968	Domestic	1	0	0	0	0
HARN	432	HARN0000432	23.00S/31.00E-11bb	43.59806503	-118.97784680	5,280.00	NULL	NULL	NULL	well_report_plss	310.00	NULL	03/22/1967	Domestic	1	0	0	0	0
HARN	434	HARN0000434	23.00S/31.00E-11dc	43.58719303	-118.97285705	5,280.00	NULL	NULL	NULL	well_report_plss	280.00	280.00	10/17/1978	Domestic	1	0	0	0	0
HARN	435	HARN0000435	23.00S/31.00E-11bb	43.59806503	-118.97784680	5,280.00	NULL	NULL	NULL	well_report_plss	102.00	NULL	01/30/1969	Domestic	1	0	0	0	0
HARN	438	HARN0000438	23.00S/31.00E-11cd	43.58705879	-118.96790030	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	07/12/1976	Domestic	1	0	0	0	0
HARN	439	HARN0000439	23.00S/31.00E-11bb	43.59806503	-118.97784680	5,280.00	NULL	NULL	NULL	well_report_plss	170.00	170.00	10/01/1966	Domestic	1	0	0	0	0
HARN	442	HARN0000442	23.00S/31.00E-13ba	43.58305212	-118.94809984	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	07/22/1985	Domestic	1	0	0	0	0
HARN	447	HARN0000447	23.00S/31.00E-13ab	43.58309277	-118.95305606	5,280.00	NULL	NULL	NULL	well_report_plss	501.00	NULL	12/17/1935	Domestic	1	0	0	0	0
HARN	458	HARN0000458	23.00S/31.00E-15ba	43.58466031	-118.98621040	9,999.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	49.00	49.00	03/15/1969	Domestic	1	0	0	0	0
HARN	469	HARN0000469	23.00S/31.00E-18cc	43.57298948	-119.05731577	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	11/10/1980	Domestic	1	0	0	0	0
HARN	485	HARN0000485	23.00S/31.00E-19bc	43.56213653	-119.05725354	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	05/15/1966	Domestic	1	0	0	0	0
HARN	486	HARN0000486	23.00S/31.00E-19bc	43.56213653	-119.05725354	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	11/16/1965	Domestic	1	0	0	0	0
HARN	488	HARN0000488	23.00S/31.00E-20ba	43.56767799	-119.02617311	400.00	OWRD	WELL LOG	WELL LOG AND IMAGERY	owrd_groundwater_staff	43.00	43.00	01/14/1963	Domestic	1	0	0	0	0
HARN	491	HARN0000491	23.00S/31.00E-20cb	43.56541056	-119.03756344	5,280.00	NULL	NULL	NULL	well_report_plss	43.00	NULL	01/18/1963	Domestic	1	0	0	0	0
HARN	492	HARN0000492	23.00S/31.00E-20cb	43.56541056	-119.03756344	5,280.00	NULL	NULL	NULL	well_report_plss	17.00	16.50	NULL	Domestic	1	0	0	0	0
HARN	493	HARN0000493	23.00S/31.00E-21bd	43.56120347	-119.00764734	5,280.00	NULL	NULL	NULL	well_report_plss	320.00	NULL	03/07/1980	Domestic	1	0	0	0	0
HARN	494	HARN0000494	NULL	43.56330448	-119.01022030	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	03/23/1971	Domestic	1	0	0	0	0
HARN	495	HARN0000495	NULL	43.56330448	-119.01022030	5,280.00	NULL	NULL	NULL	well_report_plss	35.00	NULL	10/17/1968	Domestic	1	0	0	0	0
HARN	496	HARN0000496	23.00S/31.00E-21da	43.56461275	-119.00261607	5,280.00	NULL	NULL	NULL	well_report_plss	54.00	54.00	05/14/1932	Domestic	1	0	0	0	0
HARN	497	HARN0000497	23.00S/31.00E-21da	43.56461275	-119.00261607	5,280.00	NULL	NULL	NULL	well_report_plss	13.00	13.00	05/14/1932	Domestic	1	0	0	0	0
HARN	498	HARN0000498	23.00S/31.00E-21da	43.56461275	-119.00261607	5,280.00	NULL	NULL	NULL	well_report_plss	97.00	97.00	NULL	Domestic	1	0	0	0	0
HARN	501	HARN0000501	NULL	43.56259495	-118.95056418	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	10/10/1961	Domestic	1	0	0	0	0
HARN	502	HARN0000502	23.00S/31.00E-24ad	43.56073253	-118.94306735	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	02/06/1974	Domestic	1	0	0	0	0
HARN	503	HARN0000503	23.00S/31.00E-24aa	43.56748576	-118.94480140	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	94.00	95.00	05/13/1965	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	506	HARN0000506	23.00S/31.00E-24ad	43.56073253	-118.94306735	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	09/24/1968	Domestic	1	0	0	0	0
HARN	507	HARN0000507	23.00S/31.00E-25aa	43.55349765	-118.94305574	5,280.00	NULL	NULL	NULL	well_report_plss	57.00	NULL	11/03/1977	Domestic	1	0	0	0	0
HARN	508	HARN0000508	23.00S/31.00E-28dc	43.54365744	-119.01251049	5,280.00	NULL	NULL	NULL	well_report_plss	68.00	NULL	04/10/1988	Domestic	1	0	0	0	0
HARN	509	HARN0000509	23.00S/31.00E-28dc	43.54365744	-119.01251049	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	04/15/1982	Domestic	1	0	0	0	0
HARN	510	HARN0000510	23.00S/31.00E-28aa	43.55435559	-119.00270484	5,280.00	NULL	NULL	NULL	well_report_plss	57.00	NULL	12/02/1977	Domestic	1	0	0	0	0
HARN	516	HARN0000516	23.00S/31.00E-30bd	43.54741252	-119.04724059	5,280.00	NULL	NULL	NULL	well_report_plss	48.00	NULL	07/10/1969	Domestic	1	0	0	0	0
HARN	519	HARN0000519	23.00S/31.00E-32ad	43.53283874	-119.02249461	5,280.00	NULL	NULL	NULL	well_report_plss	38.00	38.00	NULL	Domestic	1	0	0	0	0
HARN	526	HARN0000526	23.00S/32.00E-2aa	43.61167148	-118.84447251	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	07/29/1979	Domestic	1	0	0	0	0
HARN	527	HARN0000527	23.00S/32.00E-2da	43.60807353	-118.84449311	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	07/24/1979	Domestic	1	0	0	0	0
HARN	531	HARN0000531	23.00S/32.00E-3ab	43.61171559	-118.87438168	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	07/09/1979	Domestic	1	0	0	0	0
HARN	532	HARN0000532	23.00S/32.00E-3ca	43.60812626	-118.86941888	5,280.00	NULL	NULL	NULL	well_report_plss	235.00	NULL	07/26/1975	Domestic	1	0	0	0	0
HARN	536	HARN0000536	23.00S/32.00E-3aa	43.61171932	-118.86440171	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	10/22/1970	Domestic	1	0	0	0	0
HARN	537	HARN0000537	23.00S/32.00E-3aa	43.61171932	-118.86440171	5,280.00	NULL	NULL	NULL	well_report_plss	66.00	NULL	10/19/1970	Domestic	1	0	0	0	0
HARN	555	HARN0000555	NULL	43.59195200	-118.87200015	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	11/05/1965	Domestic	1	0	0	0	0
HARN	559	HARN0000559	NULL	43.59172819	-118.83208529	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	10/27/1971	Domestic	1	0	0	0	0
HARN	564	HARN0000564	23.00S/32.50E-13ab	43.58228413	-118.72083972	5,280.00	NULL	NULL	NULL	well_report_plss	155.00	NULL	01/02/1973	Domestic	1	0	0	0	0
HARN	565	HARN0000565	23.00S/32.00E-13bb	43.58373237	-118.84207478	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	232.00	232.00	10/22/1963	Domestic	1	0	0	0	0
HARN	567	HARN0000567	NULL	43.57753700	-118.87218924	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	07/17/1968	Domestic	1	0	0	0	0
HARN	571	HARN0000571	23.00S/32.00E-17dd	43.57234671	-118.90479910	5,280.00	NULL	NULL	NULL	well_report_plss	52.00	52.00	08/15/1931	Domestic	1	0	0	0	0
HARN	579	HARN0000579	23.00S/32.00E-19bc	43.56076861	-118.93861917	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	09/25/1975	Domestic	1	0	0	0	0
HARN	581	HARN0000581	NULL	43.55837058	-118.91896875	1,000.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	153.00	155.00	10/09/1968	Domestic	1	0	0	0	0
HARN	583	HARN0000583	23.00S/32.00E-20cc	43.55716201	-118.92165088	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	44.00	44.00	05/13/1931	Domestic	1	0	0	0	0
HARN	585	HARN0000585	23.00S/32.00E-20dd	43.55656114	-118.90690362	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	47.00	47.00	05/16/1931	Domestic	1	0	0	0	0
HARN	587	HARN0000587	23.00S/32.00E-21cc	43.55779119	-118.89980274	5,280.00	NULL	NULL	NULL	well_report_plss	147.00	NULL	12/05/1973	Domestic	1	0	0	0	0
HARN	591	HARN0000591	23.00S/32.00E-27ba	43.55382155	-118.86977661	5,280.00	NULL	NULL	NULL	well_report_plss	11.00	11.00	05/13/1932	Domestic	1	0	0	0	0
HARN	593	HARN0000593	23.00S/32.00E-27db	43.55023489	-118.87480842	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	465.00	10/20/1957	Domestic	1	0	0	0	0
HARN	596	HARN0000596	23.00S/32.00E-28aa	43.55404120	-118.88478652	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	06/22/1962	Domestic	1	0	0	0	0
HARN	597	HARN0000597	23.00S/32.00E-28aa	43.55404120	-118.88478652	5,280.00	NULL	NULL	NULL	well_report_plss	210.00	NULL	08/09/1963	Domestic	0	0	0	1	0
HARN	610	HARN0000610	23.00S/32.00E-30cd	43.54287559	-118.92929269	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	09/12/1978	Domestic	1	0	0	0	0
HARN	612	HARN0000612	23.00S/32.00E-31aa	43.53930298	-118.92440925	5,280.00	NULL	NULL	NULL	well_report_plss	72.00	NULL	04/24/1975	Domestic	1	0	0	0	0
HARN	614	HARN0000614	23.00S/32.00E-32ad	43.53194855	-118.90509760	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	01/23/1980	Domestic	1	0	0	0	0
HARN	618	HARN0000618	23.00S/32.00E-35cc	43.52688300	-118.89238300	100.00	OWRD	GROUNDWATER SECTION	GPS FIELD OFFICE	owrd_groundwater_staff	180.00	NULL	07/22/1981	Domestic	1	0	0	0	0
HARN	620	HARN0000620	NULL	43.53374900	-118.89250660	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	06/03/1959	Domestic	0	0	0	1	0
HARN	622	HARN0000622	23.00S/32.00E-35ab	43.53916797	-118.85486379	5,280.00	NULL	NULL	NULL	well_report_plss	13.00	13.00	NULL	Domestic	1	0	0	0	0
HARN	623	HARN0000623	23.00S/32.50E-1ba	43.61119746	-118.71582064	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	05/31/1974	Domestic	1	0	0	0	0
HARN	624	HARN0000624	23.00S/32.50E-1bb	43.61122882	-118.72578744	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	05/17/1970	Domestic	1	0	0	0	0
HARN	628	HARN0000628	23.00S/32.50E-2cd	43.60044253	-118.73577205	5,280.00	NULL	NULL	NULL	well_report_plss	19.00	19.00	NULL	Domestic	1	0	0	0	0
HARN	629	HARN0000629	23.00S/32.50E-3cb	43.60782060	-118.76567174	5,280.00	NULL	NULL	NULL	well_report_plss	483.00	483.00	10/27/1987	Domestic	1	0	0	0	0
HARN	630	HARN0000630	23.00S/32.50E-3bb	43.61145841	-118.76566240	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	NULL	06/09/1976	Domestic	1	0	0	0	0
HARN	632	HARN0000632	23.00S/32.50E-3bb	43.61145841	-118.76566240	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	12/24/1967	Domestic	1	0	0	0	0
HARN	634	HARN0000634	NULL	43.60610200	-118.77814830	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	07/15/1976	Domestic	1	0	0	0	0
HARN	636	HARN0000636	23.00S/32.50E-4ba	43.61153997	-118.77563658	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	07/01/1967	Domestic	1	0	0	0	0
HARN	639	HARN0000639	23.00S/32.50E-6da	43.60796450	-118.81052267	5,280.00	NULL	NULL	NULL	well_report_plss	16.00	NULL	NULL	Domestic	1	0	0	0	0
HARN	640	HARN0000640	23.00S/32.50E-7ac	43.58988258	-118.82004396	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	06/26/1986	Domestic	1	0	0	0	0
HARN	641	HARN0000641	23.00S/32.50E-10cd	43.58603877	-118.75571093	5,280.00	NULL	NULL	NULL	well_report_plss	102.00	NULL	09/22/1983	Domestic	1	0	0	0	0
HARN	645	HARN0000645	23.00S/32.50E-11dd	43.58472000	-118.73306000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	118.00	118.00	06/29/1974	Domestic	1	0	0	0	0
HARN	650	HARN0000650	23.00S/32.50E-13bb	43.58230394	-118.72582151	5,280.00	NULL	NULL	NULL	well_report_plss	155.00	NULL	03/12/1973	Domestic	1	0	0	0	0
HARN	653	HARN0000653	NULL	43.57718223	-118.81507159	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	03/10/1980	Domestic	1	0	0	0	0
HARN	655	HARN0000655	23.00S/32.50E-20bb	43.56809858	-118.80552282	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	09/04/1971	Domestic	1	0	0	0	0
HARN	658	HARN0000658	NULL	43.54719331	-118.74807676	150.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	253.00	253.00	09/23/1964	Domestic	1	0	0	0	0
HARN	661	HARN0000661	23.00S/32.50E-31ab	43.54028507	-118.82167331	200.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	18.00	18.00	10/04/1930	Domestic	1	0	0	0	0
HARN	664	HARN0000664	23.00S/32.50E-32bd	43.53184272	-118.79554913	5,280.00	NULL	NULL	NULL	well_report_plss	24.00	24.00	05/13/1932	Domestic	1	0	0	0	0
HARN	666	HARN0000666	NULL	43.53354452	-118.75821834	5,280.00	NULL	NULL	NULL	well_report_plss	68.00	NULL	09/25/1961	Domestic	1	0	0	0	0
HARN	671	HARN0000671	23.00S/33.00E-4ac	43.60132084	-118.66588177	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	108.00	108.00	09/13/1987	Domestic	1	0	0	0	0
HARN	673	HARN0000673	23.00S/33.00E-5db	43.60339122	-118.68135483	5,280.00	NULL	NULL	NULL	well_report_plss	92.00	NULL	09/17/1963	Domestic	1	0	0	0	0
HARN	678	HARN0000678	23.00S/33.00E-11ca	43.58879819	-118.61664907	5,280.00	NULL	NULL	NULL	well_report_plss	155.00	NULL	11/21/1974	Domestic	1	0	0	0	0
HARN	681	HARN0000681	NULL	43.58695627	-118.59921688	5,280.00	NULL	NULL	NULL	well_report_plss	170.00	NULL	07/12/1968	Domestic	1	0	0	0	0
HARN	683	HARN0000683	NULL	43.58909977	-118.59351944	200.00	OWRD	WELL LOG	WELL LOG AND IMAGERY	owrd_groundwater_staff	160.00	160.00	07/25/1966	Domestic	1	0	0	0	0
HARN	687	HARN0000687	23.00S/33.00E-18bc	43.57659000	-118.70737000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	120.00	120.00	03/27/1981	Domestic	1	0	0	0	0
HARN	689	HARN0000689	23.00S/33.00E-18ac	43.57087535	-118.70129416	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/28/1966	Domestic	1	0	0	0	0
HARN	690	HARN0000690	23.00S/33.00E-20aa	43.56361576	-118.67148192	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/21/1965	Domestic	1	0	0	0	0
HARN	693	HARN0000693	23.00S/33.00E-22aa	43.56650275	-118.64880231	500.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	101.00	101.00	07/20/1965	Domestic	1	0	0	0	0
HARN	697	HARN0000697	23.00S/33.00E-24ad	43.55623777	-118.59181321	5,280.00	NULL	NULL	NULL	well_report_plss	112.00	112.00	08/11/1970	Domestic	1	0	0	0	0
HARN	698	HARN0000698	23.00S/33.00E-24dd	43.55262622	-118.59182157	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	07/11/1978	Domestic	1	0	0	0	0
HARN	700	HARN0000700	23.00S/33.00E-26dd	43.53821620	-118.61176834	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/31/1966	Domestic	1	0	0	0	0
HARN	702	HARN0000702	23.00S/33.00E-28ab	43.54915175	-118.66153717	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	05/30/1980	Domestic	1	0	0	0	0
HARN	707	HARN0000707	23.00S/33.00E-33aa	43.53467973	-118.65159684	5,280.00	NULL	NULL	NULL	well_report_plss	72.00	NULL	10/20/1967	Domestic	1	0	0	0	0
HARN	709	HARN0000709	NULL	43.52915591	-118.59934234	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	05/06/1972	Domestic	0	0	0	1	0
HARN	710	HARN0000710	23.00S/33.00E-36da	43.53094572	-118.59187172	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	85.00	04/20/1963	Domestic	1	0	0	0	0
HARN	711	HARN0000711	NULL	43.52434232	-118.59049413	250.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	150.00	150.00	05/12/1965	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	715	HARN0000715	23.00S/34.00E-7ac	43.58521887	-118.58205986	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	08/28/1986	Domestic	1	0	0	0	0
HARN	718	HARN0000718	23.00S/34.00E-7db	43.59154800	-118.58293000	1,000.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	170.00	170.00	05/14/1981	Domestic	1	0	0	0	0
HARN	723	HARN0000723	23.00S/34.00E-7ba	43.59245921	-118.57712662	5,280.00	NULL	NULL	NULL	well_report_plss	170.00	170.00	07/26/1968	Domestic	1	0	0	0	0
HARN	725	HARN0000725	23.00S/34.00E-7dd	43.57273711	-118.57516620	50.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	76.00	77.00	05/02/1963	Domestic	1	0	0	0	0
HARN	736	HARN0000736	23.00S/34.00E-19cc	43.55262778	-118.58687408	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	04/10/1976	Domestic	1	0	0	0	0
HARN	744	HARN0000744	24.00S/25.00E-15bc	43.48941284	-119.71389800	50.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	670.00	670.00	07/20/1967	Domestic	0	1	0	0	0
HARN	748	HARN0000748	24.00S/25.00E-27bb	43.46630753	-119.71356349	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	10/31/1988	Domestic	1	0	0	0	0
HARN	760	HARN0000760	24.00S/27.00E-15ab	43.49701000	-119.47432000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	182.00	NULL	05/23/1984	Domestic	1	0	0	0	0
HARN	769	HARN0000769	24.00S/29.00E-1bc	43.51786979	-119.19690470	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	05/06/1967	Domestic	1	0	0	0	0
HARN	771	HARN0000771	24.00S/29.00E-2bc	43.51783561	-119.21680393	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	02/15/1981	Domestic	1	0	0	0	0
HARN	773	HARN0000773	24.00S/29.00E-11ad	43.50320261	-119.20183312	5,280.00	NULL	NULL	NULL	well_report_plss	127.00	NULL	06/25/1981	Domestic	1	0	0	0	0
HARN	783	HARN0000783	24.00S/29.00E-13bb	43.49578967	-119.19694967	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	04/15/1988	Domestic	1	0	0	0	0
HARN	786	HARN0000786	24.00S/29.00E-13ac	43.48856376	-119.19187087	5,280.00	NULL	NULL	NULL	well_report_plss	230.00	NULL	05/09/1986	Domestic	1	0	0	0	0
HARN	788	HARN0000788	24.00S/29.00E-13bb	43.49524140	-119.19664758	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	210.00	210.00	08/30/1981	Domestic	1	0	0	0	0
HARN	790	HARN0000790	24.00S/29.00E-13bb	43.49578967	-119.19694967	5,280.00	NULL	NULL	NULL	well_report_plss	99.00	NULL	07/12/1979	Domestic	1	0	0	0	0
HARN	791	HARN0000791	24.00S/29.00E-24aa	43.48125968	-119.18181172	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	08/25/1982	Domestic	1	0	0	0	0
HARN	798	HARN0000798	24.00S/30.00E-2bc	43.51814237	-119.09704454	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	08/02/1987	Domestic	1	0	0	0	0
HARN	799	HARN0000799	NULL	43.51998359	-119.08957210	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	06/02/1966	Domestic	1	0	0	0	0
HARN	801	HARN0000801	NULL	43.51998359	-119.08957210	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	80.00	05/14/1932	Domestic	1	0	0	0	0
HARN	805	HARN0000805	24.00S/30.00E-3bb	43.52532622	-119.11687472	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	02/09/1989	Domestic	1	0	0	0	0
HARN	807	HARN0000807	24.00S/30.00E-4bb	43.52527923	-119.13654195	5,280.00	NULL	NULL	NULL	well_report_plss	315.00	NULL	11/18/1987	Domestic	1	0	0	0	0
HARN	808	HARN0000808	24.00S/30.00E-4bb	43.52527923	-119.13654195	5,280.00	NULL	NULL	NULL	well_report_plss	185.00	NULL	06/20/1984	Domestic	1	0	0	0	0
HARN	810	HARN0000810	24.00S/30.00E-6cc	43.51420487	-119.17699836	5,280.00	NULL	NULL	NULL	well_report_plss	263.00	NULL	08/25/1976	Domestic	0	1	0	0	0
HARN	814	HARN0000814	NULL	43.50513966	-119.16946495	5,280.00	NULL	NULL	NULL	well_report_plss	96.00	NULL	06/18/1963	Domestic	1	0	0	0	0
HARN	817	HARN0000817	24.00S/30.00E-8aa	43.51082813	-119.14171730	5,280.00	NULL	NULL	NULL	well_report_plss	93.00	NULL	04/14/1966	Domestic	1	0	0	0	0
HARN	824	HARN0000824	NULL	43.50533585	-119.06931456	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	10/20/1961	Domestic	1	0	0	0	0
HARN	828	HARN0000828	24.00S/30.00E-14dc	43.48538737	-119.09149713	5,280.00	NULL	NULL	NULL	well_report_plss	71.00	NULL	08/24/1973	Domestic	1	0	0	0	0
HARN	834	HARN0000834	24.00S/30.00E-18bb	43.49592506	-119.17697564	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	08/08/1985	Domestic	1	0	0	0	0
HARN	839	HARN0000839	NULL	43.49053611	-119.16952602	5,280.00	NULL	NULL	NULL	well_report_plss	129.00	NULL	10/27/1961	Domestic	1	0	0	0	0
HARN	843	HARN0000843	24.00S/30.00E-25bc	43.45955617	-119.07637173	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	04/07/1964	Domestic	1	0	0	0	0
HARN	848	HARN0000848	24.00S/31.00E-5ad	43.51726491	-119.02265210	5,280.00	NULL	NULL	NULL	well_report_plss	57.00	NULL	07/21/1989	Domestic	1	0	0	0	0
HARN	858	HARN0000858	24.00S/31.00E-8bb	43.51010827	-119.03719154	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	09/23/1989	Domestic	1	0	0	0	0
HARN	860	HARN0000860	24.00S/31.00E-8da	43.50594424	-119.02077522	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	45.00	44.50	08/15/1930	Domestic	1	0	0	0	0
HARN	868	HARN0000868	24.00S/31.00E-14ac	43.48796757	-118.97324092	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	09/19/1977	Domestic	1	0	0	0	0
HARN	872	HARN0000872	24.00S/31.00E-24bd	43.47370137	-118.94845443	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	10/11/1985	Domestic	1	0	0	0	0
HARN	877	HARN0000877	24.00S/31.00E-31cb	43.44823522	-119.05685317	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	06/15/1979	Domestic	1	0	0	0	0
HARN	879	HARN0000879	24.00S/31.00E-31db	43.44829447	-119.05204145	5,280.00	NULL	NULL	NULL	well_report_plss	210.00	NULL	05/03/1979	Domestic	1	0	0	0	0
HARN	881	HARN0000881	NULL	43.44943897	-119.02160239	500.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	82.00	82.00	04/28/1988	Domestic	1	0	0	0	0
HARN	882	HARN0000882	24.00S/31.00E-34bb	43.45207153	-118.99784444	5,280.00	NULL	NULL	NULL	well_report_plss	285.00	NULL	04/06/1981	Domestic	1	0	0	0	0
HARN	883	HARN0000883	24.00S/31.00E-36ad	43.44488310	-118.94366543	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	02/28/1968	Domestic	1	0	0	0	0
HARN	887	HARN0000887	NULL	43.51929033	-118.85244154	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	05/20/1975	Domestic	1	0	0	0	0
HARN	889	HARN0000889	NULL	43.51929033	-118.85244154	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	05/12/1975	Domestic	1	0	0	0	0
HARN	891	HARN0000891	24.00S/32.00E-4db	43.52141604	-118.89488260	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	05/01/1989	Domestic	0	1	0	0	0
HARN	892	HARN0000892	24.00S/32.00E-4bd	43.51776408	-118.88965440	5,280.00	NULL	NULL	NULL	well_report_plss	135.00	NULL	08/07/1986	Domestic	1	0	0	0	0
HARN	894	HARN0000894	24.00S/32.00E-4db	43.52141604	-118.89488260	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/24/1978	Domestic	1	0	0	0	0
HARN	895	HARN0000895	24.00S/32.00E-4dd	43.51413861	-118.88471659	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	05/18/1977	Domestic	1	0	0	0	0
HARN	896	HARN0000896	24.00S/32.00E-4cd	43.51595300	-118.89178900	150.00	OWRD	GROUNDWATER SECTION	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	100.00	NULL	05/24/1977	Domestic	1	0	0	0	0
HARN	906	HARN0000906	24.00S/32.00E-8cc	43.49931703	-118.91900200	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	08/08/1978	Domestic	1	0	0	0	0
HARN	908	HARN0000908	24.00S/32.00E-8cd	43.49945658	-118.90910396	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	08/04/1978	Domestic	1	0	0	0	0
HARN	912	HARN0000912	24.00S/32.00E-10cd	43.49955663	-118.87020026	5,280.00	NULL	NULL	NULL	well_report_plss	59.00	NULL	06/16/1987	Domestic	1	0	0	0	0
HARN	913	HARN0000913	24.00S/32.00E-10ac	43.50321385	-118.87522872	5,280.00	NULL	NULL	NULL	well_report_plss	59.00	NULL	06/16/1987	Domestic	1	0	0	0	0
HARN	914	HARN0000914	24.00S/32.00E-10ac	43.50321385	-118.87522872	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	10/02/1983	Domestic	1	0	0	0	0
HARN	915	HARN0000915	24.00S/32.00E-10dd	43.49819674	-118.86277027	25.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	60.00	60.00	05/18/1963	Domestic	0	1	0	0	0
HARN	917	HARN0000917	24.00S/32.00E-11bc	43.50313248	-118.86010470	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	07/22/1981	Domestic	1	0	0	0	0
HARN	919	HARN0000919	24.00S/32.00E-11ac	43.50310630	-118.85507035	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	08/06/1975	Domestic	1	0	0	0	0
HARN	920	HARN0000920	24.00S/32.00E-12dd	43.49931834	-118.82484640	5,280.00	NULL	NULL	NULL	well_report_plss	64.00	NULL	12/11/1979	Domestic	1	0	0	0	0
HARN	923	HARN0000923	24.00S/32.00E-12bc	43.50427745	-118.84224960	350.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	82.00	82.00	10/07/1965	Domestic	1	0	0	0	0
HARN	924	HARN0000924	24.00S/32.00E-13da	43.49206973	-118.82487128	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	09/08/1984	Domestic	1	0	0	0	0
HARN	929	HARN0000929	NULL	43.47579479	-118.87223841	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	08/21/1977	Domestic	1	0	0	0	0
HARN	931	HARN0000931	24.00S/32.00E-23bb	43.48128881	-118.85998871	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	07/10/1981	Domestic	1	0	0	0	0
HARN	934	HARN0000934	24.00S/32.00E-24da	43.47757044	-118.82491282	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	03/26/1980	Domestic	1	0	0	0	0
HARN	939	HARN0000939	24.00S/32.00E-31da	43.44850496	-118.92387404	5,280.00	NULL	NULL	NULL	well_report_plss	400.00	400.00	09/04/1931	Domestic	1	0	0	0	0
HARN	942	HARN0000942	24.00S/32.00E-34aa	43.45218409	-118.86483018	5,280.00	NULL	NULL	NULL	well_report_plss	46.00	NULL	10/27/1967	Domestic	1	0	0	0	0
HARN	946	HARN0000946	24.00S/32.50E-2ac	43.51706890	-118.74081135	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	08/16/1982	Domestic	1	0	0	0	0
HARN	948	HARN0000948	24.00S/32.50E-10bb	43.50975399	-118.76557442	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	40.00	05/13/1932	Domestic	1	0	0	0	0
HARN	949	HARN0000949	24.00S/32.50E-11cd	43.49894717	-118.73567187	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/25/1983	Domestic	1	0	0	0	0
HARN	951	HARN0000951	24.00S/32.50E-13ba	43.49533863	-118.71590128	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	06/30/1967	Domestic	1	0	0	0	0
HARN	962	HARN0000962	24.00S/32.50E-24cc	43.46988181	-118.72566980	5,280.00	NULL	NULL	NULL	well_report_plss	280.00	NULL	07/20/1974	Domestic	1	0	0	0	0
HARN	965	HARN0000965	24.00S/32.50E-30bd	43.46153037	-118.80831148	150.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	185.00	185.00	05/13/1967	Domestic	1	0	0	0	0
HARN	968	HARN0000968	24.00S/32.50E-31aa	43.45203358	-118.80979053	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	05/28/1984	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	969	HARN0000969	24.00S/32.50E-32dc	43.44107817	-118.79989924	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	03/10/1982	Domestic	1	0	0	0	0
HARN	970	HARN0000970	24.00S/32.50E-32cb	43.44919172	-118.80185055	1,000.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	180.00	180.00	09/04/1931	Domestic	1	0	0	0	0
HARN	971	HARN0000971	24.00S/32.50E-32cb	43.44836838	-118.80485640	5,280.00	NULL	NULL	NULL	well_report_plss	41.00	NULL	01/20/1936	Domestic	1	0	0	0	0
HARN	972	HARN0000972	24.00S/32.50E-32bc	43.44473430	-118.80485822	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	NULL	Domestic	1	0	0	0	0
HARN	974	HARN0000974	NULL	43.51471860	-118.59937139	5,280.00	NULL	NULL	NULL	well_report_plss	185.00	187.00	03/18/1963	Domestic	1	0	0	0	0
HARN	976	HARN0000976	24.00S/33.00E-2db	43.51654018	-118.62176403	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	250.00	08/20/1967	Domestic	1	0	0	0	0
HARN	978	HARN0000978	NULL	43.51483710	-118.67900219	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	09/02/1968	Domestic	1	0	0	0	0
HARN	979	HARN0000979	24.00S/33.00E-6ba	43.52026819	-118.69640827	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	10/30/1987	Domestic	1	0	0	0	0
HARN	989	HARN0000989	24.00S/33.00E-9dd	43.49492676	-118.65169319	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	09/28/1975	Domestic	1	0	0	0	0
HARN	995	HARN0000995	24.00S/33.00E-12aa	43.50569914	-118.59191422	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	05/04/1971	Domestic	1	0	0	0	0
HARN	998	HARN0000998	24.00S/33.00E-13bb	43.49129571	-118.60687984	5,280.00	NULL	NULL	NULL	well_report_plss	305.00	NULL	07/06/1976	Domestic	1	0	0	0	0
HARN	999	HARN0000999	24.00S/33.00E-13bd	43.48408401	-118.59692643	5,280.00	NULL	NULL	NULL	well_report_plss	132.00	NULL	08/02/1972	Domestic	1	0	0	0	0
HARN	1000	HARN0001000	24.00S/33.00E-13bb	43.49129571	-118.60687984	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	05/24/1966	Domestic	1	0	0	0	0
HARN	1001	HARN0001001	24.00S/33.00E-13bd	43.48408401	-118.59692643	5,280.00	NULL	NULL	NULL	well_report_plss	133.00	NULL	07/26/1973	Domestic	1	0	0	0	0
HARN	1003	HARN0001003	24.00S/33.00E-14cd	43.48048097	-118.61687103	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	06/08/1983	Domestic	1	0	0	0	0
HARN	1010	HARN0001010	24.00S/33.00E-16ac	43.48409244	-118.66169155	5,280.00	NULL	NULL	NULL	well_report_plss	158.00	NULL	09/18/1983	Domestic	1	0	0	0	0
HARN	1013	HARN0001013	24.00S/33.00E-16dd	43.48048031	-118.65175154	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	11/13/1968	Domestic	1	0	0	0	0
HARN	1021	HARN0001021	24.00S/33.00E-18bb	43.49132990	-118.70615213	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	08/18/1976	Domestic	1	0	0	0	0
HARN	1022	HARN0001022	24.00S/33.00E-20aa	43.47782154	-118.67022349	500.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	104.00	104.00	08/30/1968	Domestic	1	0	0	0	0
HARN	1023	HARN0001023	24.00S/33.00E-21bd	43.46964277	-118.65678739	5,280.00	NULL	NULL	NULL	well_report_plss	117.00	NULL	06/22/1972	Domestic	1	0	0	0	0
HARN	1024	HARN0001024	24.00S/33.00E-23ac	43.46965982	-118.62188889	5,280.00	NULL	NULL	NULL	well_report_plss	215.00	NULL	05/19/1984	Domestic	1	0	0	0	0
HARN	1027	HARN0001027	24.00S/33.00E-24aa	43.47687744	-118.59195198	5,280.00	NULL	NULL	NULL	well_report_plss	148.00	NULL	04/10/1979	Domestic	1	0	0	0	0
HARN	1029	HARN0001029	24.00S/33.00E-24aa	43.47687744	-118.59195198	5,280.00	NULL	NULL	NULL	well_report_plss	48.00	NULL	08/24/1967	Domestic	1	0	0	0	0
HARN	1031	HARN0001031	24.00S/33.00E-24bd	43.46966998	-118.59695047	5,280.00	NULL	NULL	NULL	well_report_plss	143.00	NULL	08/20/1973	Domestic	1	0	0	0	0
HARN	1042	HARN0001042	24.00S/33.00E-33ac	43.44067086	-118.66170019	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	200.00	07/06/1966	Domestic	1	0	0	0	0
HARN	1045	HARN0001045	24.00S/33.00E-35dd	43.43721224	-118.61190686	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	10/03/1980	Domestic	1	0	0	0	0
HARN	1079	HARN0001079	NULL	43.37355700	-119.30978900	500.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	112.00	112.00	06/25/1957	Domestic	1	0	0	0	0
HARN	1082	HARN0001082	NULL	43.35994222	-119.34724846	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	09/14/1959	Domestic	1	0	0	0	0
HARN	1086	HARN0001086	25.00S/29.00E-36cc	43.35455688	-119.19598273	5,280.00	NULL	NULL	NULL	well_report_plss	193.00	NULL	11/15/1983	Domestic	1	0	0	0	0
HARN	1088	HARN0001088	25.00S/30.00E-26cc	43.36910422	-119.09628625	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/25/1986	Domestic	1	0	0	0	0
HARN	1090	HARN0001090	25.00S/30.00E-27ca	43.36893572	-119.11118696	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	90.00	NULL	10/21/1988	Domestic	1	0	0	0	0
HARN	1099	HARN0001099	25.00S/30.00E-35bb	43.36688255	-119.09619854	2.00	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	110.00	119.00	12/10/2008	Domestic	1	0	0	0	0
HARN	1103	HARN0001103	25.00S/31.00E-3bd	43.42872900	-118.99001600	9,999.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	160.00	160.00	09/08/2016	Domestic	1	0	0	0	0
HARN	1116	HARN0001116	25.00S/31.00E-9da	43.41410198	-118.99765125	100.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	156.00	205.00	07/25/1979	Domestic	1	0	0	0	0
HARN	1122	HARN0001122	NULL	43.40316979	-118.95064367	5,280.00	NULL	NULL	NULL	well_report_plss	260.00	NULL	10/16/1972	Domestic	1	0	0	0	0
HARN	1123	HARN0001123	25.00S/31.00E-15bc	43.40115806	-118.99732015	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	05/03/1980	Domestic	1	0	0	0	0
HARN	1124	HARN0001124	25.00S/31.00E-15cc	43.39610145	-118.99607570	500.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	110.00	NULL	04/10/1980	Domestic	1	0	0	0	0
HARN	1126	HARN0001126	25.00S/31.00E-16cc	43.39768108	-119.01725029	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	09/15/1980	Domestic	1	0	0	0	0
HARN	1130	HARN0001130	25.00S/31.00E-21cb	43.39049119	-119.01723511	5,280.00	NULL	NULL	NULL	well_report_plss	390.00	NULL	02/16/1981	Domestic	1	0	0	0	0
HARN	1137	HARN0001137	25.00S/31.00E-22bb	43.39388159	-118.99730423	5,280.00	NULL	NULL	NULL	well_report_plss	128.00	NULL	09/30/1981	Domestic	1	0	0	0	0
HARN	1138	HARN0001138	25.00S/31.00E-23ac	43.38681426	-118.97274137	5,280.00	NULL	NULL	NULL	well_report_plss	235.00	NULL	09/15/1979	Domestic	1	0	0	0	0
HARN	1145	HARN0001145	25.00S/31.00E-27da	43.38055167	-119.00406579	100.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	179.00	179.00	10/27/1962	Domestic	1	0	0	0	0
HARN	1156	HARN0001156	25.00S/31.00E-31bc	43.35849629	-119.05661230	5,280.00	NULL	NULL	NULL	well_report_plss	61.00	NULL	06/07/1983	Domestic	1	0	0	0	0
HARN	1157	HARN0001157	25.00S/31.00E-32aa	43.36549842	-119.02084716	450.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	111.00	111.00	12/10/1962	Domestic	1	0	0	0	0
HARN	1160	HARN0001160	25.00S/31.00E-34bb	43.36494793	-118.99746948	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	11/10/1985	Domestic	1	0	0	0	0
HARN	1181	HARN0001181	25.00S/32.00E-35ab	43.36491315	-118.85528602	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	08/22/1979	Domestic	1	0	0	0	0
HARN	1182	HARN0001182	25.00S/32.00E-35bb	43.36491607	-118.86024289	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	08/18/1979	Domestic	1	0	0	0	0
HARN	1187	HARN0001187	25.00S/32.50E-1dc	43.42483891	-118.72165886	400.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	86.00	86.00	10/22/1930	Domestic	1	0	0	0	0
HARN	1188	HARN0001188	25.00S/32.50E-2bd	43.43007351	-118.73548142	5,280.00	NULL	NULL	NULL	well_report_plss	253.00	253.00	NULL	Domestic	1	0	0	0	0
HARN	1189	HARN0001189	NULL	43.43862372	-118.76654136	175.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	91.00	95.00	03/17/1967	Domestic	1	0	0	0	0
HARN	1192	HARN0001192	NULL	43.43199138	-118.79758412	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	05/18/1968	Domestic	1	0	0	0	0
HARN	1193	HARN0001193	25.00S/32.50E-5ab	43.43599072	-118.79998212	300.00	OWRD	GROUNDWATER SECTION	MAP SCALE UNKNOWN	owrd_groundwater_staff	67.00	67.00	05/16/1931	Domestic	1	0	0	0	0
HARN	1194	HARN0001194	25.00S/32.50E-5db	43.43539433	-118.80072169	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	22.00	22.00	10/05/1928	Domestic	1	0	0	0	0
HARN	1195	HARN0001195	NULL	43.43206600	-118.81507699	5,280.00	NULL	NULL	NULL	well_report_plss	18.00	18.00	NULL	Domestic	1	0	0	0	0
HARN	1202	HARN0001202	NULL	43.38841130	-118.81549369	5,280.00	NULL	NULL	NULL	well_report_plss	24.00	23.50	05/11/1932	Domestic	1	0	0	0	0
HARN	1205	HARN0001205	NULL	43.38842485	-118.79797467	5,280.00	NULL	NULL	NULL	well_report_plss	20.00	19.50	05/19/1932	Domestic	1	0	0	0	0
HARN	1212	HARN0001212	NULL	43.35180000	-118.77780000	999.00	OWRD	GROUNDWATER SECTION	1:24,000 MAP	owrd_groundwater_staff	20.00	20.00	05/24/1932	Domestic	1	0	0	0	0
HARN	1215	HARN0001215	25.00S/33.00E-1bb	43.43374021	-118.60692276	5,280.00	NULL	NULL	NULL	well_report_plss	48.00	NULL	11/13/1976	Domestic	1	0	0	0	0
HARN	1216	HARN0001216	25.00S/33.00E-2da	43.43007824	-118.61189600	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	11/20/1986	Domestic	1	0	0	0	0
HARN	1217	HARN0001217	25.00S/33.00E-6dc	43.42114320	-118.70293634	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	21.00	21.00	10/10/1930	Domestic	1	0	0	0	0
HARN	1218	HARN0001218	25.00S/33.00E-7dc	43.40643103	-118.70283354	250.00	OWRD	GROUNDWATER SECTION	MAP SCALE UNKNOWN	owrd_groundwater_staff	120.00	120.00	10/10/1930	Domestic	1	0	0	0	0
HARN	1219	HARN0001219	NULL	43.41353716	-118.67889931	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	08/19/1977	Domestic	1	0	0	0	0
HARN	1231	HARN0001231	25.00S/33.00E-11aa	43.41906953	-118.61179644	5,280.00	NULL	NULL	NULL	well_report_plss	72.00	NULL	10/18/1978	Domestic	1	0	0	0	0
HARN	1232	HARN0001232	25.00S/33.00E-11ad	43.41185322	-118.61177108	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	07/30/1978	Domestic	1	0	0	0	0
HARN	1240	HARN0001240	25.00S/33.00E-23bb	43.39173742	-118.62805414	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	29.00	28.50	10/10/1930	Domestic	1	0	0	0	0
HARN	1249	HARN0001249	25.00S/34.00E-7ba	43.41914557	-118.57702377	5,280.00	NULL	NULL	NULL	well_report_plss	322.00	NULL	09/11/1989	Domestic	1	0	0	0	0
HARN	1250	HARN0001250	25.00S/34.00E-7db	43.41551912	-118.58199251	5,280.00	NULL	NULL	NULL	well_report_plss	95.00	NULL	04/08/1988	Domestic	1	0	0	0	0
HARN	1251	HARN0001251	25.00S/34.00E-7db	43.41551912	-118.58199251	5,280.00	NULL	NULL	NULL	well_report_plss	224.00	224.00	07/17/1987	Domestic	1	0	0	0	0
HARN	1252	HARN0001252	NULL	43.41756000	-118.57557000	12.40	NULL	NULL	NULL	owrd_field_staff	150.00	150.00	03/10/1986	Domestic	1	0	0	0	0
HARN	1253	HARN0001253	25.00S/34.00E-7db	43.41551912	-118.58199251	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	145.00	02/12/1986	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	1254	HARN0001254	25.00S/34.00E-7ba	43.41914557	-118.57702377	5,280.00	NULL	NULL	NULL	well_report_plss	295.00	NULL	05/12/1982	Domestic	1	0	0	0	0
HARN	1255	HARN0001255	25.00S/34.00E-7aa	43.41915200	-118.57204687	5,280.00	NULL	NULL	NULL	well_report_plss	59.00	NULL	04/28/1983	Domestic	1	0	0	0	0
HARN	1257	HARN0001257	25.00S/34.00E-7bb	43.41913239	-118.58693272	5,280.00	NULL	NULL	NULL	well_report_plss	58.00	NULL	12/12/1981	Domestic	1	0	0	0	0
HARN	1258	HARN0001258	NULL	43.41371671	-118.57946199	5,280.00	NULL	NULL	NULL	well_report_plss	86.00	NULL	07/27/1972	Domestic	1	0	0	0	0
HARN	1259	HARN0001259	NULL	43.41371671	-118.57946199	5,280.00	NULL	NULL	NULL	well_report_plss	102.00	NULL	08/08/1963	Domestic	1	0	0	0	0
HARN	1261	HARN0001261	NULL	43.41371671	-118.57946199	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	08/13/1956	Domestic	1	0	0	0	0
HARN	1262	HARN0001262	NULL	43.41371671	-118.57946199	5,280.00	NULL	NULL	NULL	well_report_plss	185.00	NULL	09/16/1965	Domestic	1	0	0	0	0
HARN	1265	HARN0001265	NULL	43.41371671	-118.57946199	5,280.00	NULL	NULL	NULL	well_report_plss	95.00	NULL	01/28/1974	Domestic	1	0	0	0	0
HARN	1266	HARN0001266	26.00S/32.00E-35cc	43.26403931	-118.73796422	5,280.00	NULL	NULL	NULL	well_report_plss	35.00	NULL	05/28/1983	Domestic	1	0	0	0	0
HARN	1268	HARN0001268	25.00S/34.00E-8db	43.41554247	-118.56213060	5,280.00	NULL	NULL	NULL	well_report_plss	162.00	NULL	07/25/1989	Domestic	1	0	0	0	0
HARN	1269	HARN0001269	25.00S/34.00E-8cd	43.40830854	-118.55716700	5,280.00	NULL	NULL	NULL	well_report_plss	95.00	NULL	09/06/1985	Domestic	1	0	0	0	0
HARN	1282	HARN0001282	25.00S/34.00E-33cc	43.35036848	-118.54717227	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	04/07/1971	Domestic	1	0	0	0	0
HARN	1290	HARN0001290	25.00S/34.00E-19bb	43.39018426	-118.58700295	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	04/18/1979	Domestic	0	0	0	1	0
HARN	1291	HARN0001291	25.00S/34.00E-19bb	43.39018426	-118.58700295	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	06/04/1971	Domestic	1	0	0	0	0
HARN	1293	HARN0001293	25.00S/34.00E-30ac	43.36846593	-118.58197751	5,280.00	NULL	NULL	NULL	well_report_plss	51.00	NULL	04/12/1989	Domestic	1	0	0	0	0
HARN	1301	HARN0001301	26.00S/25.00E-24cb	43.30398356	-119.67450023	5,280.00	NULL	NULL	NULL	well_report_plss	499.00	500.00	10/31/1968	Domestic	1	0	0	0	0
HARN	1310	HARN0001310	26.00S/29.00E-5db	43.34733779	-119.27050078	5,280.00	NULL	NULL	NULL	well_report_plss	165.00	NULL	03/25/1980	Domestic	1	0	0	0	0
HARN	1320	HARN0001320	NULL	43.34562698	-119.06892399	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	11/29/1965	Domestic	1	0	0	0	0
HARN	1325	HARN0001325	26.00S/30.00E-5cb	43.34714757	-119.15610336	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	11/28/1978	Domestic	1	0	0	0	0
HARN	1326	HARN0001326	26.00S/30.00E-6bb	43.35083097	-119.17607889	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	04/23/1980	Domestic	1	0	0	0	0
HARN	1329	HARN0001329	26.00S/30.00E-7ba	43.33611831	-119.16612246	5,280.00	NULL	NULL	NULL	well_report_plss	94.00	NULL	06/17/1966	Domestic	1	0	0	0	0
HARN	1334	HARN0001334	26.00S/30.00E-12bc	43.32931544	-119.07644143	5,280.00	NULL	NULL	NULL	well_report_plss	113.00	NULL	06/20/1980	Domestic	1	0	0	0	0
HARN	1342	HARN0001342	NULL	43.32761200	-118.98424900	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	365.00	365.00	10/31/1970	Domestic	1	0	0	0	0
HARN	1343	HARN0001343	26.00S/31.00E-12ad	43.32893868	-118.94205998	5,280.00	NULL	NULL	NULL	well_report_plss	670.00	NULL	06/20/1968	Domestic	1	0	0	0	0
HARN	1345	HARN0001345	26.00S/31.00E-14cc	43.31085385	-118.97672428	5,280.00	NULL	NULL	NULL	well_report_plss	334.00	NULL	10/13/1962	Domestic	1	0	0	0	0
HARN	1353	HARN0001353	26.00S/31.00E-26bb	43.29256555	-118.97678887	5,280.00	NULL	NULL	NULL	well_report_plss	230.00	230.00	09/28/1962	Domestic	1	0	0	0	0
HARN	1360	HARN0001360	NULL	43.26942243	-118.89169287	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	09/04/1963	Domestic	1	0	0	0	0
HARN	1365	HARN0001365	26.00S/31.00E-35bc	43.26740489	-118.85548434	5,280.00	NULL	NULL	NULL	well_report_plss	53.00	53.00	12/31/1930	Domestic	1	0	0	0	0
HARN	1367	HARN0001367	26.00S/31.00E-35ad	43.26692131	-118.84294252	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	16.00	16.00	09/12/1930	Domestic	1	0	0	0	0
HARN	1373	HARN0001373	NULL	43.31373400	-118.88065700	9,999.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	18.00	18.00	12/31/1930	Domestic	1	0	0	0	0
HARN	1375	HARN0001375	26.00S/32.00E-18aa	43.32168343	-118.92215051	5,280.00	NULL	NULL	NULL	well_report_plss	46.00	46.00	12/31/1930	Domestic	1	0	0	0	0
HARN	1376	HARN0001376	NULL	43.30484500	-118.90958200	9,999.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	18.00	18.00	09/08/1931	Domestic	1	0	0	0	0
HARN	1377	HARN0001377	26.00S/32.00E-34da	43.27124290	-118.74290063	5,280.00	NULL	NULL	NULL	well_report_plss	26.00	25.50	12/31/1930	Domestic	1	0	0	0	0
HARN	1385	HARN0001385	26.00S/33.00E-12ba	43.33255395	-118.58992154	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	09/18/1963	Domestic	1	0	0	0	0
HARN	1396	HARN0001396	26.00S/33.00E-25ad	43.28187673	-118.58494368	5,280.00	NULL	NULL	NULL	well_report_plss	309.00	NULL	04/23/1956	Domestic	0	1	0	0	0
HARN	1423	HARN0001423	NULL	43.31263584	-118.57325105	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	06/10/1963	Domestic	1	0	0	0	0
HARN	1424	HARN0001424	NULL	43.31263584	-118.57325105	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	06/10/1963	Domestic	1	0	0	0	0
HARN	1425	HARN0001425	26.00S/34.00E-19db	43.29998853	-118.57632564	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	07/15/1980	Domestic	1	0	0	0	0
HARN	1436	HARN0001436	27.00S/24.00E-5cb	43.25115900	-119.87704800	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	460.00	NULL	12/31/1915	Domestic	1	0	0	0	0
HARN	1437	HARN0001437	NULL	43.22471541	-119.73419181	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	380.00	380.00	03/20/1969	Domestic	1	0	0	0	0
HARN	1443	HARN0001443	NULL	43.25843637	-119.26774778	5,280.00	NULL	NULL	NULL	well_report_plss	47.00	47.00	08/21/1931	Domestic	1	0	0	0	0
HARN	1444	HARN0001444	27.00S/29.00E-8aa	43.24943992	-119.26060576	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	05/12/1983	Domestic	1	0	0	0	0
HARN	1449	HARN0001449	27.00S/30.00E-1ca	43.25635571	-118.94409174	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	01/17/1985	Domestic	1	0	0	0	0
HARN	1452	HARN0001452	27.00S/30.00E-3ad	43.25212180	-118.98062099	1,000.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	195.00	190.00	06/01/1985	Domestic	1	0	0	0	0
HARN	1458	HARN0001458	27.00S/30.00E-14bb	43.23112000	-118.97324000	10.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	341.00	341.00	05/02/1976	Domestic	1	0	0	0	0
HARN	1459	HARN0001459	27.00S/30.00E-34ab	43.18748199	-118.98786570	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	356.00	356.00	05/01/1976	Domestic	1	0	0	0	0
HARN	1466	HARN0001466	27.00S/31.00E-9bb	43.24746000	-118.89420000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	150.00	150.00	03/03/1965	Domestic	1	0	0	0	0
HARN	1468	HARN0001468	27.00S/31.00E-23ba	43.21660810	-118.84550901	5,280.00	NULL	NULL	NULL	well_report_plss	44.00	NULL	06/11/1983	Domestic	1	0	0	0	0
HARN	1478	HARN0001478	27.00S/33.00E-3bc	43.25313223	-118.63950258	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	10/26/1981	Domestic	1	0	0	0	0
HARN	1479	HARN0001479	NULL	43.25498232	-118.65186784	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	06/10/1981	Domestic	1	0	0	0	0
HARN	1487	HARN0001487	27.00S/33.00E-32ca	43.18436668	-118.66939081	5,280.00	NULL	NULL	NULL	well_report_plss	194.00	NULL	04/13/1978	Domestic	1	0	0	0	0
HARN	1492	HARN0001492	NULL	43.24019629	-118.55380397	5,280.00	NULL	NULL	NULL	well_report_plss	52.00	NULL	10/20/1977	Domestic	1	0	0	0	0
HARN	1499	HARN0001499	27.00S/34.00E-14cd	43.22006998	-118.49194490	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	12/13/1981	Domestic	1	0	0	0	0
HARN	1535	HARN0001535	28.00S/30.00E-2dc	43.16265051	-118.96913646	5,280.00	NULL	NULL	NULL	well_report_plss	415.00	NULL	08/01/1963	Domestic	1	0	0	0	0
HARN	1536	HARN0001536	28.00S/30.00E-20ac	43.12283995	-119.02847929	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	01/15/1968	Domestic	1	0	0	0	0
HARN	1541	HARN0001541	NULL	43.10250000	-118.82377000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	90.00	NULL	12/06/1964	Domestic	0	0	0	1	0
HARN	1542	HARN0001542	28.00S/31.00E-33ca	43.09728129	-118.88525870	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	65.00	01/06/1963	Domestic	1	0	0	0	0
HARN	1544	HARN0001544	28.00S/31.00E-36dd	43.08845000	-118.82105000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	100.00	100.00	10/27/1968	Domestic	1	0	0	0	0
HARN	1550	HARN0001550	28.00S/33.00E-21cc	43.11909188	-118.65947758	5,280.00	NULL	NULL	NULL	well_report_plss	56.00	NULL	11/01/1957	Domestic	1	0	0	0	0
HARN	1555	HARN0001555	28.00S/33.00E-36cc	43.08977930	-118.60026686	5,280.00	NULL	NULL	NULL	well_report_plss	127.00	NULL	02/05/1958	Domestic	1	0	0	0	0
HARN	1577	HARN0001577	29.00S/31.00E-36aa	43.01426001	-118.82121544	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	05/15/1981	Domestic	1	0	0	0	0
HARN	1579	HARN0001579	NULL	43.05222164	-118.78974541	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	08/09/1968	Domestic	1	0	0	0	0
HARN	1581	HARN0001581	29.00S/32.00E-22dc	43.03239181	-118.75289163	5,280.00	NULL	NULL	NULL	well_report_plss	54.00	NULL	01/23/1985	Domestic	1	0	0	0	0
HARN	1582	HARN0001582	NULL	43.03779100	-118.75042937	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	09/14/1963	Domestic	1	0	0	0	0
HARN	1584	HARN0001584	29.00S/32.00E-26bb	43.02875728	-118.73813480	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	07/14/1966	Domestic	1	0	0	0	0
HARN	1585	HARN0001585	29.00S/32.00E-26da	43.02504873	-118.72329887	5,280.00	NULL	NULL	NULL	well_report_plss	92.00	NULL	02/16/1965	Domestic	1	0	0	0	0
HARN	1586	HARN0001586	29.00S/32.00E-30ab	43.02875925	-118.81177515	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	80.00	09/25/1964	Domestic	1	0	0	0	0
HARN	1587	HARN0001587	29.00S/32.00E-32ac	43.00699827	-118.79197710	5,280.00	NULL	NULL	NULL	well_report_plss	71.00	71.00	09/18/1959	Domestic	1	0	0	0	0
HARN	1589	HARN0001589	29.00S/32.00E-36da	43.01050678	-118.70346066	5,280.00	NULL	NULL	NULL	well_report_plss	52.00	NULL	09/30/1988	Domestic	1	0	0	0	0
HARN	1591	HARN0001591	NULL	43.02642247	-118.75479923	200.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	430.00	430.00	12/21/1957	Domestic	0	1	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	1592	HARN0001592	29.00S/33.00E-32aa	43.01404484	-118.66399092	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	08/29/1989	Domestic	1	0	0	0	0
HARN	1593	HARN0001593	29.00S/33.00E-32aa	43.01404484	-118.66399092	5,280.00	NULL	NULL	NULL	well_report_plss	59.00	NULL	12/27/1987	Domestic	1	0	0	0	0
HARN	1594	HARN0001594	NULL	43.00864375	-118.67134195	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	09/17/1963	Domestic	1	0	0	0	0
HARN	1595	HARN0001595	NULL	43.01270800	-118.66646458	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	67.00	67.00	09/23/1963	Domestic	1	0	0	0	0
HARN	1596	HARN0001596	29.00S/34.00E-6dc	43.07523144	-118.57542042	5,280.00	NULL	NULL	NULL	well_report_plss	112.00	NULL	02/10/1958	Domestic	1	0	0	0	0
HARN	1603	HARN0001603	30.00S/31.00E-10dc	42.97510000	-118.87266000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	240.00	240.00	02/28/1963	Domestic	1	0	0	0	0
HARN	1605	HARN0001605	30.00S/31.00E-25bd	42.93447127	-118.82647157	5,280.00	NULL	NULL	NULL	well_report_plss	220.00	NULL	06/16/1979	Domestic	1	0	0	0	0
HARN	1606	HARN0001606	NULL	42.92179609	-118.84878643	5,280.00	NULL	NULL	NULL	well_report_plss	29.00	NULL	09/16/1963	Domestic	1	0	0	0	0
HARN	1608	HARN0001608	NULL	42.99422518	-118.73049639	5,280.00	NULL	NULL	NULL	well_report_plss	41.00	NULL	08/06/1956	Domestic	1	0	0	0	0
HARN	1609	HARN0001609	30.00S/32.00E-2dd	42.98879074	-118.72309989	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	08/25/1966	Domestic	1	0	0	0	0
HARN	1613	HARN0001613	NULL	43.00377649	-118.65552021	200.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	150.00	150.00	06/01/1971	Domestic	1	0	0	0	0
HARN	1614	HARN0001614	NULL	42.99979744	-118.64896624	200.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	129.00	129.00	06/16/1971	Domestic	1	0	0	0	0
HARN	1615	HARN0001615	NULL	42.99872590	-118.64963382	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	280.00	280.00	04/08/1969	Domestic	1	0	0	0	0
HARN	1642	HARN0001642	32.00S/32.00E-2ad	42.82574756	-118.91287294	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	01/28/1981	Domestic	1	0	0	0	0
HARN	1650	HARN0001650	32.00S/32.50E-6cb	42.82733000	-118.88692000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	100.00	NULL	04/06/1988	Domestic	1	0	0	0	0
HARN	1651	HARN0001651	NULL	42.81299829	-118.88122687	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	08/02/1968	Domestic	1	0	0	0	0
HARN	1654	HARN0001654	32.00S/32.50E-7dd	42.80761973	-118.87422317	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	05/29/1983	Domestic	1	0	0	0	0
HARN	1688	HARN0001688	33.00S/34.00E-18ba	43.57914206	-118.57165420	550.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	130.00	130.00	11/01/1964	Domestic	1	0	0	0	0
HARN	1697	HARN0001697	19.00S/26.00E-29ca	43.89120000	-119.63121000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	104.00	104.00	10/10/1984	Domestic	1	0	0	0	0
HARN	1707	HARN0001707	23.00S/33.00E-5da	43.60336993	-118.67142377	5,280.00	NULL	NULL	NULL	well_report_plss	54.00	NULL	07/19/1990	Domestic	1	0	0	0	0
HARN	1768	HARN0001768	21.00S/26.00E-33bb	43.71107309	-119.61390370	5,280.00	NULL	NULL	NULL	well_report_plss	310.00	310.00	07/14/1990	Domestic	1	0	0	0	0
HARN	1847	HARN0001847	24.00S/32.00E-2cb	43.52125040	-118.85998507	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	08/23/1990	Domestic	1	0	0	0	0
HARN	1849	HARN0001849	23.00S/32.00E-32da	43.53561497	-118.90501572	5,280.00	NULL	NULL	NULL	well_report_plss	220.00	NULL	08/20/1990	Domestic	1	0	0	0	0
HARN	1850	HARN0001850	24.00S/31.00E-31ab	43.45189031	-119.05194093	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	10/12/1990	Domestic	1	0	0	0	0
HARN	1851	HARN0001851	23.00S/31.00E-10cc	43.58750114	-118.99754017	5,280.00	NULL	NULL	NULL	well_report_plss	221.00	NULL	10/07/1990	Domestic	1	0	0	0	0
HARN	1852	HARN0001852	29.00S/33.00E-31ac	43.00687174	-118.69344390	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	10/15/1990	Domestic	1	0	0	0	0
HARN	1853	HARN0001853	29.00S/33.00E-32cc	43.00322025	-118.67866427	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	10/12/1990	Domestic	1	0	0	0	0
HARN	1854	HARN0001854	29.00S/32.00E-15dc	43.04679816	-118.75284498	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	10/29/1990	Domestic	1	0	0	0	0
HARN	1855	HARN0001855	23.00S/27.00E-9cc	43.58550852	-119.49486359	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	11/12/1990	Domestic	1	0	0	0	0
HARN	1858	HARN0001858	24.00S/32.50E-30dd	43.45567109	-118.80978982	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	NULL	Domestic	0	0	0	0	1
HARN	1860	HARN0001860	23.00S/31.00E-10ad	43.59097347	-118.98278613	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	12/09/1990	Domestic	1	0	0	0	0
HARN	1864	HARN0001864	29.00S/31.00E-13bd	43.05034977	-118.82607190	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	02/28/1991	Domestic	1	0	0	0	0
HARN	1865	HARN0001865	21.00S/26.00E-28ac	43.71842993	-119.60880965	5,280.00	NULL	NULL	NULL	well_report_plss	270.00	270.00	07/08/1990	Domestic	1	0	0	0	0
HARN	1866	HARN0001866	24.00S/32.00E-21da	43.47758873	-118.88426948	5,280.00	NULL	NULL	NULL	well_report_plss	94.00	NULL	04/06/1991	Domestic	1	0	0	0	0
HARN	1869	HARN0001869	27.00S/27.00E-33cb	43.18772955	-119.49368498	5,280.00	NULL	NULL	NULL	well_report_plss	429.00	NULL	04/05/1991	Domestic	1	0	0	0	0
HARN	1870	HARN0001870	23.00S/32.50E-22bc	43.56072671	-118.76567892	5,280.00	NULL	NULL	NULL	well_report_plss	39.00	NULL	04/10/1991	Domestic	1	0	0	0	0
HARN	1883	HARN0001883	24.00S/33.00E-3dd	43.50935291	-118.63173666	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	06/13/1991	Domestic	1	0	0	0	0
HARN	1884	HARN0001884	22.00S/30.00E-24bc	43.64794758	-119.07668953	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	06/17/1991	Domestic	1	0	0	0	0
HARN	1886	HARN0001886	27.00S/31.00E-11ab	43.24561659	-118.85040849	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	06/23/1991	Domestic	1	0	0	0	0
HARN	1887	HARN0001887	27.00S/31.00E-11ac	43.23838692	-118.85038752	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	06/25/1991	Domestic	1	0	0	0	0
HARN	1890	HARN0001890	24.00S/26.00E-36ca	43.44735488	-119.54457336	5,280.00	NULL	NULL	NULL	well_report_plss	332.00	NULL	07/17/1991	Domestic	1	0	0	0	0
HARN	1892	HARN0001892	22.00S/30.00E-24bc	43.64794758	-119.07668953	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	06/16/1991	Domestic	1	0	0	0	0
HARN	1893	HARN0001893	26.00S/32.00E-31dd	43.26382655	-118.80236523	5,280.00	NULL	NULL	NULL	well_report_plss	36.00	36.00	07/20/1991	Domestic	1	0	0	0	0
HARN	1898	HARN0001898	24.00S/33.00E-13ad	43.48408291	-118.59194230	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	09/13/1991	Domestic	1	0	0	0	0
HARN	1900	HARN0001900	32.00S/32.50E-17db	42.80200000	-118.86630000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	272.00	272.00	10/01/1991	Domestic	1	0	0	0	0
HARN	1901	HARN0001901	26.00S/31.00E-10da	43.33271738	-118.98166047	5,280.00	NULL	NULL	NULL	well_report_plss	385.00	NULL	10/10/1991	Domestic	1	0	0	0	0
HARN	1903	HARN0001903	23.00S/26.00E-9dd	43.58390000	-119.59727000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	200.00	210.00	10/20/1991	Domestic	0	1	0	0	0
HARN	1904	HARN0001904	NULL	43.47577544	-118.83247465	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	10/20/1991	Domestic	1	0	0	0	0
HARN	1905	HARN0001905	24.00S/31.00E-20db	43.47736209	-119.03230342	5,280.00	NULL	NULL	NULL	well_report_plss	92.00	NULL	10/24/1991	Domestic	1	0	0	0	0
HARN	1907	HARN0001907	22.00S/30.00E-36dd	43.61593325	-119.06182505	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	10/27/1991	Domestic	1	0	0	0	0
HARN	1918	HARN0001918	24.00S/29.00E-1ba	43.52508573	-119.18706375	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	02/06/1992	Domestic	1	0	0	0	0
HARN	1924	HARN0001924	23.00S/33.00E-5bc	43.59975636	-118.68638405	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	03/12/1992	Domestic	0	0	0	1	0
HARN	1925	HARN0001925	22.00S/32.00E-34aa	43.62624553	-118.86456987	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	03/24/1992	Domestic	1	0	0	0	0
HARN	1926	HARN0001926	24.00S/32.00E-10bb	43.51050048	-118.88002904	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	03/31/1992	Domestic	1	0	0	0	0
HARN	1928	HARN0001928	23.00S/32.00E-36da	43.53553623	-118.82473011	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	07/17/1991	Domestic	1	0	0	0	0
HARN	1935	HARN0001935	23.00S/27.00E-29cd	43.54156700	-119.50386600	50.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	137.00	NULL	06/09/1992	Domestic	1	0	0	0	0
HARN	1942	HARN0001942	26.00S/31.00E-19bd	43.30014263	-119.04669282	5,280.00	NULL	NULL	NULL	well_report_plss	95.00	NULL	07/07/1992	Domestic	1	0	0	0	0
HARN	1943	HARN0001943	23.00S/33.00E-5bb	43.60701311	-118.68636368	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	07/13/1992	Domestic	1	0	0	0	0
HARN	1944	HARN0001944	18.00S/32.00E-7ab	44.03110582	-118.93026056	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	07/26/1992	Domestic	1	0	0	0	0
HARN	1948	HARN0001948	23.00S/31.00E-7da	43.59461843	-119.04277099	5,280.00	NULL	NULL	NULL	well_report_plss	47.00	NULL	07/26/1992	Domestic	1	0	0	0	0
HARN	1951	HARN0001951	24.00S/30.00E-2db	43.52177572	-119.09209972	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	08/25/1992	Domestic	1	0	0	0	0
HARN	1952	HARN0001952	24.00S/30.00E-2db	43.52177572	-119.09209972	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	08/27/1992	Domestic	1	0	0	0	0
HARN	1960	HARN0001960	22.00S/31.00E-22dc	43.64497693	-118.99264140	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	10/01/1992	Domestic	1	0	0	0	0
HARN	1961	HARN0001961	24.00S/31.00E-31aa	43.45073000	-119.04062000	250.00	OTH	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	85.00	NULL	10/22/1992	Domestic	1	0	0	0	0
HARN	1962	HARN0001962	23.00S/30.00E-23ab	43.56912351	-119.09211619	5,280.00	NULL	NULL	NULL	well_report_plss	260.00	NULL	09/22/1992	Domestic	1	0	0	0	0
HARN	1973	HARN0001973	23.00S/31.00E-30bb	43.55487709	-119.05719829	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	11/15/1992	Domestic	1	0	0	0	0
HARN	1975	HARN0001975	18.00S/32.00E-23bc	43.57655000	-118.82162000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	95.00	NULL	11/14/1992	Domestic	1	0	0	0	0
HARN	1976	HARN0001976	23.00S/33.00E-7bc	43.58665000	-118.70695000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	55.00	NULL	11/27/1992	Domestic	1	0	0	0	0
HARN	1983	HARN0001983	26.00S/33.00E-12aa	43.33254961	-118.58495285	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	02/10/1993	Domestic	0	1	0	0	0
HARN	1986	HARN0001986	24.00S/31.00E-2dd	43.51333077	-118.96325394	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	04/12/1993	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	1999	HARN0001999	23.00S/30.00E-22ba	43.56917184	-119.10712845	5,280.00	NULL	NULL	NULL	well_report_plss	500.00	NULL	07/16/1993	Domestic	1	0	0	0	0
HARN	2009	HARN0002009	22.00S/33.00E-31dc	43.61061691	-118.70137806	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	10/03/1993	Domestic	1	0	0	0	0
HARN	2018	HARN0002018	25.00S/32.50E-2ab	43.43735684	-118.74037767	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	12/02/1993	Domestic	1	0	0	0	0
HARN	2019	HARN0002019	23.00S/31.00E-8bd	43.59112024	-119.02783430	5,280.00	NULL	NULL	NULL	well_report_plss	27.00	NULL	12/04/1993	Domestic	1	0	0	0	0
HARN	2027	HARN0002027	23.00S/32.00E-31dc	43.52809573	-118.93416860	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	02/17/1994	Domestic	1	0	0	0	0
HARN	2028	HARN0002028	22.00S/32.00E-34ba	43.62624594	-118.86957918	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	02/17/1994	Domestic	1	0	0	0	0
HARN	2041	HARN0002041	24.00S/31.00E-34ca	43.44856385	-118.98803332	5,280.00	NULL	NULL	NULL	well_report_plss	74.00	NULL	07/15/1994	Domestic	1	0	0	0	0
HARN	2043	HARN0002043	22.00S/32.00E-26db	43.63696326	-118.85462959	5,280.00	NULL	NULL	NULL	well_report_plss	185.00	NULL	07/13/1994	Domestic	1	0	0	0	0
HARN	2058	HARN0002058	23.00S/33.00E-7bc	43.58665000	-118.70695000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	82.00	120.00	11/07/1994	Domestic	1	0	0	0	0
HARN	2060	HARN0002060	23.00S/33.00E-2bc	43.59965446	-118.62659530	5,280.00	NULL	NULL	NULL	well_report_plss	285.00	NULL	12/09/1994	Domestic	1	0	0	0	0
HARN	2062	HARN0002062	25.00S/30.00E-35ab	43.36547753	-119.09129693	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	12/03/1994	Domestic	1	0	0	0	0
HARN	2066	HARN0002066	24.00S/30.00E-7da	43.50700233	-119.16183428	5,280.00	NULL	NULL	NULL	well_report_plss	95.00	NULL	01/28/1995	Domestic	1	0	0	0	0
HARN	2075	HARN0002075	23.00S/31.00E-13db	43.57926885	-118.95309062	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	04/20/1995	Domestic	1	0	0	0	0
HARN	2081	HARN0002081	24.00S/32.50E-15db	43.49156268	-118.76024347	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	06/15/1995	Domestic	1	0	0	0	0
HARN	2082	HARN0002082	23.00S/32.50E-3ab	43.61141599	-118.76067779	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	06/23/1995	Domestic	1	0	0	0	0
HARN	2093	HARN0002093	19.00S/29.00E-32cc	43.87549479	-119.27418451	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	90.00	12/20/1989	Domestic	1	0	0	0	0
HARN	2125	HARN0002125	23.00S/33.00E-21cc	43.55277280	-118.66651320	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	10/05/1995	Domestic	1	0	0	0	0
HARN	18491	HARN0018491	27.00S/34.00E-5ba	43.26020584	-118.55141876	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	09/10/1990	Domestic	0	1	0	0	0
HARN	50007	HARN0050007	23.00S/32.50E-3cc	43.60056027	-118.76567216	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	01/17/1996	Domestic	1	0	0	0	0
HARN	50018	HARN0050018	24.00S/32.00E-12da	43.50656447	-118.82482136	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	02/09/1996	Domestic	1	0	0	0	0
HARN	50019	HARN0050019	23.00S/32.00E-23cd	43.55731323	-118.84973137	5,280.00	NULL	NULL	NULL	well_report_plss	58.00	NULL	02/06/1996	Domestic	1	0	0	0	0
HARN	50024	HARN0050024	22.00S/30.00E-23ac	43.64785220	-119.09097931	5,280.00	NULL	NULL	NULL	well_report_plss	43.00	NULL	03/20/1996	Domestic	1	0	0	0	0
HARN	50026	HARN0050026	23.00S/31.00E-11ab	43.59799736	-118.97285341	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	04/03/1996	Domestic	1	0	0	0	0
HARN	50027	HARN0050027	22.00S/30.00E-36bb	43.62512552	-119.07467230	9,999.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	67.00	NULL	04/09/1996	Domestic	1	0	0	0	0
HARN	50035	HARN0050035	23.00S/32.50E-4ab	43.61158838	-118.78061707	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	04/12/1996	Domestic	1	0	0	0	0
HARN	50036	HARN0050036	23.00S/33.00E-25dd	43.53817252	-118.59185517	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	04/26/1996	Domestic	1	0	0	0	0
HARN	50038	HARN0050038	32.00S/32.00E-2da	42.82937010	-118.91286462	5,280.00	NULL	NULL	NULL	well_report_plss	155.00	155.00	05/12/1996	Domestic	1	0	0	0	0
HARN	50039	HARN0050039	25.00S/31.00E-23dc	43.38314486	-118.97274327	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	05/07/1996	Domestic	1	0	0	0	0
HARN	50057	HARN0050057	24.00S/33.00E-12cd	43.49489432	-118.59690971	5,280.00	NULL	NULL	NULL	well_report_plss	99.00	NULL	08/16/1996	Domestic	1	0	0	0	0
HARN	50072	HARN0050072	23.00S/33.00E-31db	43.53114103	-118.70130112	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	09/25/1996	Domestic	1	0	0	0	0
HARN	50079	HARN0050079	27.00S/29.00E-9bb	43.24948600	-119.25363300	9,999.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	46.00	55.00	10/25/1995	Domestic	1	0	0	0	0
HARN	50082	HARN0050082	23.00S/33.00E-5ac	43.59974915	-118.68137912	5,280.00	NULL	NULL	NULL	well_report_plss	68.00	NULL	10/04/1996	Domestic	1	0	0	0	0
HARN	50084	HARN0050084	24.00S/32.00E-10cd	43.49955663	-118.87020026	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	10/01/1996	Domestic	1	0	0	0	0
HARN	50094	HARN0050094	22.00S/30.00E-26ab	43.64065682	-119.09090285	5,280.00	NULL	NULL	NULL	well_report_plss	76.00	NULL	01/06/1997	Domestic	1	0	0	0	0
HARN	50095	HARN0050095	NULL	43.47568214	-118.81487265	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	12/22/1996	Domestic	1	0	0	0	0
HARN	50108	HARN0050108	23.00S/30.00E-2ba	43.61239093	-119.08676123	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	01/17/1997	Domestic	1	0	0	0	0
HARN	50111	HARN0050111	32.00S/32.00E-2ad	42.82574756	-118.91287294	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	08/08/1996	Domestic	1	0	0	0	0
HARN	50141	HARN0050141	25.00S/34.00E-7aa	43.41915200	-118.57204687	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	03/04/1997	Domestic	1	0	0	0	0
HARN	50152	HARN0050152	24.00S/32.00E-24da	43.47757044	-118.82491282	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	03/28/1997	Domestic	1	0	0	0	0
HARN	50170	HARN0050170	26.00S/30.00E-21bb	43.30726045	-119.13642980	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	05/31/1997	Domestic	1	0	0	0	0
HARN	50171	HARN0050171	26.00S/31.00E-30cd	43.27819210	-118.92470370	5,280.00	NULL	NULL	NULL	well_report_plss	41.00	NULL	05/26/1997	Domestic	1	0	0	0	0
HARN	50171	HARN0050171	26.00S/31.00E-30cd	43.28191797	-119.04658639	5,280.00	NULL	NULL	NULL	well_report_plss	41.00	NULL	05/26/1997	Domestic	1	0	0	0	0
HARN	50173	HARN0050173	25.00S/31.00E-28cc	43.37018238	-119.01993239	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	205.00	205.00	06/06/1997	Domestic	1	0	0	0	0
HARN	50174	HARN0050174	22.00S/25.00E-25aa	43.63818000	-119.65871000	10.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	273.00	273.00	05/08/1997	Domestic	1	0	0	0	0
HARN	50175	HARN0050175	24.00S/32.00E-24aa	43.48119563	-118.82490540	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	06/12/1997	Domestic	1	0	0	0	0
HARN	50178	HARN0050178	24.00S/33.00E-31cb	43.44306605	-118.70433490	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	250.00	250.00	06/30/1997	Domestic	1	0	0	0	0
HARN	50179	HARN0050179	24.00S/33.00E-31cb	43.44282814	-118.70515750	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	323.00	323.00	07/10/1997	Domestic	1	0	0	0	0
HARN	50185	HARN0050185	23.00S/32.50E-3da	43.60775505	-118.75071462	5,280.00	NULL	NULL	NULL	well_report_plss	87.00	NULL	07/17/1997	Domestic	1	0	0	0	0
HARN	50196	HARN0050196	26.00S/34.00E-30cc	43.27826691	-118.58046860	5,280.00	NULL	NULL	NULL	well_report_plss	275.00	NULL	08/23/1997	Domestic	1	0	0	0	0
HARN	50197	HARN0050197	24.00S/32.50E-30bb	43.46666254	-118.81980822	5,280.00	NULL	NULL	NULL	well_report_plss	48.00	NULL	08/28/1997	Domestic	1	0	0	0	0
HARN	50202	HARN0050202	23.00S/33.00E-17ad	43.57083932	-118.67147438	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	09/11/1997	Domestic	1	0	0	0	0
HARN	50204	HARN0050204	23.00S/31.00E-17bb	43.58373997	-119.03785269	5,280.00	NULL	NULL	NULL	well_report_plss	252.00	NULL	09/29/1997	Domestic	1	0	0	0	0
HARN	50226	HARN0050226	25.00S/31.00E-23bc	43.38682543	-118.97768545	5,280.00	NULL	NULL	NULL	well_report_plss	28.00	NULL	10/15/1997	Domestic	1	0	0	0	0
HARN	50229	HARN0050229	24.00S/30.00E-2cc	43.51452536	-119.09697788	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	10/20/1997	Domestic	1	0	0	0	0
HARN	50233	HARN0050233	26.00S/31.00E-27ba	43.29346482	-118.98238820	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	42.00	55.00	11/07/1997	Domestic	1	0	0	0	0
HARN	50237	HARN0050237	23.00S/34.00E-7cc	43.58296784	-118.57262300	0.20	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	117.00	117.00	11/21/1997	Domestic	1	0	0	0	0
HARN	50240	HARN0050240	22.00S/32.00E-33ab	43.62621216	-118.89501066	5,280.00	NULL	NULL	NULL	well_report_plss	290.00	NULL	11/15/1997	Domestic	1	0	0	0	0
HARN	50250	HARN0050250	23.00S/33.00E-36ad	43.52733240	-118.59188026	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	01/18/1998	Domestic	1	0	0	0	0
HARN	50286	HARN0050286	29.00S/32.00E-24ac	43.03589164	-118.71341812	5,280.00	NULL	NULL	NULL	well_report_plss	68.00	NULL	03/20/1998	Domestic	1	0	0	0	0
HARN	50287	HARN0050287	24.00S/33.00E-13ba	43.49129079	-118.59691520	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	03/27/1998	Domestic	1	0	0	0	0
HARN	50290	HARN0050290	24.00S/30.00E-2ac	43.51816644	-119.09203235	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	04/01/1998	Domestic	1	0	0	0	0
HARN	50291	HARN0050291	22.00S/31.00E-35ac	43.61965800	-118.97270392	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	04/08/1998	Domestic	1	0	0	0	0
HARN	50300	HARN0050300	23.00S/32.00E-2bc	43.60450102	-118.85947138	5,280.00	NULL	NULL	NULL	well_report_plss	71.00	NULL	04/21/1998	Domestic	1	0	0	0	0
HARN	50301	HARN0050301	22.00S/32.00E-26ba	43.64191408	-118.84984500	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	142.00	142.00	04/16/1998	Domestic	1	0	0	0	0
HARN	50306	HARN0050306	23.00S/32.50E-30dd	43.54278301	-118.81048918	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	04/24/1998	Domestic	1	0	0	0	0
HARN	50307	HARN0050307	24.00S/32.50E-14bb	43.49528924	-118.74546265	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	04/30/1998	Domestic	1	0	0	0	0
HARN	50308	HARN0050308	27.00S/31.00E-24da	43.21306848	-118.82084606	5,280.00	NULL	NULL	NULL	well_report_plss	300.00	NULL	05/10/1998	Domestic	1	0	0	0	0
HARN	50322	HARN0050322	25.00S/31.00E-23dc	43.38314486	-118.97274327	5,280.00	NULL	NULL	NULL	well_report_plss	27.00	NULL	07/23/1998	Domestic	1	0	0	0	0
HARN	50330	HARN0050330	25.00S/31.00E-23cc	43.38314490	-118.97769630	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	08/20/1998	Domestic	1	0	0	0	0
HARN	50333	HARN0050333	25.00S/31.00E-5cb	43.43368383	-119.03750658	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	NULL	08/17/1998	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	50338	HARN0050338	25.00S/31.00E-27cc	43.36840585	-118.99746366	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	08/28/1998	Domestic	0	1	0	0	0
HARN	50341	HARN0050341	25.00S/31.00E-27cc	43.37032553	-118.99529031	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	200.00	203.00	08/28/1998	Domestic	1	0	0	0	0
HARN	50342	HARN0050342	25.00S/31.00E-27cc	43.36840585	-118.99746366	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	08/07/1998	Domestic	0	0	0	0	1
HARN	50343	HARN0050343	24.00S/30.00E-2cb	43.52175857	-119.09710236	5,280.00	NULL	NULL	NULL	well_report_plss	112.00	NULL	09/15/1998	Domestic	1	0	0	0	0
HARN	50344	HARN0050344	22.00S/30.00E-27cd	43.62994678	-119.10618564	5,280.00	NULL	NULL	NULL	well_report_plss	132.00	NULL	09/17/1998	Domestic	1	0	0	0	0
HARN	50346	HARN0050346	24.00S/26.00E-32aa	43.45092889	-119.61926108	5,280.00	NULL	NULL	NULL	well_report_plss	460.00	NULL	09/22/1998	Domestic	1	0	0	0	0
HARN	50349	HARN0050349	25.00S/33.00E-24bc	43.38292150	-118.60680844	5,280.00	NULL	NULL	NULL	well_report_plss	73.00	NULL	NULL	Domestic	1	0	0	0	0
HARN	50375	HARN0050375	23.00S/32.00E-24dd	43.55728136	-118.82467651	5,280.00	NULL	NULL	NULL	well_report_plss	43.00	NULL	12/03/1998	Domestic	1	0	0	0	0
HARN	50376	HARN0050376	24.00S/32.00E-31aa	43.45213139	-118.92384022	5,280.00	NULL	NULL	NULL	well_report_plss	49.00	NULL	12/05/1998	Domestic	1	0	0	0	0
HARN	50378	HARN0050378	NULL	43.54672253	-119.58664756	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	07/01/1978	Domestic	1	0	0	0	0
HARN	50380	HARN0050380	22.00S/31.00E-33bb	43.62809516	-119.00825491	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	220.00	220.00	04/01/1995	Domestic	1	0	0	0	0
HARN	50382	HARN0050382	24.00S/31.00E-31bb	43.45185396	-119.05676565	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	02/11/1996	Domestic	1	0	0	0	0
HARN	50386	HARN0050386	25.00S/31.00E-6ac	43.43041865	-119.05213895	5,280.00	NULL	NULL	NULL	well_report_plss	257.00	NULL	12/24/1998	Domestic	1	0	0	0	0
HARN	50387	HARN0050387	24.00S/31.00E-31da	43.44843830	-119.04215774	5,280.00	NULL	NULL	NULL	well_report_plss	135.00	NULL	01/04/1999	Domestic	1	0	0	0	0
HARN	50391	HARN0050391	26.00S/31.00E-27da	43.28894117	-118.98176911	5,280.00	NULL	NULL	NULL	well_report_plss	76.00	NULL	02/09/1999	Domestic	1	0	0	0	0
HARN	50397	HARN0050397	22.00S/32.00E-35ab	43.62623593	-118.85455155	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	03/10/1999	Domestic	1	0	0	0	0
HARN	50398	HARN0050398	32.00S/32.00E-2bd	42.82708000	-118.91486000	22.70	NULL	NULL	NULL	owrd_field_staff	120.00	NULL	03/17/1999	Domestic	1	0	0	0	0
HARN	50399	HARN0050399	26.00S/31.00E-19ac	43.30418071	-119.04583900	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	110.00	110.00	03/22/1999	Domestic	1	0	0	0	0
HARN	50400	HARN0050400	23.00S/33.00E-20dd	43.55278061	-118.67149269	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	03/04/1999	Domestic	1	0	0	0	0
HARN	50401	HARN0050401	26.00S/30.00E-2db	43.34735781	-119.09126723	5,280.00	NULL	NULL	NULL	well_report_plss	102.00	NULL	03/23/1999	Domestic	1	0	0	0	0
HARN	50403	HARN0050403	22.00S/32.00E-28bc	43.63345444	-118.90007897	5,280.00	NULL	NULL	NULL	well_report_plss	122.00	NULL	04/09/1999	Domestic	1	0	0	0	0
HARN	50407	HARN0050407	24.00S/33.00E-22bc	43.47088504	-118.64478210	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	140.00	140.00	04/09/1998	Domestic	1	0	0	0	0
HARN	50408	HARN0050408	25.00S/34.00E-7ca	43.41552563	-118.57701837	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	04/16/1998	Domestic	1	0	0	0	0
HARN	50411	HARN0050411	24.00S/33.00E-12ad	43.49849376	-118.59192347	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	02/22/1999	Domestic	1	0	0	0	0
HARN	50425	HARN0050425	23.00S/31.00E-1dd	43.60142324	-118.94301945	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	07/23/1998	Domestic	1	0	0	0	0
HARN	50429	HARN0050429	26.00S/31.00E-20cd	43.29634640	-119.02676593	5,280.00	NULL	NULL	NULL	well_report_plss	51.00	NULL	05/20/1999	Domestic	1	0	0	0	0
HARN	50432	HARN0050432	23.00S/32.00E-27bb	43.55398792	-118.87978048	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	05/08/1999	Domestic	1	0	0	0	0
HARN	50433	HARN0050433	25.00S/34.00E-7da	43.41553203	-118.57204345	5,280.00	NULL	NULL	NULL	well_report_plss	222.00	NULL	05/08/1999	Domestic	1	0	0	0	0
HARN	50434	HARN0050434	25.00S/33.00E-11ad	43.41185322	-118.61177108	5,280.00	NULL	NULL	NULL	well_report_plss	104.00	NULL	05/07/1999	Domestic	1	0	0	0	0
HARN	50435	HARN0050435	24.00S/33.00E-14ba	43.49130055	-118.61684343	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	05/26/1999	Domestic	1	0	0	0	0
HARN	50445	HARN0050445	25.00S/34.00E-7ca	43.41552563	-118.57701837	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	06/11/1999	Domestic	1	0	0	0	0
HARN	50448	HARN0050448	24.00S/33.00E-21ad	43.46964608	-118.65180884	5,280.00	NULL	NULL	NULL	well_report_plss	345.00	NULL	06/08/1999	Domestic	1	0	0	0	0
HARN	50458	HARN0050458	23.00S/32.50E-3aa	43.61136841	-118.75071599	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	07/22/1999	Domestic	1	0	0	0	0
HARN	50459	HARN0050459	22.00S/30.00E-23bb	43.65501589	-119.09595957	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	07/22/1999	Domestic	1	0	0	0	0
HARN	50460	HARN0050460	23.00S/32.50E-5ca	43.61270751	-118.79502940	0.60	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	68.00	68.00	07/15/1999	Domestic	1	0	0	0	0
HARN	50461	HARN0050461	23.00S/32.50E-19ab	43.56814170	-118.82006019	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	07/30/1999	Domestic	1	0	0	0	0
HARN	50462	HARN0050462	22.00S/30.00E-27cd	43.63016529	-119.10398730	0.20	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	122.00	NULL	08/19/1999	Domestic	1	0	0	0	0
HARN	50463	HARN0050463	26.00S/30.00E-5db	43.34715915	-119.15113397	5,280.00	NULL	NULL	NULL	well_report_plss	290.00	NULL	08/31/1999	Domestic	1	0	0	0	0
HARN	50464	HARN0050464	24.00S/32.50E-9bb	43.50978925	-118.78540129	5,280.00	NULL	NULL	NULL	well_report_plss	64.00	NULL	09/10/1999	Domestic	1	0	0	0	0
HARN	50466	HARN0050466	23.00S/33.00E-36da	43.53094572	-118.59187172	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/06/1999	Domestic	1	0	0	0	0
HARN	50469	HARN0050469	23.00S/32.50E-31cb	43.53460000	-118.82040000	200.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	60.00	NULL	10/20/1999	Domestic	1	0	0	0	0
HARN	50471	HARN0050471	26.00S/30.00E-10cc	43.32657000	-119.11545000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	155.00	155.00	10/09/1999	Domestic	1	0	0	0	0
HARN	50473	HARN0050473	24.00S/32.00E-2cd	43.51394783	-118.84997413	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	10/29/1999	Domestic	1	0	0	0	0
HARN	50475	HARN0050475	22.00S/26.00E-21cd	43.64237892	-119.60468079	5,280.00	NULL	NULL	NULL	well_report_plss	530.00	535.00	08/28/2001	Domestic	1	0	0	0	0
HARN	50483	HARN0050483	23.00S/32.50E-3dc	43.60054124	-118.76068820	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	07/13/1999	Domestic	1	0	0	0	0
HARN	50486	HARN0050486	24.00S/33.00E-13da	43.48768560	-118.59193757	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	09/16/1999	Domestic	1	0	0	0	0
HARN	50487	HARN0050487	23.00S/32.50E-3cd	43.60052187	-118.75570491	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	07/12/1999	Domestic	1	0	0	0	0
HARN	50488	HARN0050488	23.00S/30.00E-10dd	43.58717352	-119.10193917	5,280.00	NULL	NULL	NULL	well_report_plss	480.00	NULL	06/30/1999	Domestic	1	0	0	0	0
HARN	50491	HARN0050491	23.00S/32.50E-15bc	43.57521153	-118.76567673	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	02/01/2000	Domestic	1	0	0	0	0
HARN	50497	HARN0050497	26.00S/29.00E-7ad	43.33064000	-119.27931000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	380.00	380.00	08/15/2015	Domestic	1	0	0	0	0
HARN	50498	HARN0050498	25.00S/34.00E-9cd	43.40831200	-118.53731114	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	12/23/1999	Domestic	0	0	0	1	0
HARN	50499	HARN0050499	24.00S/33.00E-35cd	43.43718787	-118.61688886	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	12/16/1999	Domestic	0	0	0	1	0
HARN	50506	HARN0050506	25.00S/34.00E-7ad	43.41191469	-118.57204174	5,280.00	NULL	NULL	NULL	well_report_plss	135.00	NULL	03/05/2000	Domestic	1	0	0	0	0
HARN	50508	HARN0050508	23.00S/32.00E-19dd	43.55749728	-118.92474020	5,280.00	NULL	NULL	NULL	well_report_plss	215.00	NULL	03/02/2000	Domestic	1	0	0	0	0
HARN	50511	HARN0050511	25.00S/34.00E-7bd	43.41190748	-118.57701373	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	03/25/2000	Domestic	1	0	0	0	0
HARN	50512	HARN0050512	23.00S/33.00E-35bc	43.52740673	-118.62672170	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	03/29/2000	Domestic	1	0	0	0	0
HARN	50513	HARN0050513	26.00S/34.00E-6aa	43.34687203	-118.56662951	5,280.00	NULL	NULL	NULL	well_report_plss	223.00	NULL	04/05/2000	Domestic	1	0	0	0	0
HARN	50514	HARN0050514	23.00S/32.50E-14aa	43.58370101	-118.72889100	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	230.00	230.00	03/18/2000	Domestic	1	0	0	0	0
HARN	50515	HARN0050515	22.00S/32.00E-26ba	43.64199000	-118.84984000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	100.00	100.00	04/08/2000	Domestic	1	0	0	0	0
HARN	50563	HARN0050563	25.00S/34.00E-7ba	43.41914557	-118.57702377	5,280.00	NULL	NULL	NULL	well_report_plss	267.00	NULL	05/11/2000	Domestic	1	0	0	0	0
HARN	50565	HARN0050565	25.00S/30.00E-12aa	43.42352704	-119.06134816	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	NULL	05/30/2000	Domestic	1	0	0	0	0
HARN	50567	HARN0050567	25.00S/34.00E-7ba	43.41914557	-118.57702377	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	06/28/2000	Domestic	1	0	0	0	0
HARN	50572	HARN0050572	24.00S/32.00E-10ac	43.50321385	-118.87522872	5,280.00	NULL	NULL	NULL	well_report_plss	102.00	NULL	08/16/2000	Domestic	1	0	0	0	0
HARN	50573	HARN0050573	25.00S/34.00E-8cb	43.41553752	-118.56708080	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	07/04/2000	Domestic	1	0	0	0	0
HARN	50578	HARN0050578	23.00S/30.00E-14bc	43.57503000	-119.09931000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	405.00	405.00	09/18/2000	Domestic	1	0	0	0	0
HARN	50583	HARN0050583	25.00S/28.00E-25ac	43.37261263	-119.30998839	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	09/25/2000	Domestic	1	0	0	0	0
HARN	50584	HARN0050584	25.00S/34.00E-7bb	43.41913239	-118.58693272	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/09/2000	Domestic	1	0	0	0	0
HARN	50585	HARN0050585	24.00S/33.00E-11aa	43.50572203	-118.61183115	5,280.00	NULL	NULL	NULL	well_report_plss	57.00	NULL	10/12/2000	Domestic	1	0	0	0	0
HARN	50599	HARN0050599	22.00S/33.00E-27dd	43.62503832	-118.63125243	5,280.00	NULL	NULL	NULL	well_report_plss	165.00	NULL	10/30/2000	Domestic	1	0	0	0	0
HARN	50600	HARN0050600	32.00S/32.00E-2ac	42.82585912	-118.92261081	5,280.00	NULL	NULL	NULL	well_report_plss	210.00	NULL	10/20/2000	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	50605	HARN0050605	NULL	43.51471860	-118.59937139	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	11/10/2000	Domestic	1	0	0	0	0
HARN	50610	HARN0050610	23.00S/26.00E-1aa	43.61025356	-119.53908482	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	NULL	12/20/2000	Domestic	1	0	0	0	0
HARN	50613	HARN0050613	25.00S/31.00E-4dd	43.42824288	-119.00441133	500.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	60.00	NULL	01/03/2001	Domestic	1	0	0	0	0
HARN	50620	HARN0050620	26.00S/31.00E-19da	43.30802000	-119.04563000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	80.00	80.00	12/10/1999	Domestic	1	0	0	0	0
HARN	50622	HARN0050622	28.00S/33.00E-2dd	43.16246307	-118.60494282	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	08/25/2000	Domestic	1	0	0	0	0
HARN	50645	HARN0050645	32.00S/32.00E-2bd	42.82580490	-118.91774013	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	03/17/2001	Domestic	1	0	0	0	0
HARN	50648	HARN0050648	22.00S/32.00E-28db	43.63700683	-118.89492673	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	05/15/1998	Domestic	1	0	0	0	0
HARN	50664	HARN0050664	26.00S/30.00E-2db	43.34735781	-119.09126723	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	04/27/2001	Domestic	1	0	0	0	0
HARN	50665	HARN0050665	28.00S/33.00E-2dd	43.16246307	-118.60494282	5,280.00	NULL	NULL	NULL	well_report_plss	310.00	NULL	04/25/2001	Domestic	0	1	0	0	0
HARN	50672	HARN0050672	26.00S/34.00E-6ac	43.33977310	-118.57654790	5,280.00	NULL	NULL	NULL	well_report_plss	102.00	NULL	05/07/2001	Domestic	1	0	0	0	0
HARN	50677	HARN0050677	27.00S/34.00E-15da	43.22737196	-118.50673201	5,280.00	NULL	NULL	NULL	well_report_plss	87.00	NULL	05/12/2001	Domestic	1	0	0	0	0
HARN	50678	HARN0050678	25.00S/31.00E-3bd	43.43063019	-118.98772664	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	05/21/2001	Domestic	1	0	0	0	0
HARN	50680	HARN0050680	24.00S/32.50E-17bb	43.49556190	-118.80491365	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	219.00	06/09/2001	Domestic	1	0	0	0	0
HARN	50682	HARN0050682	23.00S/32.50E-3bc	43.60418144	-118.76567117	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/02/1997	Domestic	1	0	0	0	0
HARN	50686	HARN0050686	23.00S/30.00E-25aa	43.55484382	-119.06214588	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	06/10/2001	Domestic	1	0	0	0	0
HARN	50690	HARN0050690	25.00S/31.00E-3ad	43.43063280	-118.98271285	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	07/14/2001	Domestic	1	0	0	0	0
HARN	50699	HARN0050699	23.00S/34.00E-7dd	43.58176324	-118.57218746	5,280.00	NULL	NULL	NULL	well_report_plss	325.00	NULL	08/01/2001	Domestic	1	0	0	0	0
HARN	50700	HARN0050700	24.00S/32.50E-24bd	43.47354984	-118.71587723	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	08/08/2001	Domestic	1	0	0	0	0
HARN	50701	HARN0050701	26.00S/33.00E-24aa	43.30360364	-118.58497043	5,280.00	NULL	NULL	NULL	well_report_plss	117.00	NULL	08/08/2001	Domestic	1	0	0	0	0
HARN	50709	HARN0050709	24.00S/33.00E-1ca	43.51576000	-118.59480000	14.50	NULL	NULL	NULL	owrd_field_staff	50.00	50.00	09/17/2001	Domestic	1	0	0	0	0
HARN	50711	HARN0050711	24.00S/32.00E-4bb	43.52486296	-118.90009971	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	09/15/2001	Domestic	0	0	0	1	0
HARN	50713	HARN0050713	23.00S/30.00E-10ac	43.59068462	-119.11203655	5,280.00	NULL	NULL	NULL	well_report_plss	720.00	NULL	08/20/2001	Domestic	1	0	0	0	0
HARN	50714	HARN0050714	23.00S/33.00E-35bc	43.52740673	-118.62672170	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	09/30/2001	Domestic	1	0	0	0	0
HARN	50715	HARN0050715	19.00S/32.00E-27ba	43.90041340	-118.86465586	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	09/15/2001	Domestic	1	0	0	0	0
HARN	50716	HARN0050716	27.00S/30.00E-2ad	43.25262836	-118.95896316	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	09/12/2001	Domestic	1	0	0	0	0
HARN	50717	HARN0050717	23.00S/31.00E-32ad	43.53283874	-119.02249461	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	10/05/2001	Domestic	1	0	0	0	0
HARN	50727	HARN0050727	23.00S/31.00E-11bb	43.59806503	-118.97784680	5,280.00	NULL	NULL	NULL	well_report_plss	165.00	NULL	10/26/2001	Domestic	1	0	0	0	0
HARN	50729	HARN0050729	22.00S/26.00E-21cd	43.64237892	-119.60468079	5,280.00	NULL	NULL	NULL	well_report_plss	535.00	NULL	08/28/2001	Domestic	0	0	0	1	0
HARN	50733	HARN0050733	23.00S/31.00E-3bb	43.61241461	-118.99755828	5,280.00	NULL	NULL	NULL	well_report_plss	308.00	NULL	10/30/2001	Domestic	1	0	0	0	0
HARN	50734	HARN0050734	26.00S/31.00E-18dd	43.30940051	-119.04388630	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	70.00	70.00	11/15/2001	Domestic	1	0	0	0	0
HARN	50748	HARN0050748	25.00S/33.00E-5cc	43.42255668	-118.68642248	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	12/20/2001	Domestic	1	0	0	0	0
HARN	50757	HARN0050757	24.00S/30.00E-6db	43.51451000	-119.17321000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	316.00	316.00	01/11/2002	Domestic	1	0	0	0	0
HARN	50758	HARN0050758	27.00S/31.00E-7ac	43.23830938	-118.92957797	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	01/09/2002	Domestic	1	0	0	0	0
HARN	50763	HARN0050763	23.00S/27.00E-27cc	43.54168000	-119.47591000	13.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	125.00	125.00	02/05/2002	Domestic	1	0	0	0	0
HARN	50764	HARN0050764	24.00S/29.00E-17bb	43.49624788	-119.27627880	5,280.00	NULL	NULL	NULL	well_report_plss	475.00	NULL	12/28/2001	Domestic	1	0	0	0	0
HARN	50788	HARN0050788	23.00S/32.00E-18cc	43.57171000	-118.93984000	24.00	NULL	NULL	NULL	owrd_field_staff	289.00	NULL	04/05/2002	Domestic	1	0	0	0	0
HARN	50794	HARN0050794	24.00S/33.00E-30bb	43.46341000	-118.70716000	13.10	NULL	NULL	NULL	owrd_field_staff	260.00	NULL	03/27/2002	Domestic	1	0	0	0	0
HARN	50796	HARN0050796	27.00S/31.00E-7ac	43.23830938	-118.92957797	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	04/23/2002	Domestic	0	0	0	1	0
HARN	50800	HARN0050800	27.00S/33.00E-16db	43.22777727	-118.65441576	5,280.00	NULL	NULL	NULL	well_report_plss	275.00	NULL	04/23/2002	Domestic	1	0	0	0	0
HARN	50805	HARN0050805	24.00S/32.50E-13dc	43.48562000	-118.71905000	14.60	NULL	NULL	NULL	owrd_field_staff	240.00	NULL	05/16/2002	Domestic	1	0	0	0	0
HARN	50864	HARN0050864	24.00S/33.00E-1ac	43.51291982	-118.60186101	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	05/17/2002	Domestic	1	0	0	0	0
HARN	50866	HARN0050866	26.00S/33.00E-32ac	43.26766349	-118.67409246	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	05/05/2002	Domestic	1	0	0	0	0
HARN	50892	HARN0050892	23.00S/32.00E-34cc	43.52702000	-118.88046000	11.00	NULL	NULL	NULL	owrd_field_staff	700.00	700.00	08/25/2009	Domestic	1	0	0	0	0
HARN	50893	HARN0050893	24.00S/32.00E-9aa	43.50970000	-118.88303000	11.70	NULL	NULL	NULL	owrd_field_staff	110.00	NULL	07/23/2001	Domestic	1	0	0	0	0
HARN	50894	HARN0050894	25.00S/34.00E-30cd	43.36338000	-118.57701000	13.50	NULL	NULL	NULL	owrd_field_staff	61.00	NULL	07/26/2002	Domestic	0	1	0	0	0
HARN	50895	HARN0050895	25.00S/34.00E-7db	43.41619000	-118.58002000	13.10	NULL	NULL	NULL	owrd_field_staff	167.00	167.00	08/01/2002	Domestic	1	0	0	0	0
HARN	50897	HARN0050897	23.00S/32.50E-3cd	43.60236000	-118.75334000	11.80	NULL	NULL	NULL	owrd_field_staff	115.00	NULL	08/21/2002	Domestic	1	0	0	0	0
HARN	50899	HARN0050899	24.00S/32.00E-11da	43.50504000	-118.84692000	13.50	NULL	NULL	NULL	owrd_field_staff	145.00	NULL	09/28/2002	Domestic	1	0	0	0	0
HARN	50902	HARN0050902	27.00S/31.00E-7ac	43.23830938	-118.92957797	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	09/20/2002	Domestic	0	0	0	1	0
HARN	50903	HARN0050903	23.00S/30.00E-2ba	43.61415000	-119.08495000	11.20	NULL	NULL	NULL	owrd_field_staff	250.00	NULL	10/22/2002	Domestic	1	0	0	0	0
HARN	50904	HARN0050904	22.00S/30.00E-36ca	43.62464584	-119.06893450	0.30	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	80.00	NULL	10/14/2002	Domestic	1	0	0	0	0
HARN	50912	HARN0050912	24.00S/33.00E-13cc	43.48048072	-118.60690194	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	11/12/2002	Domestic	1	0	0	0	0
HARN	50915	HARN0050915	26.00S/30.00E-25cc	43.27806683	-118.95409203	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	01/04/2003	Domestic	1	0	0	0	0
HARN	50915	HARN0050915	26.00S/30.00E-25cc	43.28203391	-119.07671688	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	01/04/2003	Domestic	1	0	0	0	0
HARN	50932	HARN0050932	25.00S/33.00E-12ac	43.41206000	-118.60395000	13.20	NULL	NULL	NULL	owrd_field_staff	65.00	62.00	03/15/2003	Domestic	1	0	0	0	0
HARN	50949	HARN0050949	25.00S/31.00E-5aa	43.43620000	-119.02436000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	160.00	NULL	05/13/2003	Domestic	1	0	0	0	0
HARN	50950	HARN0050950	26.00S/30.00E-26ac	43.28741114	-119.06983460	0.16	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	65.00	65.00	05/15/2003	Domestic	1	0	0	0	0
HARN	50953	HARN0050953	24.00S/33.00E-31db	43.39610145	-118.99607570	500.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	350.00	350.00	06/06/2003	Domestic	1	0	0	0	0
HARN	50962	HARN0050962	24.00S/32.00E-9aa	43.50979166	-118.88303630	0.41	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	160.00	160.00	08/04/2003	Domestic	1	0	0	0	0
HARN	50963	HARN0050963	24.00S/32.00E-21ba	43.48126501	-118.88900901	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	08/08/2003	Domestic	1	0	0	0	0
HARN	50964	HARN0050964	23.00S/33.00E-36ad	43.52733240	-118.59188026	5,280.00	NULL	NULL	NULL	well_report_plss	52.00	NULL	08/08/2003	Domestic	1	0	0	0	0
HARN	50965	HARN0050965	23.00S/33.00E-36ad	43.52733240	-118.59188026	5,280.00	NULL	NULL	NULL	well_report_plss	165.00	NULL	08/11/2003	Domestic	0	1	0	0	0
HARN	50975	HARN0050975	22.00S/30.00E-9ac	43.67708156	-119.13092792	5,280.00	NULL	NULL	NULL	well_report_plss	220.00	NULL	09/04/2003	Domestic	1	0	0	0	0
HARN	50988	HARN0050988	23.00S/32.50E-9ca	43.59335450	-118.77563902	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	09/06/1995	Domestic	1	0	0	0	0
HARN	50993	HARN0050993	23.00S/31.00E-5db	43.60896619	-119.03266083	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	11/08/2003	Domestic	1	0	0	0	0
HARN	51004	HARN0051004	25.00S/34.00E-7bb	43.42009543	-118.58874130	0.06	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	115.00	115.00	12/04/2003	Domestic	1	0	0	0	0
HARN	51007	HARN0051007	24.00S/29.00E-11ad	43.50320261	-119.20183312	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	12/03/2003	Domestic	0	1	0	0	0
HARN	51008	HARN0051008	20.00S/31.00E-27cd	43.79951000	-118.98760000	14.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	310.00	310.00	12/03/2003	Domestic	1	0	0	0	0
HARN	51010	HARN0051010	27.00S/30.00E-3cc	43.24793372	-118.99396390	0.39	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	123.00	NULL	10/07/2003	Domestic	1	0	0	0	0
HARN	51013	HARN0051013	23.00S/33.00E-12ab	43.59230992	-118.60190810	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	320.00	320.00	01/20/2004	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	51020	HARN0051020	22.00S/31.00E-28bb	43.64077937	-119.00156460	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	185.00	185.00	02/02/2004	Domestic	1	0	0	0	0
HARN	51031	HARN0051031	27.00S/34.00E-15da	43.22737196	-118.50673201	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	03/29/2004	Domestic	1	0	0	0	0
HARN	51038	HARN0051038	22.00S/32.00E-34bb	43.62774000	-118.87758000	10.00	NULL	NULL	NULL	owrd_field_staff	180.00	NULL	04/16/2004	Domestic	1	0	0	0	0
HARN	51039	HARN0051039	23.00S/32.00E-7ba	43.58562000	-118.94044000	13.50	NULL	NULL	NULL	owrd_field_staff	400.00	400.00	09/04/2003	Domestic	1	0	0	0	0
HARN	51045	HARN0051045	19.00S/29.00E-36ab	43.88635718	-119.18960540	5,280.00	NULL	NULL	NULL	well_report_plss	425.00	NULL	05/25/2004	Domestic	1	0	0	0	0
HARN	51046	HARN0051046	26.00S/34.00E-30dc	43.28255000	-118.58065000	13.30	NULL	NULL	NULL	owrd_field_staff	280.00	280.00	03/22/2004	Domestic	1	0	0	0	0
HARN	51065	HARN0051065	32.00S/32.00E-2bd	42.82580490	-118.91774013	5,280.00	NULL	NULL	NULL	well_report_plss	165.00	NULL	06/14/2004	Domestic	1	0	0	0	0
HARN	51071	HARN0051071	26.00S/34.00E-31ca	43.27109353	-118.57106749	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	06/12/2004	Domestic	1	0	0	0	0
HARN	51076	HARN0051076	25.00S/34.00E-7ca	43.41535728	-118.57774960	0.13	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	123.00	123.00	07/28/2004	Domestic	1	0	0	0	0
HARN	51079	HARN0051079	23.00S/33.00E-25dd	43.53817252	-118.59185517	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	08/02/2004	Domestic	1	0	0	0	0
HARN	51080	HARN0051080	25.00S/34.00E-7ba	43.42037000	-118.57763000	11.60	NULL	NULL	NULL	owrd_field_staff	250.00	250.00	09/04/2004	Domestic	1	0	0	0	0
HARN	51082	HARN0051082	25.00S/34.00E-7da	43.41478000	-118.57383000	15.00	NULL	NULL	NULL	owrd_field_staff	126.00	126.00	09/03/2004	Domestic	1	0	0	0	0
HARN	51086	HARN0051086	26.00S/31.00E-27ba	43.29378000	-118.98689000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	60.00	60.00	10/21/1996	Domestic	1	0	0	0	0
HARN	51087	HARN0051087	26.00S/26.00E-5dc	43.34032695	-119.62921322	5,280.00	NULL	NULL	NULL	well_report_plss	295.00	295.00	04/12/2004	Domestic	1	0	0	0	0
HARN	51088	HARN0051088	25.00S/30.00E-12bd	43.41629336	-119.06635266	5,280.00	NULL	NULL	NULL	well_report_plss	270.00	NULL	09/22/2004	Domestic	1	0	0	0	0
HARN	51130	HARN0051130	23.00S/33.00E-18cd	43.56726312	-118.69638174	5,280.00	NULL	NULL	NULL	well_report_plss	230.00	NULL	10/08/2002	Domestic	1	0	0	0	0
HARN	51131	HARN0051131	25.00S/32.00E-13cd	43.40265220	-118.71762018	250.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	64.00	65.00	02/09/2002	Domestic	1	0	0	0	0
HARN	51132	HARN0051132	24.00S/33.00E-12aa	43.50569914	-118.59191422	5,280.00	NULL	NULL	NULL	well_report_plss	118.00	NULL	04/24/2002	Domestic	1	0	0	0	0
HARN	51134	HARN0051134	24.00S/33.00E-18ab	43.49133078	-118.70137508	5,280.00	NULL	NULL	NULL	well_report_plss	304.00	NULL	12/30/2004	Domestic	1	0	0	0	0
HARN	51138	HARN0051138	24.00S/32.00E-13aa	43.49534000	-118.82300000	50.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	72.00	NULL	12/10/2004	Domestic	1	0	0	0	0
HARN	51139	HARN0051139	22.00S/31.00E-27cb	43.63772015	-118.99755857	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	01/12/2005	Domestic	1	0	0	0	0
HARN	51140	HARN0051140	22.00S/31.00E-33ab	43.62652600	-119.01298921	5,280.00	NULL	NULL	NULL	well_report_plss	68.00	NULL	01/20/2005	Domestic	1	0	0	0	0
HARN	51144	HARN0051144	22.00S/31.00E-33db	43.62304146	-119.01285710	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	01/27/2005	Domestic	1	0	0	0	0
HARN	51148	HARN0051148	27.00S/32.00E-6dd	43.24925728	-118.80229877	5,280.00	NULL	NULL	NULL	well_report_plss	285.00	NULL	02/17/2005	Domestic	1	0	0	0	0
HARN	51149	HARN0051149	25.00S/31.00E-23bc	43.38682543	-118.97768545	5,280.00	NULL	NULL	NULL	well_report_plss	245.00	NULL	02/25/2005	Domestic	1	0	0	0	0
HARN	51155	HARN0051155	25.00S/31.00E-23bc	43.38682543	-118.97768545	5,280.00	NULL	NULL	NULL	well_report_plss	345.00	NULL	03/31/2005	Domestic	0	1	0	0	0
HARN	51178	HARN0051178	22.00S/31.00E-33ab	43.62652600	-119.01298921	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	06/03/2005	Domestic	1	0	0	0	0
HARN	51179	HARN0051179	22.00S/31.00E-33ab	43.62652600	-119.01298921	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	06/09/2005	Domestic	1	0	0	0	0
HARN	51181	HARN0051181	20.00S/28.00E-36ca	43.79672387	-119.30481413	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	07/06/2005	Domestic	1	0	0	0	0
HARN	51183	HARN0051183	20.00S/29.00E-21cb	43.82586171	-119.25434907	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	06/29/2005	Domestic	1	0	0	0	0
HARN	51187	HARN0051187	23.00S/31.00E-1da	43.60823000	-118.94181000	12.30	NULL	NULL	NULL	owrd_field_staff	87.00	87.00	07/22/2005	Domestic	1	0	0	0	0
HARN	51200	HARN0051200	22.00S/29.00E-7db	43.68069117	-119.29037382	5,280.00	NULL	NULL	NULL	well_report_plss	255.00	NULL	07/14/2005	Domestic	1	0	0	0	0
HARN	51204	HARN0051204	23.00S/32.50E-13cc	43.57064000	-118.72820000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	165.00	165.00	08/29/2005	Domestic	1	0	0	0	0
HARN	51208	HARN0051208	24.00S/32.00E-12cd	43.49934685	-118.82989127	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	08/21/2005	Domestic	1	0	0	0	0
HARN	51211	HARN0051211	26.00S/26.00E-5dc	43.34032695	-119.62921322	5,280.00	NULL	NULL	NULL	well_report_plss	195.00	NULL	10/18/2005	Domestic	0	0	0	1	0
HARN	51212	HARN0051212	21.00S/32.50E-3ac	43.77793783	-118.76070016	5,280.00	NULL	NULL	NULL	well_report_plss	66.00	NULL	10/20/2005	Domestic	1	0	0	0	0
HARN	51225	HARN0051225	24.00S/33.00E-4ab	43.52021880	-118.66157430	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	11/03/2005	Domestic	1	0	0	0	0
HARN	51234	HARN0051234	23.00S/32.00E-12ca	43.59353559	-118.82958083	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	11/21/2005	Domestic	1	0	0	0	0
HARN	51235	HARN0051235	22.00S/31.00E-33ab	43.62402000	-119.00953000	11.60	NULL	NULL	NULL	owrd_field_staff	87.00	NULL	11/12/2005	Domestic	0	1	0	0	0
HARN	51236	HARN0051236	22.00S/31.00E-33ab	43.62652600	-119.01298921	5,280.00	NULL	NULL	NULL	well_report_plss	78.00	NULL	11/18/2005	Domestic	1	0	0	0	0
HARN	51254	HARN0051254	24.00S/32.00E-12cb	43.50726000	-118.84206000	21.00	NULL	NULL	NULL	owrd_field_staff	65.00	70.00	02/10/2006	Domestic	1	0	0	0	0
HARN	51255	HARN0051255	23.00S/32.00E-36dd	43.53461000	-118.84100000	11.20	NULL	NULL	NULL	owrd_field_staff	80.00	NULL	02/10/2006	Domestic	1	0	0	0	0
HARN	51258	HARN0051258	25.00S/34.00E-7cc	43.41543000	-118.57306000	14.30	NULL	NULL	NULL	owrd_field_staff	120.00	120.00	02/21/2006	Domestic	1	0	0	0	0
HARN	51264	HARN0051264	22.00S/31.00E-33cb	43.62234000	-119.01987000	13.30	NULL	NULL	NULL	owrd_field_staff	165.00	NULL	04/26/2006	Domestic	1	0	0	0	0
HARN	51267	HARN0051267	26.00S/31.00E-17bd	43.31435000	-119.02609000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	93.00	93.00	05/01/2006	Domestic	1	0	0	0	0
HARN	51268	HARN0051268	25.00S/34.00E-7da	43.41463000	-118.57232000	10.90	NULL	NULL	NULL	owrd_field_staff	160.00	160.00	02/05/2005	Domestic	1	0	0	0	0
HARN	51278	HARN0051278	22.00S/31.00E-33ab	43.62652600	-119.01298921	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	06/10/2006	Domestic	1	0	0	0	0
HARN	51279	HARN0051279	22.00S/31.00E-33ab	43.62432000	-119.01030000	11.70	NULL	NULL	NULL	owrd_field_staff	103.00	NULL	05/20/2006	Domestic	1	0	0	0	0
HARN	51280	HARN0051280	27.00S/33.00E-2ba	43.26015000	-118.61220000	19.10	NULL	NULL	NULL	owrd_field_staff	80.00	NULL	06/14/2006	Domestic	1	0	0	0	0
HARN	51282	HARN0051282	22.00S/27.00E-31cd	43.61415434	-119.52452514	5,280.00	NULL	NULL	NULL	well_report_plss	280.00	NULL	06/21/2006	Domestic	1	0	0	0	0
HARN	51286	HARN0051286	26.00S/31.00E-27aa	43.29256872	-118.98178707	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	06/30/2006	Domestic	1	0	0	0	0
HARN	51287	HARN0051287	26.00S/31.00E-30bb	43.28778449	-118.93449107	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	07/05/2006	Domestic	1	0	0	0	0
HARN	51287	HARN0051287	26.00S/31.00E-30bb	43.29287398	-119.05663149	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	07/05/2006	Domestic	1	0	0	0	0
HARN	51292	HARN0051292	23.00S/30.00E-2aa	43.61095860	-119.08354970	0.06	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	240.00	NULL	08/02/2006	Domestic	1	0	0	0	0
HARN	51293	HARN0051293	25.00S/34.00E-7ad	43.41282000	-118.57694000	12.70	NULL	NULL	NULL	owrd_field_staff	120.00	120.00	08/09/2006	Domestic	1	0	0	0	0
HARN	51295	HARN0051295	22.00S/29.00E-36ab	43.62523000	-119.18842000	20.40	NULL	NULL	NULL	owrd_field_staff	284.00	284.00	08/24/2005	Domestic	1	0	0	0	0
HARN	51296	HARN0051296	22.00S/29.00E-36db	43.62248790	-119.19045136	5,280.00	NULL	NULL	NULL	well_report_plss	380.00	NULL	08/21/2006	Domestic	1	0	0	0	0
HARN	51297	HARN0051297	22.00S/29.00E-36ab	43.62523000	-119.18842000	20.40	NULL	NULL	NULL	owrd_field_staff	192.00	NULL	08/17/2006	Domestic	0	1	0	0	0
HARN	51299	HARN0051299	21.00S/28.00E-36cd	43.70244745	-119.30532783	5,280.00	NULL	NULL	NULL	well_report_plss	510.00	510.00	08/28/2006	Domestic	1	0	0	0	0
HARN	51302	HARN0051302	24.00S/25.00E-22bb	43.48003084	-119.71445860	0.29	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	722.00	722.00	04/12/2006	Domestic	1	0	0	0	0
HARN	51303	HARN0051303	23.00S/32.00E-30bd	43.54800000	-118.92920000	15.60	NULL	NULL	NULL	owrd_field_staff	225.00	NULL	09/14/2006	Domestic	1	0	0	0	0
HARN	51304	HARN0051304	25.00S/31.00E-28aa	43.37938425	-119.00239409	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	09/19/2006	Domestic	1	0	0	0	0
HARN	51307	HARN0051307	23.00S/32.00E-18cc	43.57051000	-118.93973000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	290.00	305.00	09/22/2006	Domestic	1	0	0	0	0
HARN	51309	HARN0051309	23.00S/32.00E-24ad	43.56090543	-118.82466816	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	09/26/2006	Domestic	1	0	0	0	0
HARN	51315	HARN0051315	24.00S/33.00E-3dd	43.50935291	-118.63173666	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/21/2006	Domestic	1	0	0	0	0
HARN	51316	HARN0051316	24.00S/33.00E-31cb	43.44491000	-118.70754000	18.80	NULL	NULL	NULL	owrd_field_staff	330.00	NULL	11/01/2006	Domestic	1	0	0	0	0
HARN	51318	HARN0051318	24.00S/32.50E-25aa	43.46770000	-118.70873000	12.70	NULL	NULL	NULL	owrd_field_staff	300.00	NULL	11/15/2006	Domestic	1	0	0	0	0
HARN	51319	HARN0051319	23.00S/32.00E-18cc	43.57355000	-118.93837000	9,999.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	300.00	300.00	12/14/2006	Domestic	1	0	0	0	0
HARN	51321	HARN0051321	24.00S/32.00E-12cd	43.49934685	-118.82989127	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	12/27/2006	Domestic	1	0	0	0	0
HARN	51327	HARN0051327	25.00S/32.00E-26bc	43.37626000	-118.86065000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	375.00	375.00	01/21/2007	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	51328	HARN0051328	23.00S/30.00E-2aa	43.61131000	-119.08006000	12.10	NULL	NULL	NULL	owrd_field_staff	140.00	NULL	08/25/2006	Domestic	1	0	0	0	0
HARN	51329	HARN0051329	25.00S/32.50E-5ab	43.43745552	-118.79994144	5,280.00	NULL	NULL	NULL	well_report_plss	63.00	NULL	06/16/2000	Domestic	1	0	0	0	0
HARN	51330	HARN0051330	24.00S/32.50E-18ba	43.49563610	-118.81484000	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	04/25/2001	Domestic	0	0	0	0	0
HARN	51331	HARN0051331	26.00S/33.00E-25aa	43.28912385	-118.58497772	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	12/22/2001	Domestic	1	0	0	0	0
HARN	51336	HARN0051336	23.00S/32.50E-19da	43.56449062	-118.81050103	5,280.00	NULL	NULL	NULL	well_report_plss	58.00	NULL	03/26/2007	Domestic	1	0	0	0	0
HARN	51341	HARN0051341	24.00S/32.50E-35dd	43.44089811	-118.73060852	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	03/25/2007	Domestic	1	0	0	0	0
HARN	51342	HARN0051342	24.00S/32.00E-1cc	43.51389177	-118.83990812	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	03/28/2007	Domestic	1	0	0	0	0
HARN	51343	HARN0051343	24.00S/30.00E-2db	43.52364080	-119.09207650	0.07	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	80.00	80.00	04/27/2007	Domestic	1	0	0	0	0
HARN	51346	HARN0051346	29.00S/32.00E-23dc	43.03235088	-118.73320758	5,280.00	NULL	NULL	NULL	well_report_plss	63.00	NULL	05/08/2007	Domestic	1	0	0	0	0
HARN	51347	HARN0051347	27.00S/34.00E-8aa	43.24562807	-118.54637015	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	05/10/2007	Domestic	1	0	0	0	0
HARN	51348	HARN0051348	23.00S/32.00E-36db	43.53553432	-118.83478052	5,280.00	NULL	NULL	NULL	well_report_plss	53.00	NULL	05/12/2007	Domestic	1	0	0	0	0
HARN	51354	HARN0051354	25.00S/34.00E-7ca	43.41552563	-118.57701837	5,280.00	NULL	NULL	NULL	well_report_plss	220.00	NULL	06/11/2007	Domestic	0	1	0	0	0
HARN	51355	HARN0051355	NULL	43.44944444	-118.72888889	0.00	NULL	NULL	NULL	well_report_lat_long	80.00	85.00	04/18/2007	Domestic	1	0	0	0	0
HARN	51363	HARN0051363	23.00S/30.00E-26ab	43.55562000	-119.09920000	14.80	NULL	NULL	NULL	owrd_field_staff	380.00	NULL	06/27/2007	Domestic	1	0	0	0	0
HARN	51365	HARN0051365	23.00S/33.00E-29dd	43.53832642	-118.67150764	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	06/30/2007	Domestic	1	0	0	0	0
HARN	51366	HARN0051366	23.00S/33.00E-29dc	43.53834178	-118.68146371	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	06/29/2007	Domestic	1	0	0	0	0
HARN	51367	HARN0051367	23.00S/33.00E-5cc	43.59614616	-118.68639404	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	07/02/2007	Domestic	1	0	0	0	0
HARN	51368	HARN0051368	24.00S/31.00E-33ca	43.45026675	-119.00542470	0.06	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	62.00	62.00	06/28/2007	Domestic	1	0	0	0	0
HARN	51375	HARN0051375	24.00S/29.00E-1ba	43.52508573	-119.18706375	5,280.00	NULL	NULL	NULL	well_report_plss	245.00	NULL	07/16/2007	Domestic	1	0	0	0	0
HARN	51376	HARN0051376	25.00S/31.00E-27aa	43.37941184	-118.98263147	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	NULL	07/18/2007	Domestic	1	0	0	0	0
HARN	51377	HARN0051377	23.00S/32.50E-1ac	43.60400026	-118.72081754	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	06/29/2007	Domestic	1	0	0	0	0
HARN	51380	HARN0051380	23.00S/32.50E-1cc	43.60040168	-118.72580596	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	07/19/2007	Domestic	1	0	0	0	0
HARN	51382	HARN0051382	29.00S/31.00E-10db	43.06607000	-118.86845000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	200.00	200.00	08/08/2007	Domestic	1	0	0	0	0
HARN	51389	HARN0051389	23.00S/30.00E-2bb	43.61240854	-119.09664965	5,280.00	NULL	NULL	NULL	well_report_plss	305.00	NULL	08/24/2007	Domestic	1	0	0	0	0
HARN	51391	HARN0051391	25.00S/34.00E-7da	43.41553203	-118.57204345	5,280.00	NULL	NULL	NULL	well_report_plss	235.00	235.00	12/03/2010	Domestic	1	0	0	0	0
HARN	51392	HARN0051392	24.00S/32.50E-6cd	43.51365916	-118.81514697	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	03/28/2007	Domestic	1	0	0	0	0
HARN	51393	HARN0051393	23.00S/32.00E-34cc	43.52821481	-118.88001176	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	08/28/2007	Domestic	1	0	0	0	0
HARN	51394	HARN0051394	23.00S/32.50E-11cd	43.58596331	-118.73578275	5,280.00	NULL	NULL	NULL	well_report_plss	87.00	NULL	09/04/2007	Domestic	1	0	0	0	0
HARN	51398	HARN0051398	24.00S/32.00E-10bd	43.50318387	-118.87015711	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	09/06/2007	Domestic	1	0	0	0	0
HARN	51400	HARN0051400	27.00S/34.00E-7bb	43.24570332	-118.58057220	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	09/17/2007	Domestic	1	0	0	0	0
HARN	51402	HARN0051402	23.00S/33.00E-5ab	43.60700228	-118.68132914	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	09/21/2007	Domestic	1	0	0	0	0
HARN	51407	HARN0051407	24.00S/32.00E-24aa	43.47338109	-118.82273549	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	60.00	NULL	09/22/2007	Domestic	1	0	0	0	0
HARN	51411	HARN0051411	24.00S/33.00E-15bc	43.48409149	-118.64675685	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	10/20/2007	Domestic	1	0	0	0	0
HARN	51413	HARN0051413	24.00S/32.00E-14ca	43.49218421	-118.85005859	5,280.00	NULL	NULL	NULL	well_report_plss	261.00	NULL	11/27/2007	Domestic	1	0	0	0	0
HARN	51415	HARN0051415	24.00S/29.00E-1ad	43.51781349	-119.18208559	5,280.00	NULL	NULL	NULL	well_report_plss	265.00	NULL	12/03/2007	Domestic	1	0	0	0	0
HARN	51416	HARN0051416	NULL	43.52155446	-118.59140020	9,999.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	225.00	225.00	12/01/2007	Domestic	1	0	0	0	0
HARN	51417	HARN0051417	27.00S/34.00E-4cb	43.25642000	-118.54174000	15.80	NULL	NULL	NULL	owrd_field_staff	100.00	NULL	12/04/2007	Domestic	1	0	0	0	0
HARN	51418	HARN0051418	27.00S/34.00E-10bb	43.24637000	-118.51916000	14.50	NULL	NULL	NULL	owrd_field_staff	100.00	NULL	12/05/2007	Domestic	1	0	0	0	0
HARN	51420	HARN0051420	24.00S/30.00E-4cb	43.52167962	-119.13660866	5,280.00	NULL	NULL	NULL	well_report_plss	185.00	NULL	12/14/2007	Domestic	1	0	0	0	0
HARN	51427	HARN0051427	23.00S/30.00E-26ac	43.55041000	-119.09493000	12.50	NULL	NULL	NULL	owrd_field_staff	285.00	NULL	12/21/2007	Domestic	1	0	0	0	0
HARN	51428	HARN0051428	24.00S/27.00E-11bd	43.50060000	-119.43983000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	185.00	195.00	01/10/2008	Domestic	1	0	0	0	0
HARN	51430	HARN0051430	24.00S/33.00E-15bc	43.48409149	-118.64675685	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	06/12/2007	Domestic	1	0	0	0	0
HARN	51458	HARN0051458	19.00S/32.00E-7cc	43.93322313	-118.93488681	5,280.00	NULL	NULL	NULL	well_report_plss	223.00	NULL	05/06/2008	Domestic	1	0	0	0	0
HARN	51462	HARN0051462	23.00S/30.00E-26ac	43.54730375	-119.09216761	5,280.00	NULL	NULL	NULL	well_report_plss	285.00	NULL	05/19/2008	Domestic	0	0	0	1	0
HARN	51466	HARN0051466	23.00S/32.00E-18cc	43.57026696	-118.93793590	0.08	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	73.00	80.00	05/08/2008	Domestic	1	0	0	0	0
HARN	51469	HARN0051469	24.00S/32.00E-17cd	43.48484499	-118.90895329	5,280.00	NULL	NULL	NULL	well_report_plss	43.00	NULL	07/01/2008	Domestic	1	0	0	0	0
HARN	51472	HARN0051472	24.00S/33.00E-7aa	43.50580020	-118.69145989	5,280.00	NULL	NULL	NULL	well_report_plss	92.00	NULL	07/17/2008	Domestic	1	0	0	0	0
HARN	51476	HARN0051476	24.00S/33.00E-13ab	43.49129328	-118.60189750	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	08/01/2008	Domestic	1	0	0	0	0
HARN	51477	HARN0051477	26.00S/30.00E-2db	43.34735781	-119.09126723	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	08/07/2008	Domestic	0	1	0	0	0
HARN	51480	HARN0051480	24.00S/32.00E-4bd	43.51522000	-118.88477000	11.80	NULL	NULL	NULL	owrd_field_staff	85.00	NULL	08/28/2008	Domestic	1	0	0	0	0
HARN	51481	HARN0051481	22.00S/29.00E-36aa	43.62609475	-119.18047752	5,280.00	NULL	NULL	NULL	well_report_plss	460.00	460.00	08/12/2008	Domestic	1	0	0	0	0
HARN	51491	HARN0051491	24.00S/33.00E-1db	43.51652245	-118.60185514	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	10/13/2008	Domestic	1	0	0	0	0
HARN	51499	HARN0051499	22.00S/29.00E-36da	43.62246838	-119.18048724	5,280.00	NULL	NULL	NULL	well_report_plss	505.00	NULL	10/29/2008	Domestic	1	0	0	0	0
HARN	51505	HARN0051505	25.00S/33.00E-11db	43.41543563	-118.62175626	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	11/25/2008	Domestic	1	0	0	0	0
HARN	51509	HARN0051509	23.00S/30.00E-10da	43.59443897	-119.10184762	5,280.00	NULL	NULL	NULL	well_report_plss	421.00	NULL	12/04/2008	Domestic	1	0	0	0	0
HARN	51510	HARN0051510	22.00S/33.00E-33ca	43.61851000	-118.66378000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	358.00	358.00	12/02/2008	Domestic	1	0	0	0	0
HARN	51513	HARN0051513	22.00S/33.00E-20ba	43.65043336	-118.67615157	5,280.00	NULL	NULL	NULL	well_report_plss	300.00	NULL	12/20/2008	Domestic	1	0	0	0	0
HARN	51516	HARN0051516	23.00S/31.00E-11cc	43.59029000	-118.97964000	11.50	NULL	NULL	NULL	owrd_field_staff	95.00	NULL	01/16/2009	Domestic	1	0	0	0	0
HARN	51518	HARN0051518	26.00S/30.00E-16bc	43.31584000	-119.13785000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	145.00	145.00	01/20/2009	Domestic	1	0	0	0	0
HARN	51519	HARN0051519	26.00S/33.00E-34ca	43.27050000	-118.63184000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	85.00	85.00	01/14/2009	Domestic	1	0	0	0	0
HARN	51520	HARN0051520	27.00S/34.00E-8bc	43.23840203	-118.56125198	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	01/09/2009	Domestic	1	0	0	0	0
HARN	51524	HARN0051524	24.00S/32.50E-9dd	43.49737251	-118.77044420	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	153.00	153.00	02/09/2008	Domestic	1	0	0	0	0
HARN	51525	HARN0051525	24.00S/32.00E-24aa	43.48119563	-118.82490540	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	09/07/2008	Domestic	1	0	0	0	0
HARN	51534	HARN0051534	25.00S/30.00E-36bb	43.36551811	-119.07639648	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	02/03/2009	Domestic	1	0	0	0	0
HARN	51547	HARN0051547	23.00S/32.50E-31cc	43.52678883	-118.81962110	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	180.00	180.00	03/19/2009	Domestic	1	0	0	0	0
HARN	51554	HARN0051554	23.00S/32.50E-23bb	43.56944000	-118.74734000	12.60	NULL	NULL	NULL	owrd_field_staff	123.00	123.00	04/11/2009	Domestic	1	0	0	0	0
HARN	51572	HARN0051572	26.00S/30.00E-2db	43.34735781	-119.09126723	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	05/24/2009	Domestic	1	0	0	0	0
HARN	51580	HARN0051580	20.00S/32.00E-19da	43.82361843	-118.91984663	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	06/07/2009	Domestic	1	0	0	0	0
HARN	51581	HARN0051581	20.00S/32.00E-19ca	43.82360093	-118.92482115	5,280.00	NULL	NULL	NULL	well_report_plss	260.00	NULL	06/04/2009	Domestic	1	0	0	0	0
HARN	51598	HARN0051598	22.00S/29.00E-21bb	43.65518967	-119.25552675	5,280.00	NULL	NULL	NULL	well_report_plss	538.50	NULL	06/15/2009	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	51600	HARN0051600	24.00S/32.50E-7cc	43.50308640	-118.70574180	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	63.00	NULL	06/03/2009	Domestic	1	0	0	0	0
HARN	51601	HARN0051601	32.00S/32.00E-2da	42.82937010	-118.91286462	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	07/10/2009	Domestic	1	0	0	0	0
HARN	51602	HARN0051602	32.00S/32.00E-2da	42.82937010	-118.91286462	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	07/11/2009	Domestic	0	0	0	0	1
HARN	51608	HARN0051608	23.00S/31.00E-6db	43.60876290	-119.05220399	5,280.00	NULL	NULL	NULL	well_report_plss	34.00	NULL	07/08/2009	Domestic	1	0	0	0	0
HARN	51609	HARN0051609	23.00S/32.00E-31bb	43.53919317	-118.93874634	5,280.00	NULL	NULL	NULL	well_report_plss	64.00	NULL	07/09/2009	Domestic	1	0	0	0	0
HARN	51610	HARN0051610	25.00S/34.00E-30cd	43.36339481	-118.57690850	0.07	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	105.00	NULL	07/13/2009	Domestic	1	0	0	0	0
HARN	51611	HARN0051611	26.00S/33.00E-34ab	43.27340064	-118.63439090	0.14	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	103.00	103.00	07/14/2009	Domestic	1	0	0	0	0
HARN	51613	HARN0051613	23.00S/29.00E-10da	43.60997000	-119.17904000	10.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	445.00	445.00	07/22/2009	Domestic	1	0	0	0	0
HARN	51614	HARN0051614	23.00S/33.00E-6da	43.60340359	-118.69137278	5,280.00	NULL	NULL	NULL	well_report_plss	63.00	NULL	07/23/2009	Domestic	1	0	0	0	0
HARN	51620	HARN0051620	23.00S/31.00E-11bc	43.58939489	-118.96937529	50.00	NULL	NULL	NULL	exempt_use_map	140.00	NULL	08/09/2009	Domestic	1	0	0	0	0
HARN	51636	HARN0051636	23.00S/32.00E-3cb	43.60761000	-118.87814000	13.20	NULL	NULL	NULL	owrd_field_staff	112.00	NULL	11/21/2008	Domestic	1	0	0	0	0
HARN	51639	HARN0051639	25.00S/30.00E-26bb	43.37999141	-119.09628057	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	04/20/2009	Domestic	1	0	0	0	0
HARN	51641	HARN0051641	24.00S/32.50E-19ab	43.48270000	-118.81963000	13.10	NULL	NULL	NULL	owrd_field_staff	60.00	NULL	08/18/2009	Domestic	1	0	0	0	0
HARN	51642	HARN0051642	25.00S/31.00E-28bb	43.37958000	-119.01293000	11.00	NULL	NULL	NULL	owrd_field_staff	280.00	NULL	08/25/2009	Domestic	1	0	0	0	0
HARN	51643	HARN0051643	22.00S/32.00E-33ad	43.62483969	-118.90261705	99.00	NULL	NULL	NULL	exempt_use_map	230.00	NULL	09/17/2009	Domestic	1	0	0	0	0
HARN	51644	HARN0051644	23.00S/32.00E-34cc	43.52821481	-118.88001176	5,280.00	NULL	NULL	NULL	well_report_plss	700.00	NULL	08/25/2009	Domestic	0	1	0	0	0
HARN	51646	HARN0051646	23.00S/30.00E-26cb	43.55237000	-119.09705000	13.50	NULL	NULL	NULL	owrd_field_staff	285.00	285.00	09/17/2009	Domestic	1	0	0	0	0
HARN	51647	HARN0051647	24.00S/30.00E-2dd	43.51653000	-119.08301000	15.40	NULL	NULL	NULL	owrd_field_staff	83.00	NULL	09/21/2009	Domestic	1	0	0	0	0
HARN	51651	HARN0051651	23.00S/31.00E-6db	43.60757576	-119.05229550	0.32	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	30.00	40.00	10/01/2009	Domestic	1	0	0	0	0
HARN	51653	HARN0051653	24.00S/32.50E-22cc	43.47089400	-118.76707600	99.00	NULL	NULL	NULL	exempt_use_map	65.00	NULL	10/10/2009	Domestic	1	0	0	0	0
HARN	51656	HARN0051656	24.00S/33.00E-34cc	43.43583700	-118.64883900	1,000.00	NULL	NULL	NULL	exempt_use_map	83.00	NULL	10/19/2009	Domestic	1	0	0	0	0
HARN	51673	HARN0051673	24.00S/33.00E-34dc	43.43544000	-118.64661300	500.00	NULL	NULL	NULL	exempt_use_map	100.00	NULL	10/27/2009	Domestic	1	0	0	0	0
HARN	51674	HARN0051674	26.00S/31.00E-19ac	43.30128000	-119.05285000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	240.00	240.00	11/02/2009	Domestic	1	0	0	0	0
HARN	51679	HARN0051679	27.00S/31.00E-9bb	43.24731000	-118.89654000	9.20	NULL	NULL	NULL	owrd_field_staff	165.00	NULL	11/25/2009	Domestic	0	1	0	0	0
HARN	51683	HARN0051683	24.00S/33.00E-4ab	43.52187216	-118.65411715	50.00	NULL	NULL	NULL	exempt_use_map	90.00	NULL	11/28/2009	Domestic	1	0	0	0	0
HARN	51685	HARN0051685	26.00S/31.00E-19ac	43.30088000	-119.05349000	12.90	NULL	NULL	NULL	owrd_field_staff	195.00	NULL	06/12/2004	Domestic	1	0	0	0	0
HARN	51686	HARN0051686	26.00S/31.00E-19ac	43.30030000	-119.05148000	11.20	NULL	NULL	NULL	owrd_field_staff	140.00	NULL	11/04/2008	Domestic	1	0	0	0	0
HARN	51689	HARN0051689	24.00S/33.00E-9dd	43.49344000	-118.64941000	12.50	NULL	NULL	NULL	owrd_field_staff	305.00	305.00	02/04/2010	Domestic	1	0	0	0	0
HARN	51692	HARN0051692	NULL	43.41269000	-118.57219000	20.10	NULL	NULL	NULL	owrd_field_staff	130.00	130.00	03/12/2006	Domestic	1	0	0	0	0
HARN	51700	HARN0051700	26.00S/30.00E-25cb	43.29074000	-119.06931000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	100.00	100.00	04/28/2010	Domestic	1	0	0	0	0
HARN	51708	HARN0051708	19.00S/29.00E-32cc	43.87702000	-119.27280000	19.00	NULL	NULL	NULL	owrd_field_staff	0.00	NULL	06/23/2010	Domestic	0	0	0	0	1
HARN	51709	HARN0051709	26.00S/31.00E-19ac	43.30008800	-119.05349000	12.90	NULL	NULL	NULL	owrd_field_staff	0.00	NULL	06/24/2010	Domestic	0	0	0	0	1
HARN	51710	HARN0051710	26.00S/31.00E-19ac	43.30053000	-119.05148000	11.20	NULL	NULL	NULL	owrd_field_staff	0.00	NULL	06/26/2010	Domestic	0	0	0	0	1
HARN	51715	HARN0051715	27.00S/34.00E-8ad	43.23934000	-118.54523000	14.50	NULL	NULL	NULL	owrd_field_staff	84.00	NULL	07/19/2010	Domestic	1	0	0	0	0
HARN	51718	HARN0051718	20.00S/31.00E-13ab	43.84034000	-118.95216000	13.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	180.00	180.00	07/02/2010	Domestic	1	0	0	0	0
HARN	51722	HARN0051722	24.00S/33.00E-22ca	43.47249425	-118.63478640	0.38	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	390.00	390.00	08/17/2010	Domestic	1	0	0	0	0
HARN	51723	HARN0051723	23.00S/30.00E-2aa	43.61164203	-119.08051601	400.00	NULL	NULL	NULL	exempt_use_map	225.00	NULL	09/01/2010	Domestic	1	0	0	0	0
HARN	51724	HARN0051724	22.00S/30.00E-24ac	43.64910318	-119.07086400	0.12	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	165.00	NULL	09/09/2010	Domestic	1	0	0	0	0
HARN	51732	HARN0051732	24.00S/32.00E-4db	43.52190000	-118.89357000	14.50	NULL	NULL	NULL	owrd_field_staff	148.00	NULL	09/23/2010	Domestic	1	0	0	0	0
HARN	51739	HARN0051739	24.00S/32.50E-16bc	43.48935000	-118.78587000	15.60	NULL	NULL	NULL	owrd_field_staff	360.00	NULL	10/28/2010	Domestic	1	0	0	0	0
HARN	51762	HARN0051762	25.00S/34.00E-7da	43.41602000	-118.57854000	23.10	NULL	NULL	NULL	owrd_field_staff	235.00	NULL	12/03/2010	Domestic	0	1	0	0	0
HARN	51768	HARN0051768	23.00S/30.00E-13dd	43.57275000	-119.06055000	13.20	NULL	NULL	NULL	owrd_field_staff	60.00	NULL	03/11/2011	Domestic	1	0	0	0	0
HARN	51773	HARN0051773	25.00S/30.00E-35bb	43.36547955	-119.09626548	5,280.00	NULL	NULL	NULL	well_report_plss	124.00	NULL	03/25/2011	Domestic	0	1	0	1	0
HARN	51785	HARN0051785	23.00S/30.00E-26bc	43.54892000	-119.09856000	14.70	NULL	NULL	NULL	owrd_field_staff	362.00	NULL	05/24/2011	Domestic	1	0	0	0	0
HARN	51786	HARN0051786	22.00S/29.00E-21dd	43.65570000	-119.25082000	20.90	NULL	NULL	NULL	owrd_field_staff	420.00	420.00	02/10/2006	Domestic	1	0	0	0	0
HARN	51789	HARN0051789	23.00S/32.00E-25bd	43.54789000	-118.82254000	15.20	NULL	NULL	NULL	owrd_field_staff	83.00	NULL	06/14/2011	Domestic	1	0	0	0	0
HARN	51796	HARN0051796	20.00S/27.00E-7bb	43.85917000	-119.52750000	99.00	NULL	NULL	NULL	exempt_use_map	110.00	NULL	07/21/2011	Domestic	1	0	0	0	0
HARN	51798	HARN0051798	23.00S/32.00E-20dc	43.55850000	-118.91769000	16.20	NULL	NULL	NULL	owrd_field_staff	100.00	NULL	07/28/2011	Domestic	1	0	0	0	0
HARN	51801	HARN0051801	25.00S/33.00E-3aa	43.43364316	-118.63180211	5,280.00	NULL	NULL	NULL	well_report_plss	285.00	NULL	08/12/2011	Domestic	1	0	0	0	0
HARN	51804	HARN0051804	23.00S/31.00E-5bc	43.60539812	-119.03769331	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	08/30/2011	Domestic	0	0	0	0	1
HARN	51809	HARN0051809	23.00S/32.00E-26db	43.55423000	-118.85366000	14.70	NULL	NULL	NULL	owrd_field_staff	117.00	NULL	09/30/2011	Domestic	1	0	0	0	0
HARN	51814	HARN0051814	23.00S/25.00E-10da	43.59188107	-119.69984292	5,280.00	NULL	NULL	NULL	well_report_plss	265.00	NULL	10/12/2011	Domestic	1	0	0	0	0
HARN	51818	HARN0051818	19.00S/31.00E-36ca	43.88280000	-118.94390000	99.00	NULL	NULL	NULL	exempt_use_map	445.00	NULL	10/28/2011	Domestic	1	0	0	0	0
HARN	51828	HARN0051828	25.00S/34.00E-7ba	43.41987000	-118.57819000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	312.00	312.00	12/21/2011	Domestic	1	0	0	0	0
HARN	51829	HARN0051829	23.00S/26.00E-4bc	43.60284904	-119.61417540	5,280.00	NULL	NULL	NULL	well_report_plss	385.00	NULL	01/14/2012	Domestic	1	0	0	0	0
HARN	51843	HARN0051843	23.00S/31.00E-24da	43.56561000	-118.94230000	14.10	NULL	NULL	NULL	owrd_field_staff	76.00	298.00	05/02/2012	Domestic	1	0	0	0	0
HARN	51850	HARN0051850	27.00S/34.00E-9ca	43.24194990	-118.53147861	5,280.00	NULL	NULL	NULL	well_report_plss	170.00	NULL	05/22/2012	Domestic	1	0	0	0	0
HARN	51852	HARN0051852	20.00S/32.00E-7cb	43.85305000	-118.93470000	99.00	NULL	NULL	NULL	exempt_use_map	180.00	NULL	06/01/2012	Domestic	1	0	0	0	0
HARN	51862	HARN0051862	28.00S/33.00E-24dc	43.11881737	-118.59514716	5,280.00	NULL	NULL	NULL	well_report_plss	143.00	NULL	07/13/2012	Domestic	1	0	0	0	0
HARN	51863	HARN0051863	25.00S/34.00E-7da	43.41451000	-118.57191000	16.00	NULL	NULL	NULL	owrd_field_staff	142.00	142.00	07/17/2012	Domestic	1	0	0	0	0
HARN	51865	HARN0051865	22.00S/29.00E-26cc	43.62887463	-119.21345246	99.00	NULL	NULL	NULL	exempt_use_map	345.00	NULL	07/27/2012	Domestic	1	0	0	0	0
HARN	51866	HARN0051866	19.00S/31.00E-36ad	43.87614509	-118.93830330	200.00	NULL	NULL	NULL	exempt_use_map	395.00	NULL	08/02/2012	Domestic	1	0	0	0	0
HARN	51868	HARN0051868	23.00S/32.00E-11ca	43.59359286	-118.84955585	5,280.00	NULL	NULL	NULL	well_report_plss	103.00	NULL	07/31/2012	Domestic	1	0	0	0	0
HARN	51880	HARN0051880	19.00S/29.00E-36ab	43.88745344	-119.18943621	99.00	NULL	NULL	NULL	exempt_use_map	505.00	505.00	09/14/2012	Domestic	1	0	0	0	0
HARN	51882	HARN0051882	23.00S/32.50E-11bb	43.59829561	-118.74784688	99.00	NULL	NULL	NULL	exempt_use_map	104.00	104.00	09/19/2012	Domestic	1	0	0	0	0
HARN	51889	HARN0051889	25.00S/34.00E-7ab	43.41268000	-118.57635000	16.60	NULL	NULL	NULL	owrd_field_staff	150.00	150.00	09/13/2012	Domestic	1	0	0	0	0
HARN	51890	HARN0051890	23.00S/32.50E-14aa	43.58322064	-118.72870910	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	140.00	140.00	09/01/2012	Domestic	1	0	0	0	0
HARN	51897	HARN0051897	23.00S/31.00E-30ab	43.55483475	-119.05226358	5,280.00	NULL	NULL	NULL	well_report_plss	64.00	NULL	11/15/2012	Domestic	1	0	0	0	0
HARN	51898	HARN0051898	23.00S/31.00E-6ab	43.61227598	-119.05185365	99.00	NULL	NULL	NULL	exempt_use_map	224.00	NULL	12/10/2012	Domestic	1	0	0	0	0
HARN	51937	HARN0051937	32.00S/32.00E-2ad	42.82714000	-118.91534000	16.60	NULL	NULL	NULL	owrd_field_staff	188.00	NULL	04/29/2013	Domestic	0	0	0	1	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	51951	HARN0051951	24.00S/30.00E-9ca	43.50550000	-119.12447000	15.60	NULL	NULL	NULL	owrd_field_staff	105.00	NULL	06/18/2013	Domestic	1	0	0	0	0
HARN	51963	HARN0051963	23.00S/31.00E-5aa	43.61177671	-119.02105400	0.09	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	161.00	161.00	07/20/2013	Domestic	1	0	0	0	0
HARN	51964	HARN0051964	24.00S/29.00E-4ca	43.52218000	-119.24438000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	420.00	420.00	07/11/2013	Domestic	1	0	0	0	0
HARN	51965	HARN0051965	23.00S/32.00E-32cc	43.52813440	-118.92000590	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	09/16/2008	Domestic	1	0	0	0	0
HARN	51968	HARN0051968	25.00S/34.00E-5aa	43.43542000	-118.55524000	17.20	NULL	NULL	NULL	owrd_field_staff	185.00	185.00	08/11/2013	Domestic	1	0	0	0	0
HARN	52005	HARN0052005	22.00S/32.50E-8cd	43.67282315	-118.79515720	5,280.00	NULL	NULL	NULL	well_report_plss	202.00	202.00	10/16/2013	Domestic	1	0	0	0	0
HARN	52012	HARN0052012	26.00S/33.00E-36ad	43.26864505	-118.58550164	99.00	NULL	NULL	NULL	exempt_use_map	321.00	NULL	11/29/2013	Domestic	1	0	0	0	0
HARN	52014	HARN0052014	24.00S/33.00E-1db	43.51652245	-118.60185514	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	01/21/2014	Domestic	1	0	0	0	0
HARN	52020	HARN0052020	25.00S/34.00E-7db	43.41731478	-118.57985235	99.00	NULL	NULL	NULL	exempt_use_map	230.00	230.00	02/21/2014	Domestic	1	0	0	0	0
HARN	52024	HARN0052024	24.00S/30.00E-4cc	43.51282200	-119.13623600	0.00	NULL	NULL	NULL	well_report_lat_long	101.00	NULL	02/17/2014	Domestic	0	0	0	1	0
HARN	52046	HARN0052046	24.00S/32.00E-10da	43.50923000	-118.86281000	16.90	NULL	NULL	NULL	owrd_field_staff	150.00	NULL	05/06/2014	Domestic	1	0	0	0	0
HARN	52061	HARN0052061	23.00S/32.00E-18cc	43.57175774	-118.93872201	5,280.00	NULL	NULL	NULL	well_report_plss	297.00	NULL	06/12/2014	Domestic	0	0	0	1	0
HARN	52062	HARN0052062	24.00S/30.00E-7ad	43.50201119	-119.16325878	99.00	NULL	NULL	NULL	exempt_use_map	162.00	NULL	06/16/2014	Domestic	1	0	0	0	0
HARN	52065	HARN0052065	25.00S/31.00E-5bc	43.43139000	-119.03935000	13.60	NULL	NULL	NULL	owrd_field_staff	302.00	NULL	07/02/2014	Domestic	1	0	0	0	0
HARN	52067	HARN0052067	22.00S/31.00E-33ca	43.62593000	-119.01933000	15.80	NULL	NULL	NULL	owrd_field_staff	200.00	NULL	07/01/2014	Domestic	1	0	0	0	0
HARN	52068	HARN0052068	25.00S/31.00E-22dd	43.38168615	-118.98254000	0.07	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	95.00	95.00	NULL	Domestic	1	0	0	0	0
HARN	52071	HARN0052071	24.00S/29.00E-2bc	43.51783561	-119.21680393	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	07/10/2014	Domestic	0	1	0	0	0
HARN	52072	HARN0052072	23.00S/33.00E-5bc	43.60114887	-118.68848094	99.00	NULL	NULL	NULL	exempt_use_map	162.00	NULL	07/14/2014	Domestic	1	0	0	0	0
HARN	52073	HARN0052073	25.00S/33.00E-2da	43.42948000	-118.61422000	14.40	NULL	NULL	NULL	owrd_field_staff	210.00	210.00	07/18/2014	Domestic	1	0	0	0	0
HARN	52076	HARN0052076	32.00S/32.00E-2ac	42.82923051	-118.91438454	99.00	NULL	NULL	NULL	exempt_use_map	200.00	NULL	06/17/2014	Domestic	1	0	0	0	0
HARN	52077	HARN0052077	32.00S/32.00E-2ac	42.82806000	-118.91482000	16.10	NULL	NULL	NULL	owrd_field_staff	220.00	NULL	06/30/2014	Domestic	1	0	0	0	0
HARN	52078	HARN0052078	32.00S/32.00E-2ab	42.83308841	-118.92242733	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	07/17/2014	Domestic	0	0	0	0	1
HARN	52079	HARN0052079	32.00S/32.00E-2ac	42.82784000	-118.91465000	17.90	NULL	NULL	NULL	owrd_field_staff	292.00	NULL	07/18/2014	Domestic	0	0	0	0	1
HARN	52083	HARN0052083	22.00S/32.00E-35bc	43.62035000	-118.86169000	15.30	NULL	NULL	NULL	owrd_field_staff	140.00	NULL	07/28/2014	Domestic	1	0	0	0	0
HARN	52099	HARN0052099	24.00S/32.50E-9ab	43.50977784	-118.78044494	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	08/25/2014	Domestic	1	0	0	0	0
HARN	52100	HARN0052100	29.00S/33.00E-32bc	43.00532000	-118.67797000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	303.00	303.00	08/14/2014	Domestic	1	0	0	0	0
HARN	52103	HARN0052103	23.00S/32.00E-5ad	43.60530000	-118.78851000	14.20	NULL	NULL	NULL	owrd_field_staff	162.00	NULL	08/01/2014	Domestic	1	0	0	0	0
HARN	52106	HARN0052106	23.00S/32.00E-3da	43.60656000	-118.74886000	14.50	NULL	NULL	NULL	owrd_field_staff	120.00	NULL	08/31/2014	Domestic	1	0	0	0	0
HARN	52107	HARN0052107	NULL	43.51924904	-118.83231236	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	08/07/2014	Domestic	1	0	0	0	0
HARN	52108	HARN0052108	25.00S/31.00E-23cc	43.38250206	-118.97701974	99.00	NULL	NULL	NULL	exempt_use_map	50.00	NULL	08/01/2014	Domestic	1	0	0	0	0
HARN	52136	HARN0052136	24.00S/29.00E-3dd	43.51677331	-119.22079680	0.27	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	255.00	255.00	07/17/1978	Domestic	1	0	0	0	0
HARN	52138	HARN0052138	30.00S/33.00E-5bd	42.99256024	-118.66908641	99.00	NULL	NULL	NULL	exempt_use_map	184.00	NULL	12/12/2014	Domestic	1	0	0	0	0
HARN	52145	HARN0052145	22.00S/31.00E-33db	43.62371000	-119.01475000	13.20	NULL	NULL	NULL	owrd_field_staff	123.00	NULL	01/16/2015	Domestic	1	0	0	0	0
HARN	52160	HARN0052160	23.00S/30.00E-26bc	43.54895000	-119.09857000	0.00	NULL	NULL	NULL	owrd_field_staff	362.00	NULL	02/12/2015	Domestic	0	0	0	1	0
HARN	52164	HARN0052164	28.00S/30.00E-11ab	43.15908000	-118.97058000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	445.00	445.00	03/05/2015	Domestic	1	0	0	0	0
HARN	52166	HARN0052166	29.00S/33.00E-32bc	43.00529596	-118.67792670	99.00	NULL	NULL	NULL	exempt_use_map	303.00	NULL	03/12/2015	Domestic	0	0	0	1	0
HARN	52200	HARN0052200	25.00S/34.00E-7ca	43.41539000	-118.57777000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	220.00	220.00	05/14/2015	Domestic	1	0	0	0	0
HARN	52244	HARN0052244	23.00S/30.00E-1ba	43.61244085	-119.06696799	150.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	owrd_groundwater_staff	252.00	252.00	08/31/1936	Domestic	0	0	0	0	0
HARN	52252	HARN0052252	24.00S/29.00E-3ac	43.51833047	-119.23427826	99.00	NULL	NULL	NULL	exempt_use_map	243.00	NULL	06/24/2015	Domestic	1	0	0	0	0
HARN	52267	HARN0052267	22.00S/32.00E-34aa	43.62624553	-118.86456987	5,280.00	NULL	NULL	NULL	well_report_plss	215.00	215.00	12/31/1965	Domestic	1	0	0	0	0
HARN	52275	HARN0052275	25.00S/32.00E-35db	43.36352700	-118.85383800	300.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	400.00	400.00	12/31/1964	Domestic	1	0	0	0	0
HARN	52312	HARN0052312	24.00S/33.00E-18cb	43.48928328	-118.70452446	500.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	0.00	NULL	NULL	Domestic	1	0	0	0	0
HARN	52315	HARN0052315	24.00S/32.50E-18db	43.49126058	-118.82094190	9,999.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	180.00	180.00	12/31/1959	Domestic	1	0	0	0	0
HARN	52341	HARN0052341	23.00S/31.00E-12cc	43.58684576	-118.95797583	5,280.00	NULL	NULL	NULL	well_report_plss	76.00	76.00	NULL	Domestic	1	0	0	0	0
HARN	52346	HARN0052346	23.00S/33.00E-33cb	43.53109171	-118.66653525	5,280.00	NULL	NULL	NULL	well_report_plss	49.00	49.00	12/31/1968	Domestic	1	0	0	0	0
HARN	52349	HARN0052349	NULL	43.37718721	-118.77410526	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	56.00	56.00	NULL	Domestic	1	0	0	0	0
HARN	52352	HARN0052352	NULL	43.42799296	-118.67902242	5,280.00	NULL	NULL	NULL	well_report_plss	39.00	39.00	NULL	Domestic	1	0	0	0	0
HARN	52355	HARN0052355	25.00S/33.00E-34aa	43.36118479	-118.63157114	5,280.00	NULL	NULL	NULL	well_report_plss	14.00	14.00	NULL	Domestic	1	0	0	0	0
HARN	52363	HARN0052363	26.00S/31.00E-1db	43.34708533	-118.95204116	5,280.00	NULL	NULL	NULL	well_report_plss	10.00	10.00	NULL	Domestic	1	0	0	0	0
HARN	52369	HARN0052369	NULL	43.30572303	-118.90351082	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	18.50	18.50	NULL	Domestic	1	0	0	0	0
HARN	52371	HARN0052371	NULL	43.28392385	-118.71068625	5,280.00	NULL	NULL	NULL	well_report_plss	59.00	59.00	NULL	Domestic	1	0	0	0	0
HARN	52374	HARN0052374	NULL	43.26949370	-118.71071080	5,280.00	NULL	NULL	NULL	well_report_plss	11.00	11.00	NULL	Domestic	1	0	0	0	0
HARN	52389	HARN0052389	27.00S/29.00E-9ab	43.24940226	-119.25046785	5,280.00	NULL	NULL	NULL	well_report_plss	43.00	43.00	NULL	Domestic	1	0	0	0	0
HARN	52390	HARN0052390	27.00S/29.00E-10ab	43.24933726	-119.23016725	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	40.00	NULL	Domestic	1	0	0	0	0
HARN	52391	HARN0052391	27.00S/29.00E-15ab	43.23463109	-119.23024877	5,280.00	NULL	NULL	NULL	well_report_plss	103.00	103.00	NULL	Domestic	1	0	0	0	0
HARN	52393	HARN0052393	NULL	43.25451582	-118.94657994	5,280.00	NULL	NULL	NULL	well_report_plss	54.00	54.00	NULL	Domestic	1	0	0	0	0
HARN	52407	HARN0052407	24.00S/30.00E-2aa	43.52541537	-119.08218832	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	200.00	12/31/1950	Domestic	1	0	0	0	0
HARN	52420	HARN0052420	25.00S/32.50E-17ba	43.40839170	-118.79533212	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	08/11/2015	Domestic	1	0	0	0	0
HARN	52422	HARN0052422	23.00S/32.00E-23dc	43.55709000	-118.86159000	0.00	NULL	NULL	NULL	owrd_field_staff	160.00	NULL	08/13/2015	Domestic	1	0	0	0	0
HARN	52425	HARN0052425	26.00S/29.00E-7ad	43.32926264	-119.28078799	5,280.00	NULL	NULL	NULL	well_report_plss	380.00	NULL	08/15/2015	Domestic	0	1	0	0	0
HARN	52427	HARN0052427	23.00S/30.00E-36ac	43.53646011	-119.07239294	99.00	NULL	NULL	NULL	exempt_use_map	70.00	NULL	08/24/2015	Domestic	1	0	0	0	0
HARN	52429	HARN0052429	26.00S/34.00E-6aa	43.34687203	-118.56662951	5,280.00	NULL	NULL	NULL	well_report_plss	223.00	NULL	08/26/2015	Domestic	0	1	0	0	0
HARN	52430	HARN0052430	27.00S/33.00E-4bb	43.26043502	-118.65928153	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	08/28/2015	Domestic	1	0	0	0	0
HARN	52433	HARN0052433	23.00S/32.00E-23dc	43.55731851	-118.85473684	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	08/16/2015	Domestic	0	1	0	0	0
HARN	52436	HARN0052436	NULL	43.24860000	-118.59411000	99.00	NULL	NULL	NULL	exempt_use_map	80.00	80.00	10/08/2015	Domestic	1	0	0	0	0
HARN	52439	HARN0052439	21.00S/30.00E-15bd	43.75240954	-119.10395865	99.00	NULL	NULL	NULL	exempt_use_map	670.00	670.00	10/09/2015	Domestic	1	0	0	0	0
HARN	52451	HARN0052451	23.00S/32.50E-15ab	43.58299000	-118.75964000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	200.00	200.00	11/18/2015	Domestic	0	1	0	0	0
HARN	52452	HARN0052452	26.00S/28.00E-36ab	43.27794000	-119.31154000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	0.00	NULL	NULL	Domestic	1	0	0	0	0
HARN	52458	HARN0052458	24.00S/32.00E-13aa	43.49569447	-118.82485909	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	11/18/2015	Domestic	1	0	0	0	0
HARN	52478	HARN0052478	24.00S/31.00E-33cc	43.44257148	-119.01894709	99.00	NULL	NULL	NULL	exempt_use_map	192.00	NULL	09/10/2015	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	52479	HARN0052479	23.00S/32.50E-11dd	43.58475860	-118.73273980	9,999.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	230.00	NULL	03/25/2016	Domestic	1	0	0	0	0
HARN	52489	HARN0052489	23.00S/31.00E-9cd	43.58678638	-119.00900659	99.00	NULL	NULL	NULL	exempt_use_map	118.00	NULL	04/06/2016	Domestic	1	0	0	0	0
HARN	52510	HARN0052510	25.00S/31.00E-6bb	43.35281000	-119.05823000	0.00	NULL	NULL	NULL	owrd_field_staff	280.00	NULL	05/13/2016	Domestic	1	0	0	0	0
HARN	52523	HARN0052523	22.00S/30.00E-10cd	43.67253970	-119.10599809	99.00	NULL	NULL	NULL	exempt_use_map	205.00	NULL	07/16/2016	Domestic	1	0	0	0	0
HARN	52528	HARN0052528	24.00S/32.00E-14bb	43.49610000	-118.85950000	99.00	NULL	NULL	NULL	exempt_use_map	260.00	NULL	07/17/2016	Domestic	1	0	0	0	0
HARN	52529	HARN0052529	23.00S/34.00E-18aa	43.57822485	-118.57155847	99.00	NULL	NULL	NULL	exempt_use_map	220.00	NULL	07/15/2016	Domestic	1	0	0	0	0
HARN	52531	HARN0052531	30.00S/33.00E-22bd	42.94837000	-118.62746000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	946.00	946.00	07/05/2016	Domestic	1	0	0	0	0
HARN	52532	HARN0052532	24.00S/32.00E-4db	43.52063400	-118.89626000	100.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	156.00	421.00	07/19/2016	Domestic	1	0	0	0	0
HARN	52544	HARN0052544	24.00S/32.00E-12bb	43.51098000	-118.83878000	100.00	OWRD	GROUNDWATER SECTION	WATER RIGHT TRANSFER MAP	owrd_groundwater_staff	440.00	440.00	08/17/2016	Domestic	1	0	0	0	0
HARN	52586	HARN0052586	25.00S/31.00E-3bd	43.43063019	-118.98772664	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	09/08/2016	Domestic	0	1	0	0	0
HARN	52588	HARN0052588	24.00S/33.00E-24bc	43.47132008	-118.60525933	99.00	NULL	NULL	NULL	exempt_use_map	170.00	NULL	07/11/2016	Domestic	1	0	0	0	0
HARN	52589	HARN0052589	23.00S/26.00E-5ca	43.60645459	-119.62420951	5,280.00	NULL	NULL	NULL	well_report_plss	302.00	NULL	07/07/2016	Domestic	1	0	0	0	0
HARN	52600	HARN0052600	24.00S/32.50E-30ba	43.46494480	-118.81649833	99.00	NULL	NULL	NULL	exempt_use_map	50.00	NULL	09/20/2016	Domestic	1	0	0	0	0
HARN	52601	HARN0052601	24.00S/33.00E-34ac	43.44064000	-118.64153000	0.00	NULL	NULL	NULL	owrd_field_staff	192.00	NULL	09/21/2016	Domestic	1	0	0	0	0
HARN	52602	HARN0052602	23.00S/31.00E-5bc	43.60469548	-119.03696660	0.06	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	261.00	261.00	09/21/2016	Domestic	1	0	0	0	0
HARN	52632	HARN0052632	24.00S/33.00E-23bb	43.47850000	-118.62890000	0.00	NULL	NULL	NULL	well_report_lat_long	210.00	NULL	03/09/2017	Domestic	1	0	0	0	0
HARN	52638	HARN0052638	23.00S/30.00E-26cb	43.55090000	-119.09950000	99.00	NULL	NULL	NULL	exempt_use_map	399.00	NULL	04/21/2017	Domestic	1	0	0	0	0
HARN	52641	HARN0052641	23.00S/31.00E-6cb	43.60842000	-119.05325000	0.00	NULL	NULL	NULL	owrd_field_staff	100.00	NULL	05/12/2017	Domestic	1	0	0	0	0
HARN	52642	HARN0052642	25.00S/31.00E-7ca	43.42169000	-119.04556000	0.00	NULL	NULL	NULL	owrd_field_staff	280.00	NULL	05/19/2017	Domestic	1	0	0	0	0
HARN	52645	HARN0052645	23.00S/32.00E-30ab	43.55431000	-118.93304000	0.00	NULL	NULL	NULL	owrd_field_staff	503.00	NULL	05/05/2017	Domestic	0	0	0	1	0
HARN	52651	HARN0052651	24.00S/33.00E-31bb	43.44787840	-118.70630710	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	06/11/2017	Domestic	1	0	0	0	0
HARN	52652	HARN0052652	22.00S/30.00E-35cc	43.61535000	-119.09509000	0.00	NULL	NULL	NULL	owrd_field_staff	357.00	NULL	05/25/2017	Domestic	1	0	0	0	0
HARN	52653	HARN0052653	22.00S/30.00E-35cc	43.61535000	-119.09509000	0.00	NULL	NULL	NULL	owrd_field_staff	280.00	NULL	05/23/2017	Domestic	0	0	0	0	1
HARN	52664	HARN0052664	29.00S/32.00E-36cd	43.00390000	-118.70900000	0.00	NULL	NULL	NULL	owrd_field_staff	205.00	NULL	07/21/2017	Domestic	1	0	0	0	0
HARN	52665	HARN0052665	23.00S/33.00E-8bc	43.58530863	-118.68640636	5,280.00	NULL	NULL	NULL	well_report_plss	302.00	NULL	07/25/2017	Domestic	1	0	0	0	0
HARN	52671	HARN0052671	24.00S/32.00E-11ac	43.50461622	-118.85513690	100.00	USGS	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	97.50	97.50	08/08/2017	Domestic	1	0	0	0	0
HARN	52672	HARN0052672	24.00S/32.00E-9aa	43.50992000	-118.88308000	0.00	NULL	NULL	NULL	owrd_field_staff	217.00	NULL	08/17/2017	Domestic	1	0	0	0	0
HARN	52673	HARN0052673	33.00S/32.00E-30cd	42.67515000	-118.76593000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	115.00	115.00	07/28/2017	Domestic	1	0	0	0	0
HARN	52678	HARN0052678	24.00S/32.00E-12cb	43.50746000	-118.83803000	0.00	NULL	NULL	NULL	owrd_field_staff	100.00	NULL	09/11/2017	Domestic	1	0	0	0	0
HARN	52679	HARN0052679	22.00S/32.50E-25db	43.63824000	-118.72204000	0.00	NULL	NULL	NULL	owrd_field_staff	220.00	NULL	09/20/2017	Domestic	1	0	0	0	0
HARN	52682	HARN0052682	22.00S/30.00E-25cc	43.63024000	-119.07832000	0.00	NULL	NULL	NULL	owrd_field_staff	60.00	NULL	10/20/2017	Domestic	1	0	0	0	0
HARN	52714	HARN0052714	24.00S/32.50E-17bb	43.49556190	-118.80491365	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	65.00	04/10/2018	Domestic	1	0	0	0	0
HARN	52723	HARN0052723	25.00S/31.00E-28bb	43.37934000	-119.01656000	0.00	NULL	NULL	NULL	well_report_lat_long	200.00	NULL	05/23/2018	Domestic	1	0	0	0	1
HARN	52726	HARN0052726	23.00S/27.00E-6cc	43.59946566	-119.53427994	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	06/28/2018	Domestic	1	0	0	0	0
HARN	52730	HARN0052730	29.00S/32.00E-36da	43.01050678	-118.70346066	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	07/12/2018	Domestic	1	0	0	0	0
HARN	52734	HARN0052734	25.00S/31.00E-28bb	43.37912000	-119.01599000	0.00	NULL	NULL	NULL	well_report_lat_long	560.00	NULL	07/30/2018	Domestic	1	0	0	0	0
HARN	52735	HARN0052735	22.00S/32.00E-36ca	43.62400000	-118.82880000	99.00	NULL	NULL	NULL	exempt_use_map	203.00	NULL	08/01/2018	Domestic	1	0	0	0	0
HARN	52736	HARN0052736	22.00S/29.00E-36ca	43.62283772	-119.18463005	99.00	NULL	NULL	NULL	well_report_lat_long	521.00	NULL	08/06/2018	Domestic	1	0	0	0	0
HARN	52737	HARN0052737	23.00S/32.00E-18cc	43.57175774	-118.93872201	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	08/23/2018	Domestic	0	0	0	1	0
HARN	52738	HARN0052738	23.00S/31.00E-24aa	43.56936700	-118.94154000	0.00	NULL	NULL	NULL	well_report_lat_long	70.00	NULL	08/10/2018	Domestic	0	0	0	0	1
HARN	52741	HARN0052741	22.00S/31.00E-33ac	43.62105179	-119.01358005	99.00	NULL	NULL	NULL	exempt_use_map	125.00	NULL	08/30/2018	Domestic	1	0	0	0	0
HARN	52742	HARN0052742	23.00S/32.00E-20dd	43.55777361	-118.90481565	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	09/21/2018	Domestic	1	0	0	0	0
HARN	52750	HARN0052750	23.00S/32.00E-29bb	43.55379267	-118.91985243	99.00	NULL	NULL	NULL	exempt_use_map	220.00	NULL	11/04/2018	Domestic	1	0	0	0	0
HARN	52753	HARN0052753	26.00S/30.00E-2db	43.34735781	-119.09126723	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	10/23/2018	Domestic	1	0	0	0	0
HARN	52781	HARN0052781	24.00S/31.00E-5ad	43.51821000	-119.02195000	0.00	NULL	NULL	NULL	owrd_field_staff	170.00	170.00	04/16/2019	Domestic	1	0	0	0	0
HARN	52787	HARN0052787	24.00S/33.00E-31ad	43.44008000	-118.69141000	0.00	NULL	NULL	NULL	owrd_field_staff	98.00	NULL	05/02/2019	Domestic	1	0	0	0	0
HARN	52793	HARN0052793	23.00S/33.00E-35da	43.52920000	-118.61390000	99.00	NULL	NULL	NULL	exempt_use_map	180.00	NULL	06/18/2019	Domestic	1	0	0	0	0
HARN	52798	HARN0052798	23.00S/32.00E-32bd	43.53195537	-118.91006317	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	06/26/2019	Domestic	1	0	0	0	0
HARN	52806	HARN0052806	24.00S/33.00E-33cc	43.43703782	-118.66665521	5,280.00	NULL	NULL	NULL	well_report_plss	304.00	NULL	07/17/2019	Domestic	1	0	0	0	0
HARN	52809	HARN0052809	22.00S/30.00E-31bd	43.61897556	-119.16567339	5,280.00	NULL	NULL	NULL	well_report_plss	600.00	NULL	07/05/2019	Domestic	1	0	0	0	0
HARN	52810	HARN0052810	24.00S/32.50E-6db	43.52102608	-118.81999875	5,280.00	NULL	NULL	NULL	well_report_plss	123.00	NULL	07/26/2019	Domestic	1	0	0	0	0
HARN	52813	HARN0052813	23.00S/33.00E-24dc	43.55180000	-118.60290000	99.00	NULL	NULL	NULL	exempt_use_map	109.00	NULL	07/31/2019	Domestic	1	0	0	0	0
MALH	2322	MALH0002322	26.00S/29.00E-7ad	43.33008000	-119.27848000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	85.00	85.00	09/03/1981	Domestic	1	0	0	0	0

Appendix A4:

Table listing rural domestic wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
															Well Work Done				
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	New Well	Deepen Well	Convert Well	Alter Well	Abandon Well

Notes:
The well locations listed are the best location available for each well listed as of September 2019
This table includes a duplicate OWRD well identification entry with a different latitude-longitude location for the following wells: HARN 50171, HARN 50915, and HARN 51287
Entry Possible for Multiple Columns
NULL: nothing entered and/or not known, applies to multiple columns
OTH or OTHER: not identified, applies to Latitude-Longitude Method and Well Primary Use columns
UNKNOWN: not known, applies to multiple columns
Entry Possible for Horizontal Error
0.00 to 9,999.00 feet
9,999.00 is an entry flag indicating the horizontal error is unknown and/or is likely very large
Entry Possible for Location Origin
ODEQ: Oregon Department of Environmental Quality
OTH or OTHER: not identified
OWRD: Oregon Water Resources Department
USGS: U.S. Geological Survey
Entry Possible for Location Source at OWRD
FIELD SERVICES SECTION: well location determined at OWRD by Field Service reviews and/or projects and/or field work
GROUNDWATER SECTION: well location determined at OWRD by Groundwater Section reviews and/or projects and/or field work
WATER RIGHT: well location determined at OWRD using information within water right materials filed and/or recorded
WELL LOG: well location determined at OWRD using information within water well report filed and/or recorded
Entry Possible for Latitude-Longitude Method
1:125,000 MAP: well location determined using a 1:125,000 scale map
1:62,500 MAP: well location determined using a 1:62,500 scale map
1:24,000 MAP: well location determined using a 1:24,000 scale map
MAP SCALE UNKNOWN: well location determined using a map of an unknown, uncertain, and/or undetermined scale
GPS: well location determined in the field at the well site using an unspecified Global Position System (GPS) unit
GPS FIELD OFFICE: well location determined in the field at the well site by OWRD field sevices staff using available GPS capabilities
GPS IPAD: well location determined in the field at the well site using the GPS capabilities within an Apple i-Pad unit
GPS SURVEY GRADE: well location determined in the field at the well site using a survey grade GPS unit
WATER RIGHT APPLICATION MAP: well location determined at OWRD using information on a map accompanying a water right application
WATER RIGHT FINAL PROOF MAP: well location determined at OWRD using information on a final proof map accompanying documents to "prove" a water right eligible to receive a certificate
WATER RIGHT TRANSFER MAP: well location determined at OWRD using information on a map accompanying a water right transfer application
WATER RIGHT UNKNOWN SOURCE: well location determined at OWRD using unidentified information within water right materials filed and/or recorded
WELL LOG AND IMAGERY: well location determined at OWRD using GPS and/or PLS location information on a water well report along with aerial and/or satellite imagery (often georeferenced) to see and establish the well location
Entry Possible for Latitude-Longitude Method Comment
exempt_use_map: the well location was determined from an exempt use map submitted to owrd documenting a non-water right well location on a map that can vary in quality and accuracy
owrd_field_staff: owrd field staff determined the well location
owrd_groundwater_staff: owrd groundwater staff determined the well location
well_report_lat_long: well location latitude-longitude is from latitude-longitude recorded on the water well report
well_report_plss: well location latitude-longitude is the center of the center of the smallest public land survey system (Township/Range-Section quarter-quarter-quarter) acreage tract reported
Notes for Well Work Done:
Abandon Well: water well report (well log) listed documents the abandonment of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Alter Well: water well report (well log) listed documents the alteration of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Convert Well: water well report (well log) listed documents the conversion of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Deepen Well: water well report (well log) listed documents the deepening of an existing well (1 = box on report form checked, 0 = box on report form not checked)
New Well: water well report (well log) listed documents the construction of a new well (1 = box on report form checked, 0 = box on report form not checked)
Data Sources:
Oregon Water Resources Department 2019a, 2019f

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
GRAN	4	GRAN0000004	16.00S/31.00E-8cd	44.19393508	-119.02432876	5,280.00	NULL	NULL	NULL	well_report_plss	81.00	NULL	07/25/1990	Livestock	1	0	0	0	0
GRAN	6	GRAN0000006	16.00S/30.00E-25aa	44.16120915	-119.05970370	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	08/01/1990	Livestock	1	0	0	0	0
GRAN	443	GRAN0000443	16.00S/31.00E-16ba	44.19025596	-119.00414035	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	09/09/1992	Livestock	1	0	0	0	0
GRAN	470	GRAN0000470	16.00S/31.00E-28ca	44.15752660	-119.00416109	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	09/14/1992	Livestock	1	0	0	0	0
GRAN	777	GRAN0000777	16.00S/30.00E-3cd	44.20850865	-119.10513586	5,280.00	NULL	NULL	NULL	well_report_plss	330.00	NULL	10/07/1967	Livestock	1	0	0	0	0
GRAN	838	GRAN0000838	17.00S/31.00E-9cc	44.10669373	-119.01438992	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	08/20/1994	Livestock	1	0	0	0	0
GRAN	839	GRAN0000839	16.00S/31.00E-34cb	44.14296767	-118.99405106	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	08/23/1994	Livestock	1	0	0	0	0
GRAN	888	GRAN0000888	17.00S/31.00E-4bd	44.12481142	-119.00428595	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	09/15/1995	Livestock	1	0	0	0	0
GRAN	50297	GRAN0050297	17.00S/31.00E-3ca	44.12840705	-118.98415846	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	03/16/2000	Livestock	1	0	0	0	0
GRAN	50456	GRAN0050456	16.00S/31.00E-27ba	44.16116986	-118.98390848	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	08/03/2001	Livestock	1	0	0	0	0
GRAN	50833	GRAN0050833	17.00S/31.00E-21bb	44.08857344	-119.01447063	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	10/16/2006	Livestock	1	0	0	0	0
GRAN	50940	GRAN0050940	17.00S/31.00E-22bb	44.08863471	-118.99439583	5,280.00	NULL	NULL	NULL	well_report_plss	103.00	NULL	07/10/2008	Livestock	1	0	0	0	0
GRAN	50951	GRAN0050951	16.00S/31.00E-19aa	44.17576960	-119.03949917	5,280.00	NULL	NULL	NULL	well_report_plss	103.00	NULL	10/15/2008	Livestock	1	0	0	0	0
GRAN	50973	GRAN0050973	18.00S/32.00E-7ab	44.03110582	-118.93026056	5,280.00	NULL	NULL	NULL	well_report_plss	260.00	NULL	03/27/2009	Livestock	1	0	0	0	0
GRAN	51010	GRAN0051010	17.00S/31.00E-12bb	44.11813353	-118.95807068	99.00	NULL	NULL	NULL	exempt_use_map	360.00	NULL	09/11/2009	Livestock	1	0	0	0	0
GRAN	51012	GRAN0051012	17.00S/31.00E-12bb	44.11944000	-118.95937000	17.90	NULL	NULL	NULL	owrd_field_staff	125.00	NULL	10/02/2009	Livestock	1	0	0	0	0
GRAN	51042	GRAN0051042	18.00S/31.00E-24db	43.99840567	-118.94862605	5,280.00	NULL	NULL	NULL	well_report_plss	203.00	NULL	09/23/2010	Livestock	1	0	0	0	0
GRAN	51139	GRAN0051139	18.00S/31.00E-12ac	44.01834778	-118.94539825	99.00	NULL	NULL	NULL	exempt_use_map	145.00	NULL	09/18/2012	Livestock	1	0	0	0	0
GRAN	51171	GRAN0051171	16.00S/32.00E-27dd	44.14873355	-118.85774104	99.00	NULL	NULL	NULL	exempt_use_map	285.00	NULL	12/11/2013	Livestock	1	0	0	0	0
GRAN	51172	GRAN0051172	16.00S/31.00E-26ba	44.16271000	-118.96140000	15.90	NULL	NULL	NULL	owrd_field_staff	303.00	NULL	02/02/2014	Livestock	1	0	0	0	0
GRAN	51192	GRAN0051192	16.00S/30.00E-27dd	44.14865824	-119.10184865	99.00	NULL	NULL	NULL	exempt_use_map	204.00	204.00	09/30/2014	Livestock	1	0	0	0	0
GRAN	51261	GRAN0051261	16.00S/31.00E-36cc	44.13394371	-118.95349148	99.00	NULL	NULL	NULL	exempt_use_map	400.00	NULL	12/04/2015	Livestock	1	0	0	0	0
GRAN	51266	GRAN0051266	16.00S/31.00E-7cc	44.19392502	-119.05462450	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	12/09/2015	Livestock	1	0	0	0	0
GRAN	51267	GRAN0051267	17.00S/31.00E-16da	44.09779288	-119.00526963	99.00	NULL	NULL	NULL	exempt_use_map	220.00	NULL	12/14/2015	Livestock	1	0	0	0	0
GRAN	51268	GRAN0051268	17.00S/31.00E-3aa	44.12982904	-118.98528597	99.00	NULL	NULL	NULL	exempt_use_map	218.00	NULL	01/07/2016	Livestock	1	0	0	0	0
GRAN	51270	GRAN0051270	17.00S/31.00E-14cc	44.09229991	-118.97433721	5,280.00	NULL	NULL	NULL	well_report_plss	324.00	NULL	03/17/2016	Livestock	1	0	0	0	0
GRAN	51323	GRAN0051323	16.00S/31.00E-19aa	44.17576960	-119.03949917	5,280.00	NULL	NULL	NULL	well_report_plss	183.00	NULL	03/08/2018	Livestock	0	1	0	0	0
GRAN	51337	GRAN0051337	17.00S/31.00E-27bd	44.06518000	-118.98310000	0.00	NULL	NULL	NULL	owrd_field_staff	305.00	NULL	06/28/2018	Livestock	1	0	0	0	0
GRAN	51344	GRAN0051344	16.00S/31.00E-22ab	44.17720000	-118.99030000	99.00	NULL	NULL	NULL	exempt_use_map	435.00	435.00	12/28/2018	Livestock	1	0	0	0	0
GRAN	51345	GRAN0051345	16.00S/31.00E-21aa	44.17726279	-118.99967155	99.00	NULL	NULL	NULL	exempt_use_map	700.00	NULL	12/27/2018	Livestock	1	0	0	0	0
HARN	5	HARN0000005	23.00S/31.00E-9bd	43.59108131	-119.00772663	5,280.00	NULL	NULL	NULL	well_report_plss	52.00	NULL	04/05/1990	Livestock	1	0	0	0	0
HARN	54	HARN0000054	21.00S/30.00E-10dd	43.76186872	-119.10093993	5,280.00	NULL	NULL	NULL	well_report_plss	350.00	NULL	07/21/1963	Livestock	1	0	0	0	0
HARN	62	HARN0000062	22.00S/26.00E-6bb	43.69633908	-119.65417596	5,280.00	NULL	NULL	NULL	well_report_plss	35.00	NULL	10/24/1961	Livestock	1	0	0	0	0
HARN	64	HARN0000064	22.00S/26.00E-17bb	43.66804796	-119.63447011	5,280.00	NULL	NULL	NULL	well_report_plss	25.00	NULL	10/25/1961	Livestock	1	0	0	0	0
HARN	65	HARN0000065	22.00S/26.00E-29dc	43.62838098	-119.62918815	5,280.00	NULL	NULL	NULL	well_report_plss	350.00	NULL	07/23/1989	Livestock	1	0	0	0	0
HARN	67	HARN0000067	22.00S/26.00E-30ad	43.63014630	-119.64412630	500.00	USGS	GROUNDWATER SECTION	1:62,500 MAP	owrd_groundwater_staff	98.00	100.00	10/26/1968	Livestock	1	0	0	0	0
HARN	68	HARN0000068	22.00S/26.00E-35cc	43.61376054	-119.57417817	5,280.00	NULL	NULL	NULL	well_report_plss	260.00	NULL	08/15/1989	Livestock	1	0	0	0	0
HARN	69	HARN0000069	22.00S/29.00E-34bb	43.62613227	-119.23537857	5,280.00	NULL	NULL	NULL	well_report_plss	267.00	NULL	08/04/1968	Livestock	1	0	0	0	0
HARN	102	HARN0000102	22.00S/31.00E-27cb	43.63772015	-118.99755857	5,280.00	NULL	NULL	NULL	well_report_plss	10.00	10.00	NULL	Livestock	1	0	0	0	0
HARN	117	HARN0000117	22.00S/31.00E-32bb	43.62685333	-119.03749136	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	07/01/1963	Livestock	1	0	0	0	0
HARN	125	HARN0000125	22.00S/31.00E-33cc	43.61588685	-119.01754677	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	01/28/1960	Livestock	1	0	0	0	0
HARN	137	HARN0000137	22.00S/31.00E-34ca	43.62323291	-118.98758393	5,280.00	NULL	NULL	NULL	well_report_plss	9.00	9.00	NULL	Livestock	1	0	0	0	0
HARN	139	HARN0000139	22.00S/31.00E-35cc	43.61601466	-118.97766705	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	01/24/1961	Livestock	1	0	0	0	0
HARN	140	HARN0000140	22.00S/31.00E-35dc	43.61602762	-118.97268797	5,280.00	NULL	NULL	NULL	well_report_plss	141.00	NULL	03/29/1963	Livestock	1	0	0	0	0
HARN	145	HARN0000145	22.00S/31.00E-36ab	43.62699274	-118.95282411	5,280.00	NULL	NULL	NULL	well_report_plss	36.00	36.00	NULL	Livestock	1	0	0	0	0
HARN	173	HARN0000173	22.00S/32.00E-31dc	43.61596945	-118.93434309	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	01/26/1960	Livestock	1	0	0	0	0
HARN	190	HARN0000190	22.00S/32.50E-13ac	43.66201084	-118.72071096	5,280.00	NULL	NULL	NULL	well_report_plss	195.00	NULL	08/29/1968	Livestock	1	0	0	0	0
HARN	197	HARN0000197	22.00S/32.50E-25dd	43.62947105	-118.71075960	5,280.00	NULL	NULL	NULL	well_report_plss	122.00	NULL	09/09/1968	Livestock	1	0	0	0	0
HARN	220	HARN0000220	22.00S/33.00E-27ca	43.63227210	-118.63615443	5,280.00	NULL	NULL	NULL	well_report_plss	338.00	NULL	11/10/1961	Livestock	1	0	0	0	0
HARN	224	HARN0000224	22.00S/33.00E-31aa	43.62305000	-118.68858000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	225.00	225.00	10/18/1961	Livestock	1	0	0	0	0
HARN	225	HARN0000225	22.00S/33.00E-31dd	43.61237740	-118.68951540	0.00	NULL	NULL	NULL	well_report_lat_long	140.00	NULL	10/29/1961	Livestock	1	0	0	0	0
HARN	230	HARN0000230	22.00S/33.00E-34bb	43.62220795	-118.64765327	500.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	167.00	167.00	12/29/1961	Livestock	1	0	0	0	0
HARN	232	HARN0000232	22.00S/34.00E-20ab	43.65195320	-118.56628033	250.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	134.00	134.00	09/11/1968	Livestock	1	0	0	0	0
HARN	234	HARN0000234	23.00S/25.00E-30dc	43.54249971	-119.77024622	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	08/20/1968	Livestock	1	0	0	0	0
HARN	238	HARN0000238	23.00S/26.00E-5bb	43.61024000	-119.63099200	250.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	133.00	141.00	11/06/1973	Livestock	1	0	0	0	0
HARN	239	HARN0000239	23.00S/26.00E-5cd	43.59920748	-119.62417809	5,280.00	NULL	NULL	NULL	well_report_plss	138.00	NULL	11/10/1973	Livestock	0	1	0	0	0
HARN	240	HARN0000240	23.00S/26.00E-5cd	43.59920748	-119.62417809	5,280.00	NULL	NULL	NULL	well_report_plss	201.00	NULL	11/08/1973	Livestock	1	0	0	0	0
HARN	241	HARN0000241	23.00S/26.00E-7da	43.59194046	-119.63928434	5,280.00	NULL	NULL	NULL	well_report_plss	30.00	NULL	10/09/1987	Livestock	1	0	0	0	0
HARN	242	HARN0000242	23.00S/26.00E-8bb	43.59556942	-119.63420567	5,280.00	NULL	NULL	NULL	well_report_plss	180.00	NULL	02/01/1969	Livestock	1	0	0	0	0
HARN	247	HARN0000247	23.00S/26.00E-21ba	43.56661207	-119.60375858	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	10/20/1968	Livestock	1	0	0	0	0
HARN	248	HARN0000248	23.00S/26.00E-23dc	43.55459300	-119.55940000	500.00	OWRD	GROUNDWATER SECTION	1:62,500 MAP	owrd_groundwater_staff	80.00	80.00	10/05/1968	Livestock	1	0	0	0	0
HARN	255	HARN0000255	23.00S/26.00E-30cc	43.52417602	-119.59359650	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	242.00	247.00	08/30/1957	Livestock	1	0	0	0	0
HARN	262	HARN0000262	23.00S/27.00E-27ab	43.55233756	-119.46883975	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	10/02/1987	Livestock	1	0	0	0	0
HARN	266	HARN0000266	23.00S/27.00E-29ba	43.55117312	-119.50792991	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	170.00	170.00	12/22/1976	Livestock	1	0	0	0	0
HARN	272	HARN0000272	23.00S/27.00E-30ba	43.55227827	-119.52432829	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	01/13/1977	Livestock	1	0	0	0	0
HARN	275	HARN0000275	23.00S/27.00E-34ac	43.53146328	-119.47010048	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	07/17/1989	Livestock	1	0	0	0	0
HARN	331	HARN0000331	NULL	43.60698692	-118.97023430	5,280.00	NULL	NULL	NULL	well_report_plss	350.00	350.00	NULL	Livestock	1	0	0	0	0
HARN	363	HARN0000363	23.00S/31.00E-5cc	43.60187981	-119.03784020	5,280.00	NULL	NULL	NULL	well_report_plss	12.00	12.00	NULL	Livestock	1	0	0	0	0
HARN	411	HARN0000411	23.00S/31.00E-9dd	43.58531496	-119.00121762	450.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	12.00	12.00	06/07/1932	Livestock	1	0	0	0	0
HARN	412	HARN0000412	27.00S/30.00E-1ca	43.25635571	-118.94409174	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	03/01/1990	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	417	HARN0000417	23.00S/31.00E-10ab	43.59815862	-118.99270974	5,280.00	NULL	NULL	NULL	well_report_plss	13.00	13.00	NULL	Livestock	1	0	0	0	0
HARN	433	HARN0000433	NULL	43.59254388	-118.97032352	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	05/15/1967	Livestock	1	0	0	0	0
HARN	446	HARN0000446	23.00S/31.00E-13ab	43.58309277	-118.95305606	5,280.00	NULL	NULL	NULL	well_report_plss	16.00	16.00	09/13/1930	Livestock	1	0	0	0	0
HARN	454	HARN0000454	23.00S/31.00E-14ab	43.58402228	-118.97424744	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	28.00	28.00	08/09/1930	Livestock	1	0	0	0	0
HARN	456	HARN0000456	23.00S/31.00E-14ab	43.58346854	-118.97288567	5,280.00	NULL	NULL	NULL	well_report_plss	108.00	NULL	03/11/1962	Livestock	1	0	0	0	0
HARN	457	HARN0000457	23.00S/31.00E-14ac	43.57582796	-118.97295166	5,280.00	NULL	NULL	NULL	well_report_plss	88.00	NULL	08/14/1964	Livestock	1	0	0	0	0
HARN	476	HARN0000476	NULL	43.57830150	-119.04996355	5,280.00	NULL	NULL	NULL	well_report_plss	13.00	13.00	NULL	Livestock	1	0	0	0	0
HARN	499	HARN0000499	23.00S/31.00E-23dd	43.55686519	-118.96401238	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	56.00	55.50	10/26/1931	Livestock	1	0	0	0	0
HARN	504	HARN0000504	23.00S/31.00E-24aa	43.56800005	-118.94313394	5,280.00	NULL	NULL	NULL	well_report_plss	78.00	78.00	NULL	Livestock	1	0	0	0	0
HARN	505	HARN0000505	23.00S/31.00E-24db	43.56439969	-118.95310603	5,280.00	NULL	NULL	NULL	well_report_plss	11.00	10.50	NULL	Livestock	1	0	0	0	0
HARN	511	HARN0000511	23.00S/31.00E-28bb	43.55586661	-119.01871850	500.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	45.00	45.00	08/13/1930	Livestock	1	0	0	0	0
HARN	518	HARN0000518	23.00S/31.00E-32ba	43.54014413	-119.02743208	5,280.00	NULL	NULL	NULL	well_report_plss	295.00	295.00	NULL	Livestock	1	0	0	0	0
HARN	545	HARN0000545	23.00S/32.00E-6bc	43.60507175	-118.93862879	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	01/25/1961	Livestock	1	0	0	0	0
HARN	552	HARN0000552	23.00S/32.00E-8da	43.59392490	-118.90460979	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	12/30/1968	Livestock	1	0	0	0	0
HARN	575	HARN0000575	23.00S/32.00E-18cb	43.57923452	-118.93871457	5,280.00	NULL	NULL	NULL	well_report_plss	24.00	NULL	05/13/1932	Livestock	1	0	0	0	0
HARN	582	HARN0000582	23.00S/32.00E-20bb	43.56860900	-118.91989147	5,280.00	NULL	NULL	NULL	well_report_plss	15.00	15.00	08/14/1930	Livestock	1	0	0	0	0
HARN	586	HARN0000586	23.00S/32.00E-20dd	43.55777361	-118.90481565	5,280.00	NULL	NULL	NULL	well_report_plss	13.00	12.50	NULL	Livestock	1	0	0	0	0
HARN	588	HARN0000588	23.00S/32.00E-21bb	43.56871723	-118.89979919	5,280.00	NULL	NULL	NULL	well_report_plss	13.00	12.50	NULL	Livestock	1	0	0	0	0
HARN	589	HARN0000589	23.00S/32.00E-22aa	43.56827245	-118.86470302	5,280.00	NULL	NULL	NULL	well_report_plss	20.00	20.00	NULL	Livestock	1	0	0	0	0
HARN	594	HARN0000594	23.00S/32.00E-28aa	43.55404120	-118.88478652	5,280.00	NULL	NULL	NULL	well_report_plss	12.00	12.00	NULL	Livestock	1	0	0	0	0
HARN	627	HARN0000627	23.00S/32.50E-2bb	43.61220777	-118.74586090	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	15.00	15.00	10/06/1930	Livestock	1	0	0	0	0
HARN	638	HARN0000638	NULL	43.60610310	-118.81506846	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	15.00	NULL	Livestock	1	0	0	0	0
HARN	654	HARN0000654	23.00S/32.50E-20cc	43.55722999	-118.80551746	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	08/07/1988	Livestock	1	0	0	0	0
HARN	660	HARN0000660	NULL	43.53371493	-118.81510239	5,280.00	NULL	NULL	NULL	well_report_plss	52.00	52.00	09/05/1931	Livestock	1	0	0	0	0
HARN	663	HARN0000663	23.00S/32.50E-32da	43.53545118	-118.79057242	5,280.00	NULL	NULL	NULL	well_report_plss	21.00	21.00	NULL	Livestock	1	0	0	0	0
HARN	667	HARN0000667	23.00S/32.50E-35ab	43.53891935	-118.74079220	5,280.00	NULL	NULL	NULL	well_report_plss	20.00	20.00	05/31/1932	Livestock	1	0	0	0	0
HARN	668	HARN0000668	23.00S/32.50E-36ac	43.53161244	-118.72088403	5,280.00	NULL	NULL	NULL	well_report_plss	22.00	22.00	NULL	Livestock	1	0	0	0	0
HARN	670	HARN0000670	23.00S/33.00E-3cd	43.59457431	-118.63779457	200.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	12.00	11.50	10/06/1930	Livestock	1	0	0	0	0
HARN	676	HARN0000676	NULL	43.60157938	-118.69862335	5,280.00	NULL	NULL	NULL	well_report_plss	18.00	18.00	NULL	Livestock	1	0	0	0	0
HARN	684	HARN0000684	23.00S/33.00E-12ad	43.58609212	-118.59316849	400.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	80.00	80.00	12/04/1969	Livestock	1	0	0	0	0
HARN	694	HARN0000694	23.00S/33.00E-22ac	43.55787227	-118.64168850	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	19.00	18.50	10/06/1930	Livestock	1	0	0	0	0
HARN	708	HARN0000708	23.00S/33.00E-33ab	43.53469685	-118.66154886	5,280.00	NULL	NULL	NULL	well_report_plss	16.00	16.00	12/31/1932	Livestock	1	0	0	0	0
HARN	745	HARN0000745	24.00S/25.00E-29ba	43.46563700	-119.74404600	50.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	662.00	NULL	02/10/1988	Livestock	1	0	0	0	0
HARN	746	HARN0000746	24.00S/25.00E-27ca	43.46384300	-119.70359800	50.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	625.00	NULL	03/18/1988	Livestock	1	0	0	0	0
HARN	747	HARN0000747	24.00S/25.00E-24ab	43.47977800	-119.66692900	50.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	675.00	NULL	03/15/1988	Livestock	1	0	0	0	0
HARN	751	HARN0000751	24.00S/27.00E-3aa	43.52576192	-119.45927920	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	110.00	110.00	03/07/1988	Livestock	1	0	0	0	0
HARN	754	HARN0000754	24.00S/27.00E-11db	43.50597422	-119.44793900	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	75.00	75.00	10/18/1989	Livestock	1	0	0	0	0
HARN	762	HARN0000762	24.00S/27.00E-22ab	43.48236000	-119.46914000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	88.00	88.00	06/28/1989	Livestock	1	0	0	0	0
HARN	793	HARN0000793	NULL	43.52473700	-119.07920400	600.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	60.00	60.00	NULL	Livestock	1	0	0	0	0
HARN	809	HARN0000809	24.00S/30.00E-4cc	43.51450344	-119.13674302	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	04/27/1965	Livestock	1	0	0	0	0
HARN	811	HARN0000811	24.00S/30.00E-6cc	43.51285000	-119.17932000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	263.00	263.00	08/25/1976	Livestock	1	0	0	0	0
HARN	825	HARN0000825	24.00S/30.00E-12dc	43.49983505	-119.07173254	5,280.00	NULL	NULL	NULL	well_report_plss	597.00	NULL	11/30/1968	Livestock	1	0	0	0	0
HARN	826	HARN0000826	24.00S/30.00E-12bc	43.50358914	-119.07676168	5,280.00	NULL	NULL	NULL	well_report_plss	118.00	NULL	09/30/1966	Livestock	1	0	0	0	0
HARN	832	HARN0000832	24.00S/30.00E-17bb	43.49608483	-119.15695432	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	06/08/1967	Livestock	1	0	0	0	0
HARN	838	HARN0000838	24.00S/30.00E-18aa	43.49605615	-119.16196706	5,280.00	NULL	NULL	NULL	well_report_plss	33.00	33.00	05/28/1932	Livestock	1	0	0	0	0
HARN	846	HARN0000846	NULL	43.51896239	-118.97068004	5,280.00	NULL	NULL	NULL	well_report_plss	61.00	60.50	NULL	Livestock	1	0	0	0	0
HARN	847	HARN0000847	24.00S/31.00E-4ba	43.52485256	-119.00774703	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	08/21/1986	Livestock	1	0	0	0	0
HARN	854	HARN0000854	24.00S/31.00E-6dd	43.51383673	-119.04215561	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	11/02/1987	Livestock	1	0	0	0	0
HARN	856	HARN0000856	24.00S/31.00E-6cd	43.51401302	-119.04711303	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	10.00	NULL	Livestock	1	0	0	0	0
HARN	857	HARN0000857	24.00S/31.00E-7da	43.50656645	-119.04208033	5,280.00	NULL	NULL	NULL	well_report_plss	73.00	NULL	02/11/1981	Livestock	1	0	0	0	0
HARN	862	HARN0000862	24.00S/31.00E-9cd	43.49897479	-119.00798546	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	10/22/1983	Livestock	1	0	0	0	0
HARN	864	HARN0000864	24.00S/31.00E-9cb	43.50630105	-119.01781580	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	42.00	NULL	Livestock	1	0	0	0	0
HARN	865	HARN0000865	24.00S/31.00E-10dc	43.49881700	-118.99314282	5,280.00	NULL	NULL	NULL	well_report_plss	11.00	11.00	09/08/1931	Livestock	1	0	0	0	0
HARN	866	HARN0000866	24.00S/31.00E-12ab	43.50985124	-118.95326250	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	09/27/1966	Livestock	1	0	0	0	0
HARN	867	HARN0000867	24.00S/31.00E-12cc	43.49763194	-118.96065148	250.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	11.00	11.00	09/04/1930	Livestock	1	0	0	0	0
HARN	870	HARN0000870	24.00S/31.00E-20ad	43.47284342	-119.02103462	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	53.00	53.00	09/02/1930	Livestock	1	0	0	0	0
HARN	922	HARN0000922	24.00S/32.00E-12da	43.50656447	-118.82482136	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	40.00	NULL	Livestock	1	0	0	0	0
HARN	930	HARN0000930	24.00S/32.00E-22dd	43.47035872	-118.86491835	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	04/25/1963	Livestock	1	0	0	0	0
HARN	932	HARN0000932	24.00S/32.00E-23dc	43.47035398	-118.85494640	5,280.00	NULL	NULL	NULL	well_report_plss	46.00	46.00	08/11/1931	Livestock	1	0	0	0	0
HARN	936	HARN0000936	24.00S/32.00E-26dc	43.45579249	-118.85486231	5,280.00	NULL	NULL	NULL	well_report_plss	16.00	NULL	05/31/1932	Livestock	1	0	0	0	0
HARN	941	HARN0000941	24.00S/32.00E-31da	43.44850496	-118.92387404	5,280.00	NULL	NULL	NULL	well_report_plss	12.00	NULL	09/04/1931	Livestock	1	0	0	0	0
HARN	947	HARN0000947	24.00S/32.50E-7bd	43.50283756	-118.81495063	5,280.00	NULL	NULL	NULL	well_report_plss	41.00	41.00	05/13/1932	Livestock	1	0	0	0	0
HARN	997	HARN0000997	24.00S/33.00E-13ba	43.49129079	-118.59691520	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	04/16/1978	Livestock	1	0	0	0	0
HARN	1032	HARN0001032	NULL	43.45705773	-118.59945580	5,280.00	NULL	NULL	NULL	well_report_plss	135.00	NULL	11/11/1988	Livestock	0	1	0	0	0
HARN	1049	HARN0001049	24.00S/33.00E-36bd	43.44084515	-118.59697030	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	05/11/1989	Livestock	1	0	0	0	0
HARN	1057	HARN0001057	24.00S/34.00E-18aa	43.49130242	-118.57231069	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	12/02/1976	Livestock	1	0	0	0	0
HARN	1064	HARN0001064	24.00S/34.00E-30ba	43.46253302	-118.57710353	5,280.00	NULL	NULL	NULL	well_report_plss	16.00	16.00	NULL	Livestock	1	0	0	0	0
HARN	1075	HARN0001075	25.00S/24.00E-13bd	43.39634000	-119.79159000	11.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	507.00	507.00	11/20/1989	Livestock	1	0	0	0	0
HARN	1081	HARN0001081	25.00S/28.00E-25ac	43.37261263	-119.30998839	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	10/12/1988	Livestock	1	0	0	0	0
HARN	1109	HARN0001109	25.00S/31.00E-6da	43.43376646	-119.04240711	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	07/05/1986	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	1110	HARN0001110	25.00S/31.00E-6da	43.43376646	-119.04240711	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	07/15/1981	Livestock	0	0	0	1	0
HARN	1119	HARN0001119	25.00S/31.00E-9dc	43.41358336	-119.01143333	300.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	105.00	105.00	05/26/1931	Livestock	1	0	0	0	0
HARN	1155	HARN0001155	25.00S/31.00E-30dd	43.36926229	-119.04196578	5,280.00	NULL	NULL	NULL	well_report_plss	107.00	107.00	NULL	Livestock	1	0	0	0	0
HARN	1162	HARN0001162	NULL	43.43210588	-118.85234193	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	150.00	NULL	Livestock	1	0	0	0	0
HARN	1164	HARN0001164	25.00S/32.00E-2aa	43.43617539	-118.84613569	400.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	43.00	43.00	10/09/1930	Livestock	1	0	0	0	0
HARN	1166	HARN0001166	25.00S/32.00E-7ca	43.41946959	-118.92882819	5,280.00	NULL	NULL	NULL	well_report_plss	167.00	NULL	08/16/1968	Livestock	1	0	0	0	0
HARN	1167	HARN0001167	25.00S/32.00E-10da	43.41936897	-118.86482705	5,280.00	NULL	NULL	NULL	well_report_plss	47.00	47.00	NULL	Livestock	1	0	0	0	0
HARN	1168	HARN0001168	25.00S/32.00E-12ab	43.42297232	-118.83508396	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	45.00	NULL	Livestock	1	0	0	0	0
HARN	1169	HARN0001169	25.00S/32.00E-13cb	43.40481637	-118.84021147	5,280.00	NULL	NULL	NULL	well_report_plss	48.50	48.50	NULL	Livestock	1	0	0	0	0
HARN	1170	HARN0001170	25.00S/32.00E-15ca	43.40485312	-118.86983303	5,280.00	NULL	NULL	NULL	well_report_plss	48.00	48.00	NULL	Livestock	1	0	0	0	0
HARN	1171	HARN0001171	25.00S/32.00E-16bd	43.40127168	-118.88955457	5,280.00	NULL	NULL	NULL	well_report_plss	49.00	49.00	NULL	Livestock	1	0	0	0	0
HARN	1172	HARN0001172	25.00S/32.00E-17da	43.40489158	-118.90429571	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	1174	HARN0001174	NULL	43.40315477	-118.93108448	5,280.00	NULL	NULL	NULL	well_report_plss	43.00	43.00	NULL	Livestock	1	0	0	0	0
HARN	1179	HARN0001179	25.00S/32.00E-26ba	43.37940470	-118.85031907	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/25/1968	Livestock	1	0	0	0	0
HARN	1183	HARN0001183	NULL	43.35958516	-118.85280669	5,280.00	NULL	NULL	NULL	well_report_plss	21.00	21.00	09/08/1931	Livestock	1	0	0	0	0
HARN	1185	HARN0001185	25.00S/32.50E-1bd	43.43007859	-118.71589498	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	200.00	NULL	Livestock	1	0	0	0	0
HARN	1190	HARN0001190	25.00S/32.50E-4dc	43.42511488	-118.77827057	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	51.00	51.00	06/03/1931	Livestock	1	0	0	0	0
HARN	1196	HARN0001196	25.00S/32.50E-6da	43.43383910	-118.80993622	5,280.00	NULL	NULL	NULL	well_report_plss	76.00	NULL	08/07/1968	Livestock	1	0	0	0	0
HARN	1197	HARN0001197	25.00S/32.50E-8bb	43.42291871	-118.80521226	5,280.00	NULL	NULL	NULL	well_report_plss	42.00	NULL	10/28/1968	Livestock	1	0	0	0	0
HARN	1201	HARN0001201	25.00S/32.50E-17cc	43.39729171	-118.80477410	100.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	14.00	13.50	08/28/1931	Livestock	1	0	0	0	0
HARN	1204	HARN0001204	NULL	43.38617700	-118.80611400	50.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	47.00	47.00	NULL	Livestock	1	0	0	0	0
HARN	1207	HARN0001207	NULL	43.38936400	-118.75561900	100.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	50.00	50.00	05/24/1932	Livestock	1	0	0	0	0
HARN	1211	HARN0001211	25.00S/32.50E-30da	43.37580531	-118.81061090	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	10/26/1968	Livestock	1	0	0	0	0
HARN	1237	HARN0001237	25.00S/33.00E-14dc	43.39208063	-118.61979441	400.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	0.00	NULL	05/10/1961	Livestock	1	0	0	0	0
HARN	1271	HARN0001271	25.00S/34.00E-9bd	43.41193143	-118.53732324	5,280.00	NULL	NULL	NULL	well_report_plss	78.00	NULL	04/05/1978	Livestock	1	0	0	0	0
HARN	1285	HARN0001285	25.00S/34.00E-17cd	43.39376629	-118.55717741	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	04/16/1978	Livestock	1	0	0	0	0
HARN	1302	HARN0001302	26.00S/25.00E-32da	43.27516733	-119.73962026	5,280.00	NULL	NULL	NULL	well_report_plss	420.00	NULL	12/27/1988	Livestock	1	0	0	0	0
HARN	1305	HARN0001305	26.00S/28.00E-11cd	43.32595000	-119.32454000	10.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	90.00	90.00	01/24/1968	Livestock	1	0	0	0	0
HARN	1306	HARN0001306	26.00S/28.00E-12cb	43.33278394	-119.31487782	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	120.00	07/30/1987	Livestock	1	0	0	0	0
HARN	1307	HARN0001307	NULL	43.31644730	-119.32716644	5,280.00	NULL	NULL	NULL	well_report_plss	33.00	33.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1309	HARN0001309	26.00S/29.00E-5cc	43.33955791	-119.27657513	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	120.00	120.00	09/27/1983	Livestock	1	0	0	0	0
HARN	1312	HARN0001312	26.00S/29.00E-18da	43.31954132	-119.27844967	150.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	104.00	104.00	11/11/1957	Livestock	0	1	0	0	0
HARN	1344	HARN0001344	26.00S/31.00E-12bd	43.32892612	-118.94704072	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	12/17/1966	Livestock	1	0	0	0	0
HARN	1347	HARN0001347	26.00S/31.00E-16dd	43.31091337	-119.00167280	5,280.00	NULL	NULL	NULL	well_report_plss	151.00	NULL	01/25/1965	Livestock	1	0	0	0	0
HARN	1349	HARN0001349	26.00S/31.00E-18bd	43.31320700	-119.04691200	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	335.00	335.00	06/01/1967	Livestock	1	0	0	0	0
HARN	1350	HARN0001350	NULL	43.30168852	-118.96932186	5,280.00	NULL	NULL	NULL	well_report_plss	68.00	NULL	10/31/1968	Livestock	1	0	0	0	0
HARN	1352	HARN0001352	26.00S/31.00E-26dd	43.27826385	-118.84064633	5,280.00	NULL	NULL	NULL	well_report_plss	212.00	NULL	08/30/1968	Livestock	1	0	0	0	0
HARN	1364	HARN0001364	26.00S/31.00E-35bc	43.26740489	-118.85548434	5,280.00	NULL	NULL	NULL	well_report_plss	25.00	25.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1368	HARN0001368	26.00S/31.00E-2cc	43.33981923	-118.97671915	5,280.00	NULL	NULL	NULL	well_report_plss	18.00	18.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1370	HARN0001370	NULL	43.31635800	-118.70486800	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	35.00	35.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1371	HARN0001371	NULL	43.31660900	-118.84878400	9,999.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	60.00	60.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1372	HARN0001372	NULL	43.31227400	-118.75512000	9,999.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	46.00	46.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1374	HARN0001374	26.00S/32.00E-18aa	43.32168343	-118.92215051	5,280.00	NULL	NULL	NULL	well_report_plss	21.00	21.00	05/18/1932	Livestock	1	0	0	0	0
HARN	1380	HARN0001380	NULL	43.34218061	-118.69130990	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	70.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1381	HARN0001381	NULL	43.32752373	-118.67181836	5,280.00	NULL	NULL	NULL	well_report_plss	20.00	20.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1383	HARN0001383	26.00S/33.00E-12aa	43.33254961	-118.58495285	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	02/24/1981	Livestock	0	0	0	1	0
HARN	1390	HARN0001390	NULL	43.30551663	-118.68115072	5,000.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	15.00	15.00	05/16/1932	Livestock	1	0	0	0	0
HARN	1397	HARN0001397	26.00S/33.00E-26cd	43.27722008	-118.61132469	100.00	USGS	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	115.00	115.00	05/23/1955	Livestock	1	0	0	0	0
HARN	1398	HARN0001398	26.00S/33.00E-26dc	43.27838286	-118.61451216	5,280.00	NULL	NULL	NULL	well_report_plss	35.00	35.00	12/31/1930	Livestock	1	0	0	0	0
HARN	1419	HARN0001419	26.00S/34.00E-5cc	43.33612572	-118.56161615	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	10/08/1966	Livestock	0	1	0	0	0
HARN	1430	HARN0001430	NULL	43.28378935	-118.55387385	5,280.00	NULL	NULL	NULL	well_report_plss	170.00	NULL	08/24/1968	Livestock	1	0	0	0	0
HARN	1439	HARN0001439	27.00S/27.00E-5dc	43.25337974	-119.50847485	5,280.00	NULL	NULL	NULL	well_report_plss	192.00	NULL	10/23/1957	Livestock	0	0	0	1	0
HARN	1448	HARN0001448	27.00S/29.00E-15ab	43.23463109	-119.23024877	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	11/16/1965	Livestock	1	0	0	0	0
HARN	1454	HARN0001454	NULL	43.25713638	-119.00992425	2,500.00	OWRD	GROUNDWATER SECTION	WELL LOG AND IMAGERY	owrd_groundwater_staff	315.00	315.00	08/21/1931	Livestock	1	0	0	0	0
HARN	1456	HARN0001456	27.00S/30.00E-12da	43.24187399	-118.93912140	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	04/24/1985	Livestock	1	0	0	0	0
HARN	1457	HARN0001457	27.00S/30.00E-14ab	43.23086478	-118.96889881	5,280.00	NULL	NULL	NULL	well_report_plss	310.00	NULL	07/15/1985	Livestock	1	0	0	0	0
HARN	1469	HARN0001469	27.00S/31.00E-32cc	43.17674662	-118.91472139	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	11/14/1986	Livestock	1	0	0	0	0
HARN	1470	HARN0001470	27.00S/32.00E-3aa	43.26042895	-118.74291283	5,280.00	NULL	NULL	NULL	well_report_plss	35.00	NULL	11/28/1987	Livestock	1	0	0	0	0
HARN	1480	HARN0001480	27.00S/33.00E-10ab	43.24586438	-118.63457278	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	NULL	08/02/1980	Livestock	1	0	0	0	0
HARN	1483	HARN0001483	27.00S/33.00E-20ca	43.21334286	-118.66932004	5,280.00	NULL	NULL	NULL	well_report_plss	162.00	NULL	06/22/1956	Livestock	1	0	0	0	0
HARN	1484	HARN0001484	27.00S/33.00E-23ca	43.21446000	-118.60832500	500.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	503.00	NULL	07/22/1988	Livestock	1	0	0	0	0
HARN	1500	HARN0001500	27.00S/34.00E-14dd	43.22004666	-118.48700858	5,280.00	NULL	NULL	NULL	well_report_plss	46.00	NULL	12/13/1980	Livestock	1	0	0	0	0
HARN	1505	HARN0001505	27.00S/34.00E-16ac	43.22382611	-118.53646882	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	10/28/1988	Livestock	1	0	0	0	0
HARN	1529	HARN0001529	NULL	43.11155286	-119.40702369	5,280.00	NULL	NULL	NULL	well_report_plss	165.00	NULL	02/06/1968	Livestock	1	0	0	0	0
HARN	1534	HARN0001534	NULL	43.17003500	-119.09526500	500.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	180.00	NULL	07/10/1987	Livestock	1	0	0	0	0
HARN	1540	HARN0001540	NULL	43.16910641	-118.81857850	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	278.00	278.00	01/21/1966	Livestock	1	0	0	0	0
HARN	1554	HARN0001554	28.00S/33.00E-31ac	43.10070792	-118.69655331	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	owrd_groundwater_staff	335.00	335.00	10/10/1989	Livestock	1	0	0	0	0
HARN	1562	HARN0001562	28.00S/34.00E-19dd	43.11704000	-118.56575000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	338.00	338.00	06/05/1958	Livestock	1	0	0	0	0
HARN	1574	HARN0001574	29.00S/31.00E-3bc	43.07922072	-118.87540326	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	02/14/1988	Livestock	1	0	0	0	0
HARN	1575	HARN0001575	NULL	43.01168000	-118.85260000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	71.00	75.00	11/15/1970	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	1576	HARN0001576	NULL	43.00881052	-118.84833539	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	07/24/1965	Livestock	1	0	0	0	0
HARN	1578	HARN0001578	29.00S/32.00E-14ba	43.05764445	-118.72823659	5,280.00	NULL	NULL	NULL	well_report_plss	206.00	NULL	01/12/1988	Livestock	1	0	0	0	0
HARN	1580	HARN0001580	29.00S/32.00E-22cb	43.03960551	-118.75779769	5,280.00	NULL	NULL	NULL	well_report_plss	53.00	NULL	10/12/1987	Livestock	1	0	0	0	0
HARN	1583	HARN0001583	29.00S/32.00E-26cc	43.01783786	-118.73801809	5,280.00	NULL	NULL	NULL	well_report_plss	61.00	61.00	12/14/1969	Livestock	1	0	0	0	0
HARN	1588	HARN0001588	29.00S/32.00E-35ac	43.00570514	-118.73384060	0.50	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	325.00	325.00	09/06/1962	Livestock	1	0	0	0	0
HARN	1590	HARN0001590	29.00S/33.00E-2ca	43.08250827	-118.61005755	5,280.00	NULL	NULL	NULL	well_report_plss	38.00	NULL	09/25/1989	Livestock	1	0	0	0	0
HARN	1602	HARN0001602	30.00S/31.00E-10dc	42.97425359	-118.87084522	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	01/06/1987	Livestock	1	0	0	0	0
HARN	1611	HARN0001611	NULL	42.97716000	-118.79040000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	427.00	427.00	01/17/1967	Livestock	1	0	0	0	0
HARN	1612	HARN0001612	NULL	42.93628121	-118.76988238	5,280.00	NULL	NULL	NULL	well_report_plss	410.00	NULL	11/22/1971	Livestock	0	1	0	0	0
HARN	1626	HARN0001626	24.00S/31.00E-8cb	43.50647449	-119.03717828	5,280.00	NULL	NULL	NULL	well_report_plss	56.00	NULL	09/11/1956	Livestock	1	0	0	0	0
HARN	1833	HARN0001833	23.00S/32.50E-22bc	43.56072671	-118.76567892	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	07/26/1990	Livestock	1	0	0	0	0
HARN	1839	HARN0001839	29.00S/33.00E-2cd	43.07526348	-118.60996472	5,280.00	NULL	NULL	NULL	well_report_plss	250.00	NULL	05/05/1990	Livestock	1	0	0	0	0
HARN	1841	HARN0001841	28.00S/29.50E-6ad	43.16335429	-119.20078810	0.30	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	450.00	450.00	05/12/1990	Livestock	1	0	0	0	0
HARN	1842	HARN0001842	23.00S/30.00E-3aa	43.61241649	-119.10164213	5,280.00	NULL	NULL	NULL	well_report_plss	300.00	NULL	05/28/1990	Livestock	1	0	0	0	0
HARN	1859	HARN0001859	23.00S/31.00E-9cc	43.58757214	-119.01766558	5,280.00	NULL	NULL	NULL	well_report_plss	34.00	NULL	12/04/1990	Livestock	1	0	0	0	0
HARN	1862	HARN0001862	27.00S/34.00E-11ba	43.24542810	-118.49180942	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	02/27/1991	Livestock	0	1	0	0	0
HARN	1871	HARN0001871	25.00S/24.00E-14bb	43.41042047	-119.81398984	5,280.00	NULL	NULL	NULL	well_report_plss	655.00	NULL	04/25/1991	Livestock	1	0	0	0	0
HARN	1872	HARN0001872	25.00S/24.00E-22da	43.39225606	-119.81905653	5,280.00	NULL	NULL	NULL	well_report_plss	101.00	NULL	04/23/1991	Livestock	1	0	0	0	0
HARN	1894	HARN0001894	23.00S/28.00E-25cb	43.55032000	-119.31627000	16.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	500.00	500.00	08/14/1991	Livestock	1	0	0	0	0
HARN	1896	HARN0001896	29.00S/32.00E-23ac	43.03595367	-118.73320177	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	09/25/1991	Livestock	1	0	0	0	0
HARN	1897	HARN0001897	30.00S/31.00E-22bb	42.95618033	-118.87592887	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	09/19/1991	Livestock	1	0	0	0	0
HARN	1902	HARN0001902	NULL	43.64501565	-118.67850884	5,280.00	NULL	NULL	NULL	well_report_plss	106.00	NULL	10/23/1991	Livestock	1	0	0	0	0
HARN	1906	HARN0001906	26.00S/31.00E-10da	43.33271738	-118.98166047	5,280.00	NULL	NULL	NULL	well_report_plss	396.00	NULL	10/20/1991	Livestock	1	0	0	0	0
HARN	1908	HARN0001908	25.00S/32.00E-26bc	43.37215995	-118.86022988	5,280.00	NULL	NULL	NULL	well_report_plss	115.00	NULL	11/18/1991	Livestock	1	0	0	0	0
HARN	1911	HARN0001911	26.00S/24.00E-24ca	43.30448651	-119.78431301	5,280.00	NULL	NULL	NULL	well_report_plss	620.00	NULL	09/25/1991	Livestock	0	1	0	0	0
HARN	1931	HARN0001931	29.00S/33.00E-4ba	43.08632792	-118.64952627	5,280.00	NULL	NULL	NULL	well_report_plss	225.00	225.00	04/24/1992	Livestock	1	0	0	0	0
HARN	1933	HARN0001933	24.00S/32.00E-10bb	43.51050048	-118.88002904	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	05/08/1992	Livestock	1	0	0	0	0
HARN	1934	HARN0001934	25.00S/33.00E-5ba	43.43524000	-118.67781000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	80.00	80.00	05/12/1992	Livestock	1	0	0	0	0
HARN	1940	HARN0001940	24.00S/32.00E-5da	43.52143080	-118.90491019	5,280.00	NULL	NULL	NULL	well_report_plss	57.00	NULL	06/11/1992	Livestock	1	0	0	0	0
HARN	1945	HARN0001945	23.00S/26.00E-21ac	43.55937920	-119.60877260	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	07/22/1992	Livestock	1	0	0	0	0
HARN	1947	HARN0001947	22.00S/25.00E-25db	43.63537517	-119.66966884	5,280.00	NULL	NULL	NULL	well_report_plss	394.00	NULL	07/22/1992	Livestock	1	0	0	0	0
HARN	1950	HARN0001950	27.00S/28.00E-24cc	43.21033000	-119.31726000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	389.00	396.00	07/16/1992	Livestock	1	0	0	0	0
HARN	1953	HARN0001953	25.00S/34.00E-7ca	43.41552563	-118.57701837	5,280.00	NULL	NULL	NULL	well_report_plss	175.00	NULL	09/03/1992	Livestock	1	0	0	0	0
HARN	1954	HARN0001954	31.00S/32.50E-16aa	42.89079810	-118.83451514	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	09/24/1992	Livestock	1	0	0	0	0
HARN	1955	HARN0001955	32.00S/32.75E34ca	42.75633993	-118.70257226	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	09/20/1992	Livestock	1	0	0	0	0
HARN	1956	HARN0001956	29.00S/33.00E-31da	43.01049032	-118.68364495	5,280.00	NULL	NULL	NULL	well_report_plss	25.00	NULL	09/05/1992	Livestock	1	0	0	0	0
HARN	1957	HARN0001957	30.00S/33.00E-5cc	42.98875559	-118.67871712	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	09/03/1992	Livestock	1	0	0	0	0
HARN	1958	HARN0001958	23.00S/32.00E-19aa	43.56851566	-118.92479507	5,280.00	NULL	NULL	NULL	well_report_plss	255.00	NULL	08/31/1992	Livestock	1	0	0	0	0
HARN	1965	HARN0001965	23.00S/31.00E-6dd	43.60180735	-119.04267916	5,280.00	NULL	NULL	NULL	well_report_plss	39.00	NULL	10/19/1992	Livestock	1	0	0	0	0
HARN	1967	HARN0001967	28.00S/34.00E-29ba	43.11510676	-118.55107216	5,280.00	NULL	NULL	NULL	well_report_plss	320.00	NULL	09/22/1992	Livestock	1	0	0	0	0
HARN	1968	HARN0001968	32.00S/33.00E-8dc	42.80706754	-118.62884562	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	10/30/1992	Livestock	1	0	0	0	0
HARN	1969	HARN0001969	31.00S/33.00E-32ac	42.83971790	-118.62888409	5,280.00	NULL	NULL	NULL	well_report_plss	107.00	NULL	10/20/1992	Livestock	1	0	0	0	0
HARN	1978	HARN0001978	29.00S/31.00E-15cd	43.04672786	-118.86568572	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	12/22/1992	Livestock	1	0	0	0	0
HARN	1981	HARN0001981	24.00S/27.00E-23da	43.47889908	-119.43680890	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	100.00	100.00	02/27/1993	Livestock	1	0	0	0	0
HARN	1989	HARN0001989	25.00S/31.00E-35cb	43.36134233	-118.97727761	5,280.00	NULL	NULL	NULL	well_report_plss	280.00	NULL	05/02/1993	Livestock	1	0	0	0	0
HARN	1992	HARN0001992	22.00S/32.50E-35aa	43.62587561	-118.73072084	5,280.00	NULL	NULL	NULL	well_report_plss	150.00	NULL	06/07/1993	Livestock	1	0	0	0	0
HARN	1997	HARN0001997	24.00S/34.00E-31ba	43.44809815	-118.57715008	5,280.00	NULL	NULL	NULL	well_report_plss	200.00	NULL	05/28/1993	Livestock	1	0	0	0	0
HARN	2001	HARN0002001	26.00S/33.00E-30ab	43.28936379	-118.69387009	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	08/03/1993	Livestock	1	0	0	0	0
HARN	2006	HARN0002006	24.00S/31.00E-10db	43.50604186	-118.99313420	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	09/09/1993	Livestock	1	0	0	0	0
HARN	2014	HARN0002014	22.00S/33.00E-31bb	43.62143635	-118.70604448	5,280.00	NULL	NULL	NULL	well_report_plss	101.00	NULL	11/12/1993	Livestock	0	1	0	0	0
HARN	2015	HARN0002015	22.00S/33.00E-21cd	43.63951792	-118.65610348	5,280.00	NULL	NULL	NULL	well_report_plss	241.00	NULL	11/13/1993	Livestock	0	0	0	1	0
HARN	2024	HARN0002024	22.00S/30.00E-25aa	43.64118861	-119.06155128	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	01/17/1994	Livestock	1	0	0	0	0
HARN	2034	HARN0002034	24.00S/34.00E-29ac	43.45535657	-118.56227665	5,280.00	NULL	NULL	NULL	well_report_plss	300.00	NULL	03/19/1994	Livestock	1	0	0	0	0
HARN	2037	HARN0002037	23.00S/31.00E-33aa	43.53988754	-119.00249858	5,280.00	NULL	NULL	NULL	well_report_plss	108.00	NULL	06/20/1994	Livestock	1	0	0	0	0
HARN	2038	HARN0002038	23.00S/31.00E-33da	43.53626548	-119.00249231	5,280.00	NULL	NULL	NULL	well_report_plss	95.00	NULL	06/23/1994	Livestock	1	0	0	0	0
HARN	2047	HARN0002047	24.00S/33.00E-6cd	43.50942378	-118.69642537	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	09/28/1994	Livestock	1	0	0	0	0
HARN	2057	HARN0002057	23.00S/33.00E-6bb	43.60700922	-118.70612341	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	11/21/1994	Livestock	1	0	0	0	0
HARN	2063	HARN0002063	29.00S/32.00E-36cc	43.00327053	-118.71822326	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	11/17/1994	Livestock	0	0	0	1	0
HARN	2064	HARN0002064	24.00S/33.00E-4dd	43.50937476	-118.65164639	5,280.00	NULL	NULL	NULL	well_report_plss	72.00	NULL	01/27/1995	Livestock	1	0	0	0	0
HARN	2068	HARN0002068	26.00S/29.00E-16bd	43.31620075	-119.24805598	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	160.00	160.00	03/02/1995	Livestock	1	0	0	0	0
HARN	2070	HARN0002070	26.00S/29.00E-23db	43.30342879	-119.21117637	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	03/13/1995	Livestock	1	0	0	0	0
HARN	2076	HARN0002076	24.00S/32.00E-4cb	43.52145839	-118.89991930	5,280.00	NULL	NULL	NULL	well_report_plss	58.00	NULL	05/08/1995	Livestock	1	0	0	0	0
HARN	2077	HARN0002077	22.00S/30.00E-26dd	43.62971443	-119.08148715	5,280.00	NULL	NULL	NULL	well_report_plss	52.00	NULL	05/19/1995	Livestock	0	0	0	1	0
HARN	2091	HARN0002091	23.00S/32.00E-1aa	43.61163507	-118.82454039	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	09/21/1995	Livestock	1	0	0	0	0
HARN	2097	HARN0002097	28.00S/32.00E-36cd	43.08854600	-118.71861100	50.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	175.00	175.00	07/28/1975	Livestock	1	0	0	0	0
HARN	2104	HARN0002104	24.00S/32.00E-15aa	43.49589335	-118.86515500	5,280.00	NULL	NULL	NULL	well_report_plss	68.00	NULL	10/10/1995	Livestock	1	0	0	0	0
HARN	50054	HARN0050054	23.00S/32.50E-14ad	43.57508401	-118.73080777	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	07/31/1995	Livestock	1	0	0	0	0
HARN	50071	HARN0050071	25.00S/32.00E-25bb	43.37940075	-118.84040482	5,280.00	NULL	NULL	NULL	well_report_plss	61.00	NULL	09/17/1996	Livestock	1	0	0	0	0
HARN	50077	HARN0050077	27.00S/30.00E-2bd	43.25365218	-118.96425450	150.00	USGS	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	160.00	160.00	09/28/1996	Livestock	1	0	0	0	0
HARN	50078	HARN0050078	22.00S/32.00E-8dc	43.67358836	-118.91583490	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	420.00	420.00	09/26/1996	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done				
															New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	50080	HARN0050080	29.00S/32.00E-26aa	43.02868033	-118.72331669	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	11/03/1995	LIVESTOCK	1	0	0	0	0
HARN	50088	HARN0050088	26.00S/33.00E-11ba	43.33256288	-118.60978245	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	11/22/1996	Livestock	1	0	0	0	0
HARN	50089	HARN0050089	22.00S/30.00E-25cb	43.63703693	-119.07674177	5,280.00	NULL	NULL	NULL	well_report_plss	56.00	NULL	12/06/1996	Livestock	1	0	0	0	0
HARN	50109	HARN0050109	27.00S/34.00E-14dc	43.22009321	-118.49688129	5,280.00	NULL	NULL	NULL	well_report_plss	47.00	NULL	01/19/1997	Livestock	1	0	0	0	0
HARN	50147	HARN0050147	23.00S/24.00E-36ad	43.53164122	-119.77972120	5,280.00	NULL	NULL	NULL	well_report_plss	55.00	NULL	02/28/1997	Livestock	1	0	0	0	0
HARN	50148	HARN0050148	23.00S/24.00E-36ad	43.53164122	-119.77972120	5,280.00	NULL	NULL	NULL	well_report_plss	212.00	NULL	02/24/1997	Livestock	1	0	0	0	0
HARN	50172	HARN0050172	25.00S/31.00E-3ad	43.43063280	-118.98271285	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	05/30/1997	Livestock	1	0	0	0	0
HARN	50177	HARN0050177	22.00S/30.00E-27bd	43.63353657	-119.10609481	5,280.00	NULL	NULL	NULL	well_report_plss	59.00	NULL	05/29/1997	Livestock	1	0	0	0	0
HARN	50181	HARN0050181	23.00S/31.00E-21aa	43.56831702	-119.00264950	5,280.00	NULL	NULL	NULL	well_report_plss	425.00	NULL	07/11/1997	Livestock	1	0	0	0	0
HARN	50193	HARN0050193	23.00S/26.00E-5ab	43.61218000	-119.62783000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	555.00	555.00	06/25/1997	Livestock	1	0	0	0	0
HARN	50207	HARN0050207	25.00S/34.00E-8dd	43.40831036	-118.55221063	5,280.00	NULL	NULL	NULL	well_report_plss	108.00	NULL	10/10/1997	Livestock	1	0	0	0	0
HARN	50228	HARN0050228	26.00S/29.00E-31da	43.27462737	-119.28063329	5,280.00	NULL	NULL	NULL	well_report_plss	53.00	NULL	10/22/1997	Livestock	1	0	0	0	0
HARN	50255	HARN0050255	NULL	43.33105787	-119.08894510	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	02/08/1998	Livestock	1	0	0	0	0
HARN	50283	HARN0050283	24.00S/32.00E-4bb	43.52486296	-118.90009971	5,280.00	NULL	NULL	NULL	well_report_plss	112.00	NULL	03/06/1998	Livestock	1	0	0	0	0
HARN	50284	HARN0050284	25.00S/33.00E-8dd	43.40813286	-118.67141195	5,280.00	NULL	NULL	NULL	well_report_plss	168.00	NULL	03/13/1998	Livestock	1	0	0	0	0
HARN	50292	HARN0050292	24.00S/32.00E-15da	43.49224158	-118.86510732	5,280.00	NULL	NULL	NULL	well_report_plss	89.00	NULL	04/13/1998	Livestock	1	0	0	0	0
HARN	50309	HARN0050309	23.00S/24.00E-36ad	43.52945293	-119.77866480	0.20	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	416.00	NULL	05/19/1998	Livestock	1	0	0	0	0
HARN	50329	HARN0050329	23.00S/32.00E-34cc	43.52821481	-118.88001176	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	08/24/1998	Livestock	1	0	0	0	0
HARN	50331	HARN0050331	22.00S/30.00E-35aa	43.62621567	-119.08140705	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	08/18/1998	Livestock	1	0	0	0	0
HARN	50350	HARN0050350	24.00S/33.00E-35cd	43.43718787	-118.61688886	5,280.00	NULL	NULL	NULL	well_report_plss	192.00	NULL	10/10/1998	Livestock	1	0	0	0	0
HARN	50354	HARN0050354	25.00S/31.00E-19bb	43.39467285	-119.05675777	5,280.00	NULL	NULL	NULL	well_report_plss	370.00	NULL	10/15/1998	Livestock	1	0	0	0	0
HARN	50356	HARN0050356	31.00S/32.00E-24cc	42.86563025	-118.90787020	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	40.00	11/05/1998	Livestock	1	0	0	0	0
HARN	50373	HARN0050373	28.00S/31.00E-29aa	43.11541871	-118.90006644	5,280.00	NULL	NULL	NULL	well_report_plss	220.00	NULL	11/30/1998	Livestock	1	0	0	0	0
HARN	50374	HARN0050374	25.00S/31.00E-29dd	43.36664462	-119.02556022	2.00	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	145.00	145.00	12/02/1998	Livestock	1	0	0	0	0
HARN	50409	HARN0050409	24.00S/31.00E-30cc	43.45548676	-119.05671828	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	11/04/1998	Livestock	1	0	0	0	0
HARN	50424	HARN0050424	23.00S/33.00E-4bb	43.60697068	-118.66645369	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	05/13/1999	Livestock	1	0	0	0	0
HARN	50446	HARN0050446	23.00S/32.00E-36db	43.53553432	-118.83478052	5,280.00	NULL	NULL	NULL	well_report_plss	57.00	NULL	06/21/1999	Livestock	1	0	0	0	0
HARN	50449	HARN0050449	23.00S/32.00E-5ab	43.61188437	-118.91454246	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	06/23/1999	Livestock	1	0	0	0	0
HARN	50474	HARN0050474	29.00S/31.00E-14dd	43.04550000	-118.84118000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	80.00	80.00	11/20/1999	Livestock	1	0	0	0	0
HARN	50484	HARN0050484	26.00S/31.00E-17aa	43.32190536	-119.02176272	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	11/04/1999	Livestock	1	0	0	0	0
HARN	50485	HARN0050485	29.00S/32.00E-21ad	43.03600924	-118.76269925	5,280.00	NULL	NULL	NULL	well_report_plss	39.00	NULL	11/03/1999	Livestock	1	0	0	0	0
HARN	50490	HARN0050490	23.00S/32.50E-21aa	43.56798608	-118.77065886	5,280.00	NULL	NULL	NULL	well_report_plss	58.00	NULL	01/26/2000	Livestock	1	0	0	0	0
HARN	50562	HARN0050562	24.00S/33.00E-13db	43.48768919	-118.60190402	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	05/14/2000	Livestock	1	0	0	0	0
HARN	50575	HARN0050575	31.00S/32.50E-29cd	42.85105235	-118.85943847	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	01/06/2000	Livestock	1	0	0	0	0
HARN	50576	HARN0050576	30.00S/31.00E-23cc	42.94535636	-118.85605233	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	07/18/2000	Livestock	1	0	0	0	0
HARN	50582	HARN0050582	25.00S/28.00E-35bb	43.36535285	-119.33478779	5,280.00	NULL	NULL	NULL	well_report_plss	35.00	NULL	09/21/2000	Livestock	1	0	0	0	0
HARN	50586	HARN0050586	24.00S/33.00E-36dd	43.43724881	-118.59199494	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/24/2000	Livestock	1	0	0	0	0
HARN	50597	HARN0050597	31.00S/32.00E-12aa	42.90523006	-118.89295872	5,280.00	NULL	NULL	NULL	well_report_plss	110.00	NULL	11/01/2000	Livestock	1	0	0	0	0
HARN	50598	HARN0050598	31.00S/32.00E-12aa	42.90784000	-118.89141000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	110.00	110.00	11/07/2000	Livestock	1	0	0	0	0
HARN	50609	HARN0050609	27.00S/31.00E-3ac	43.25286550	-118.87027114	5,280.00	NULL	NULL	NULL	well_report_plss	66.00	NULL	12/16/2000	Livestock	1	0	0	0	0
HARN	50612	HARN0050612	31.00S/32.00E-13ca	42.88708000	-118.89906000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	105.00	105.00	12/29/2000	Livestock	1	0	0	0	0
HARN	50646	HARN0050646	23.00S/28.00E-8dd	43.58658491	-119.38064843	5,280.00	NULL	NULL	NULL	well_report_plss	760.00	NULL	09/15/1997	Livestock	1	0	0	0	0
HARN	50647	HARN0050647	29.00S/32.00E-24cc	43.03228426	-118.71837506	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	NULL	10/12/2000	Livestock	1	0	0	0	0
HARN	50698	HARN0050698	24.00S/32.00E-4cb	43.52171700	-118.89645000	9,999.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	75.00	NULL	07/24/2001	Livestock	1	0	0	0	0
HARN	50708	HARN0050708	29.00S/31.00E-36ad	43.00703429	-118.82121463	5,280.00	NULL	NULL	NULL	well_report_plss	320.00	NULL	09/07/2001	Livestock	1	0	0	0	0
HARN	50712	HARN0050712	25.00S/32.00E-35bb	43.36491607	-118.86024289	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	09/14/2001	Livestock	0	0	0	1	0
HARN	50718	HARN0050718	22.00S/32.50E-25dd	43.62947105	-118.71075960	5,280.00	NULL	NULL	NULL	well_report_plss	204.00	NULL	10/01/2001	Livestock	0	1	0	0	0
HARN	50719	HARN0050719	25.00S/32.50E-20bb	43.39546661	-118.80481310	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	77.00	77.00	09/29/2001	Livestock	1	0	0	0	0
HARN	50722	HARN0050722	23.00S/31.00E-33ca	43.53634119	-119.00754298	5,280.00	NULL	NULL	NULL	well_report_plss	44.00	NULL	10/09/2001	Livestock	1	0	0	0	0
HARN	50737	HARN0050737	23.00S/31.00E-17bb	43.58373997	-119.03785269	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	11/17/2001	Livestock	1	0	0	0	0
HARN	50745	HARN0050745	25.00S/34.00E-30bb	43.37570971	-118.58696308	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	12/08/2001	Livestock	1	0	0	0	0
HARN	50752	HARN0050752	24.00S/32.50E-1cc	43.51339438	-118.72592135	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	01/12/2002	Livestock	1	0	0	0	0
HARN	50753	HARN0050753	23.00S/26.00E-23db	43.56313177	-119.56892275	5,280.00	NULL	NULL	NULL	well_report_plss	215.00	NULL	01/18/2002	Livestock	1	0	0	0	0
HARN	50755	HARN0050755	30.00S/33.00E-5cc	42.98875559	-118.67871712	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	09/09/2001	Livestock	0	0	0	1	0
HARN	50761	HARN0050761	23.00S/26.00E-14ac	43.57501000	-119.56914000	15.50	NULL	NULL	NULL	owrd_field_staff	185.00	NULL	01/23/2002	Livestock	1	0	0	0	0
HARN	50765	HARN0050765	23.00S/26.00E-6aa	43.61919000	-119.61903000	10.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	403.00	403.00	01/27/2002	Livestock	1	0	0	0	0
HARN	50773	HARN0050773	26.00S/35.00E-31bd	43.26735733	-118.45378225	5,280.00	NULL	NULL	NULL	well_report_plss	190.00	NULL	12/17/2001	Livestock	1	0	0	0	0
HARN	50774	HARN0050774	27.00S/35.00E-5bd	43.25271711	-118.43380470	5,280.00	NULL	NULL	NULL	well_report_plss	220.00	NULL	01/10/2002	Livestock	1	0	0	0	0
HARN	50807	HARN0050807	24.00S/29.00E-11bb	43.51059453	-119.21680871	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	05/13/2002	Livestock	1	0	0	0	0
HARN	50808	HARN0050808	24.00S/29.00E-2cd	43.51418200	-119.20683120	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	05/14/2002	Livestock	1	0	0	0	0
HARN	50910	HARN0050910	27.00S/25.00E-16dc	43.22290000	-119.73436000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	510.00	510.00	11/19/2002	Livestock	1	1	0	0	0
HARN	50913	HARN0050913	22.00S/32.50E-35ac	43.61875000	-118.73917000	13.50	NULL	NULL	NULL	owrd_field_staff	212.00	NULL	12/17/2002	Livestock	0	1	0	0	0
HARN	50920	HARN0050920	29.00S/31.00E-24bb	43.04316746	-118.83586970	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	NULL	01/10/2003	Livestock	1	0	0	0	0
HARN	50921	HARN0050921	29.00S/32.00E-23ca	43.03954198	-118.72826219	5,280.00	NULL	NULL	NULL	well_report_plss	125.00	NULL	01/17/2003	Livestock	1	0	0	0	0
HARN	50930	HARN0050930	24.00S/29.00E-11ad	43.50320261	-119.20183312	5,280.00	NULL	NULL	NULL	well_report_plss	305.00	NULL	03/17/2003	Livestock	0	1	0	0	0
HARN	50933	HARN0050933	23.00S/33.00E-33bb	43.53470509	-118.66653095	5,280.00	NULL	NULL	NULL	well_report_plss	260.00	260.00	04/01/2003	Livestock	1	0	0	0	0
HARN	50945	HARN0050945	24.00S/30.00E-22cc	43.47079520	-119.11634317	5,280.00	NULL	NULL	NULL	well_report_plss	355.00	NULL	05/17/2003	Livestock	1	0	0	0	0
HARN	50967	HARN0050967	23.00S/26.00E-18aa	43.58107913	-119.63932065	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	05/29/2003	Livestock	1	0	0	0	0
HARN	50968	HARN0050968	21.00S/26.00E-9cd	43.75901120	-119.60321477	5,280.00	NULL	NULL	NULL	well_report_plss	350.00	NULL	08/25/2003	Livestock	1	0	0	0	0
HARN	50978	HARN0050978	33.00S/32.00E-31bd	42.66488000	-118.76015000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	290.00	NULL	10/26/2002	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	50979	HARN0050979	24.00S/31.00E-8ad	43.50265362	-119.02088530	0.08	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	55.00	NULL	09/19/2003	Livestock	1	0	0	0	0
HARN	51005	HARN0051005	27.00S/31.00E-6cb	43.25640719	-118.93442566	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	11/17/2003	Livestock	1	0	0	0	0
HARN	51014	HARN0051014	23.00S/33.00E-1dc	43.59446784	-118.60029780	25.00	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	380.00	380.00	05/25/2015	Livestock	1	0	0	0	0
HARN	51017	HARN0051017	30.00S/31.00E-21ad	42.94831961	-118.87863975	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	85.00	85.00	01/22/2004	Livestock	1	0	0	0	0
HARN	51027	HARN0051027	23.00S/31.00E-11ab	43.59799736	-118.97285341	5,280.00	NULL	NULL	NULL	well_report_plss	90.00	NULL	02/18/2004	Livestock	1	0	0	0	0
HARN	51040	HARN0051040	30.00S/32.00E-8cd	42.97479000	-118.78423000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	440.00	440.00	04/07/2004	Livestock	1	0	0	0	0
HARN	51044	HARN0051044	26.00S/29.00E-5cc	43.33941000	-119.27660000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	265.00	265.00	05/19/2004	Livestock	1	0	0	0	0
HARN	51073	HARN0051073	23.00S/31.00E-13dd	43.57169588	-118.94314925	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	07/26/2004	Livestock	1	0	0	0	0
HARN	51078	HARN0051078	25.00S/32.50E-22ba	43.39395971	-118.75537770	5,280.00	NULL	NULL	NULL	well_report_plss	88.00	NULL	08/07/2004	Livestock	1	0	0	0	0
HARN	51083	HARN0051083	22.00S/33.00E-23cc	43.63944144	-118.62613086	5,280.00	NULL	NULL	NULL	well_report_plss	192.00	NULL	09/13/2004	Livestock	1	0	0	0	0
HARN	51092	HARN0051092	26.00S/33.00E-32ab	43.27483591	-118.67405657	5,280.00	NULL	NULL	NULL	well_report_plss	75.00	NULL	09/26/2004	Livestock	1	0	0	0	0
HARN	51128	HARN0051128	24.00S/32.50E-20bc	43.47378296	-118.80486578	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	11/30/2004	Livestock	0	1	0	0	0
HARN	51136	HARN0051136	24.00S/30.00E-12ba	43.51084710	-119.06691899	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	11/21/2004	Livestock	1	0	0	0	0
HARN	51137	HARN0051137	23.00S/32.50E-31ba	43.53915328	-118.81545618	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	12/12/2004	Livestock	1	0	0	0	0
HARN	51152	HARN0051152	26.00S/31.00E-35cc	43.26379346	-118.85548321	5,280.00	NULL	NULL	NULL	well_report_plss	33.00	NULL	03/25/2005	Livestock	1	0	0	0	0
HARN	51188	HARN0051188	28.00S/29.00E-2db	43.16866266	-119.08991890	0.09	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	60.00	NULL	08/02/2005	Livestock	1	0	0	0	0
HARN	51205	HARN0051205	23.00S/33.00E-1cc	43.59442257	-118.59940910	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	165.00	165.00	09/01/2005	Livestock	1	0	0	0	0
HARN	51206	HARN0051206	23.00S/31.00E-29ca	43.55096022	-119.02748320	5,280.00	NULL	NULL	NULL	well_report_plss	38.00	NULL	09/02/2005	Livestock	1	0	0	0	0
HARN	51213	HARN0051213	23.00S/32.00E-15ba	43.58293324	-118.86963551	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	10/27/2005	Livestock	1	0	0	0	0
HARN	51227	HARN0051227	32.00S/32.00E-2ca	42.82943247	-118.91767867	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	NULL	12/07/2005	Livestock	1	0	0	0	0
HARN	51252	HARN0051252	22.00S/31.00E-30db	43.63767163	-119.05228250	5,280.00	NULL	NULL	NULL	well_report_plss	325.00	NULL	01/31/2006	Livestock	0	1	0	0	0
HARN	51261	HARN0051261	27.00S/32.00E-25db	43.19884273	-118.71320694	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	03/28/2006	Livestock	1	0	0	0	0
HARN	51262	HARN0051262	27.00S/32.00E-25db	43.19884273	-118.71320694	5,280.00	NULL	NULL	NULL	well_report_plss	105.00	NULL	03/27/2006	Livestock	1	0	0	0	0
HARN	51276	HARN0051276	24.00S/32.50E-33cc	43.44099277	-118.78663640	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	62.00	62.00	05/25/2006	Livestock	1	0	0	0	0
HARN	51294	HARN0051294	27.00S/32.00E-6dd	43.24925728	-118.80229877	5,280.00	NULL	NULL	NULL	well_report_plss	210.00	NULL	08/08/2006	Livestock	1	0	0	0	0
HARN	51311	HARN0051311	22.00S/32.00E-34aa	43.62624553	-118.86456987	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	10/17/2006	Livestock	1	0	0	0	0
HARN	51312	HARN0051312	25.00S/33.00E-25ad	43.36847197	-118.59191209	5,280.00	NULL	NULL	NULL	well_report_plss	65.00	NULL	10/23/2006	Livestock	1	0	0	0	0
HARN	51314	HARN0051314	25.00S/31.00E-6ac	43.43041865	-119.05213895	5,280.00	NULL	NULL	NULL	well_report_plss	205.00	NULL	10/25/2006	Livestock	1	0	0	0	0
HARN	51323	HARN0051323	23.00S/31.00E-9dd	43.58752324	-119.00253654	5,280.00	NULL	NULL	NULL	well_report_plss	45.00	NULL	01/27/2007	Livestock	1	0	0	0	0
HARN	51345	HARN0051345	29.00S/32.00E-23cb	43.03957040	-118.73812975	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	05/08/2007	Livestock	1	0	0	0	0
HARN	51349	HARN0051349	24.00S/31.00E-15da	43.49154316	-118.98320971	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	05/14/2007	Livestock	1	0	0	0	0
HARN	51356	HARN0051356	22.00S/31.00E-31cc	43.61594066	-119.05708247	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	06/12/2007	Livestock	1	0	0	0	0
HARN	51364	HARN0051364	24.00S/32.00E-9cc	43.49956713	-118.89918049	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	06/29/2007	Livestock	1	0	0	0	0
HARN	51379	HARN0051379	24.00S/33.00E-2cc	43.50934699	-118.62675877	5,280.00	NULL	NULL	NULL	well_report_plss	50.00	NULL	07/03/2007	Livestock	1	0	0	0	0
HARN	51388	HARN0051388	23.00S/32.00E-18cc	43.57175774	-118.93872201	5,280.00	NULL	NULL	NULL	well_report_plss	62.00	NULL	08/22/2007	Livestock	1	0	0	0	0
HARN	51414	HARN0051414	24.00S/32.00E-21ad	43.47392983	-118.88426980	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	11/30/2007	Livestock	1	0	0	0	0
HARN	51438	HARN0051438	23.00S/31.00E-11dc	43.58571000	-118.97015000	14.30	NULL	NULL	NULL	owrd_field_staff	120.00	NULL	04/01/2008	Livestock	0	0	0	1	0
HARN	51457	HARN0051457	19.00S/32.00E-6cb	43.95499156	-118.93496383	5,280.00	NULL	NULL	NULL	well_report_plss	123.00	NULL	05/05/2008	Livestock	1	0	0	0	0
HARN	51467	HARN0051467	28.00S/28.00E-10ba	43.16140000	-119.38206000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	382.00	382.00	06/12/2008	Livestock	1	0	0	0	0
HARN	51479	HARN0051479	23.00S/32.00E-20dc	43.55765264	-118.91484391	5,280.00	NULL	NULL	NULL	well_report_plss	103.00	NULL	08/19/2008	Livestock	1	0	0	0	0
HARN	51483	HARN0051483	25.00S/26.00E-2bc	43.42918848	-119.57404670	5,280.00	NULL	NULL	NULL	well_report_plss	460.00	NULL	07/10/2008	Livestock	1	0	0	0	0
HARN	51487	HARN0051487	23.00S/32.00E-33bb	43.53926811	-118.89996020	5,280.00	NULL	NULL	NULL	well_report_plss	223.00	NULL	09/10/2008	Livestock	1	0	0	0	0
HARN	51489	HARN0051489	23.00S/27.00E-28cb	43.54873092	-119.49446326	5,280.00	NULL	NULL	NULL	well_report_plss	123.00	NULL	10/07/2008	Livestock	1	0	0	0	0
HARN	51490	HARN0051490	24.00S/31.00E-9db	43.50625112	-119.01289738	5,280.00	NULL	NULL	NULL	well_report_plss	63.00	NULL	10/09/2008	Livestock	1	0	0	0	0
HARN	51500	HARN0051500	23.00S/32.00E-17bb	43.58318790	-118.91978209	5,280.00	NULL	NULL	NULL	well_report_plss	83.00	NULL	11/03/2008	Livestock	1	0	0	0	0
HARN	51536	HARN0051536	25.00S/30.00E-26bb	43.37308000	-119.08032000	2.00	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	160.00	160.00	01/15/2009	Livestock	1	0	0	0	0
HARN	51540	HARN0051540	27.00S/32.00E-19ac	43.21085410	-118.81316329	300.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	60.00	60.00	09/01/2000	Livestock	1	0	0	0	0
HARN	51546	HARN0051546	24.00S/31.00E-6dc	43.51296157	-119.05213940	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	63.00	NULL	03/20/2009	Livestock	1	0	0	0	0
HARN	51558	HARN0051558	24.00S/30.00E-7cb	43.50414000	-119.17408000	19.80	NULL	NULL	NULL	owrd_field_staff	125.00	NULL	04/16/2009	Livestock	1	0	0	0	0
HARN	51566	HARN0051566	27.00S/34.00E-12cb	43.24178311	-118.48200033	5,280.00	NULL	NULL	NULL	well_report_plss	120.00	NULL	05/01/2009	Livestock	1	0	0	0	0
HARN	51612	HARN0051612	28.00S/32.00E-36da	43.09736042	-118.70344490	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	07/16/2009	Livestock	1	0	0	0	0
HARN	51615	HARN0051615	25.00S/30.00E-16db	43.40388771	-119.13326219	99.00	NULL	NULL	NULL	exempt_use_map	405.00	NULL	07/28/2009	Livestock	1	0	0	0	0
HARN	51618	HARN0051618	23.00S/33.00E-1cc	43.60017700	-118.59609500	25.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	660.00	NULL	07/31/2009	Livestock	1	0	0	0	0
HARN	51623	HARN0051623	25.00S/31.00E-25aa	43.55474000	-118.94135000	17.40	NULL	NULL	NULL	owrd_field_staff	105.00	NULL	08/10/2009	Livestock	1	0	0	0	0
HARN	51624	HARN0051624	25.00S/31.00E-26cb	43.37569120	-118.97766243	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	08/11/2009	Livestock	1	0	0	0	0
HARN	51625	HARN0051625	23.00S/31.00E-35ca	43.53580686	-118.96794059	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	08/12/2009	Livestock	1	0	0	0	0
HARN	51626	HARN0051626	24.00S/31.00E-3bd	43.51685169	-118.98804452	5,280.00	NULL	NULL	NULL	well_report_plss	85.00	NULL	08/13/2009	Livestock	1	0	0	0	0
HARN	51627	HARN0051627	23.00S/31.00E-21da	43.56461275	-119.00261607	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	08/14/2009	Livestock	1	0	0	0	0
HARN	51628	HARN0051628	25.00S/32.50E-20ab	43.39387092	-118.80040004	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	08/19/2009	Livestock	1	0	0	0	0
HARN	51645	HARN0051645	19.00S/32.00E-18ca	43.92409222	-118.92534634	660.00	NULL	NULL	NULL	exempt_use_map	245.00	NULL	09/09/2009	Livestock	1	0	0	0	0
HARN	51650	HARN0051650	25.00S/32.50E-20bc	43.38659655	-118.80542659	5,280.00	NULL	NULL	NULL	well_report_plss	63.00	NULL	09/23/2009	Livestock	1	0	0	0	0
HARN	51655	HARN0051655	23.00S/32.00E-18bd	43.57414300	-118.93136800	200.00	NULL	NULL	NULL	exempt_use_map	82.00	NULL	10/16/2009	Livestock	1	0	0	0	0
HARN	51684	HARN0051684	33.00S/30.00E-25ad	43.37497261	-119.05747632	250.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	170.00	170.00	11/15/2009	Livestock	1	0	0	0	0
HARN	51693	HARN0051693	26.00S/31.00E-5bb	43.35253000	-119.03853000	19.90	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	owrd_groundwater_staff	152.00	152.00	02/24/2010	Livestock	1	0	0	0	0
HARN	51703	HARN0051703	24.00S/29.00E-11ad	43.50320261	-119.20183312	5,280.00	NULL	NULL	NULL	well_report_plss	405.00	NULL	05/11/2010	Livestock	0	1	0	0	0
HARN	51704	HARN0051704	22.00S/31.00E-7da	43.68020000	-118.92631000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	184.00	184.00	05/13/2010	Livestock	1	0	0	0	0
HARN	51714	HARN0051714	20.00S/30.00E-23ab	43.82640309	-119.09099663	400.00	NULL	NULL	NULL	exempt_use_map	83.00	NULL	07/13/2010	Livestock	1	0	0	0	0
HARN	51733	HARN0051733	24.00S/31.00E-24dd	43.46975000	-118.94328000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	163.00	163.00	10/21/2010	Livestock	1	0	0	0	0
HARN	51734	HARN0051734	24.00S/32.00E-33db	43.44733000	-118.89663000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	103.00	103.00	10/22/2010	Livestock	1	0	0	0	0
HARN	51735	HARN0051735	25.00S/32.00E-8ab	43.42122000	-118.91157000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	103.00	103.00	10/22/2010	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	51736	HARN0051736	25.00S/32.00E-20dd	43.38350000	-118.90310000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	103.00	103.00	10/23/2010	Livestock	1	0	0	0	0
HARN	51737	HARN0051737	25.00S/31.00E-1db	43.43370000	-118.95212000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	103.00	103.00	11/03/2010	Livestock	1	0	0	0	0
HARN	51767	HARN0051767	26.00S/30.00E-17bb	43.32092781	-119.14906410	0.29	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	490.00	490.00	02/24/2011	Livestock	1	0	0	0	0
HARN	51780	HARN0051780	27.00S/35.00E-17ac	43.22537000	-118.44154000	99.00	NULL	NULL	NULL	exempt_use_map	200.00	NULL	12/31/2008	Livestock	1	0	0	0	0
HARN	51802	HARN0051802	23.00S/31.00E-30bd	43.54803000	-119.04640000	30.00	OWRD	FIELD SERVICES SECTION	GPS FIELD OFFICE	owrd_groundwater_staff	53.00	NULL	08/18/2011	Livestock	1	0	0	0	0
HARN	51813	HARN0051813	29.00S/33.00E-19bc	43.03587354	-118.69855641	5,280.00	NULL	NULL	NULL	well_report_plss	145.00	NULL	10/05/2011	Livestock	1	0	0	0	0
HARN	51826	HARN0051826	25.00S/33.00E-3bd	43.57850600	-118.62575200	99.00	NULL	NULL	NULL	exempt_use_map	115.00	NULL	12/28/2011	Livestock	1	0	0	0	0
HARN	51833	HARN0051833	25.00S/33.00E-10bc	43.41121000	-118.64580000	99.00	NULL	NULL	NULL	exempt_use_map	125.00	NULL	03/29/2012	Livestock	1	0	0	0	0
HARN	51864	HARN0051864	24.00S/31.00E-34da	43.35307307	-118.97979420	0.14	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	64.00	64.00	07/18/2012	Livestock	1	0	0	0	0
HARN	51872	HARN0051872	29.00S/32.00E-22ad	43.03728345	-118.74119286	99.00	NULL	NULL	NULL	exempt_use_map	60.00	NULL	08/22/2012	Livestock	1	0	0	0	0
HARN	51873	HARN0051873	29.00S/33.00E-29ac	43.01939732	-118.67666791	100.00	NULL	NULL	NULL	exempt_use_map	23.00	NULL	08/23/2012	Livestock	1	0	0	0	0
HARN	51874	HARN0051874	29.00S/33.00E-30cd	43.01921656	-118.68267103	100.00	NULL	NULL	NULL	exempt_use_map	30.00	NULL	08/24/2012	Livestock	1	0	0	0	0
HARN	51896	HARN0051896	25.00S/26.00E-30ad	43.37529315	-119.52341850	0.09	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	234.00	234.00	11/30/2012	Livestock	1	0	0	0	0
HARN	51905	HARN0051905	26.00S/29.00E-7ad	43.32797000	-119.27985000	13.80	NULL	NULL	NULL	owrd_field_staff	73.00	NULL	02/22/2013	Livestock	1	0	0	0	0
HARN	51906	HARN0051906	26.00S/31.00E-30cb	43.28537949	-118.93446764	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	02/26/2013	Livestock	1	0	0	0	0
HARN	51906	HARN0051906	26.00S/31.00E-30cb	43.28923625	-119.05661041	5,280.00	NULL	NULL	NULL	well_report_plss	84.00	NULL	02/26/2013	Livestock	1	0	0	0	0
HARN	51907	HARN0051907	26.00S/31.00E-30db	43.28833333	-119.04916389	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	79.00	79.00	02/28/2013	Livestock	1	0	0	0	0
HARN	51922	HARN0051922	23.00S/32.00E-10cb	43.59490991	-118.76796880	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	300.00	300.00	03/05/2013	Livestock	1	0	0	0	0
HARN	51956	HARN0051956	20.00S/32.00E-10cb	43.85413934	-118.86779194	99.00	NULL	NULL	NULL	exempt_use_map	280.00	NULL	06/22/2013	Livestock	1	0	0	0	0
HARN	51961	HARN0051961	24.00S/32.00E-2db	43.52161000	-118.85581000	14.20	NULL	NULL	NULL	owrd_field_staff	130.00	NULL	07/17/2013	Livestock	1	0	0	0	0
HARN	51969	HARN0051969	25.00S/30.00E-29dd	43.36759000	-119.14449000	0.00	NULL	NULL	NULL	owrd_field_staff	250.00	NULL	08/21/2013	Livestock	1	0	0	0	0
HARN	51988	HARN0051988	24.00S/32.00E-2db	43.52161000	-118.85581000	14.20	NULL	NULL	NULL	owrd_field_staff	130.00	NULL	09/05/2013	Livestock	0	0	0	1	0
HARN	52006	HARN0052006	27.00S/34.00E-8cb	43.24214000	-118.56120000	99.00	NULL	NULL	NULL	exempt_use_map	142.00	NULL	10/21/2013	Livestock	1	0	0	0	0
HARN	52013	HARN0052013	27.00S/35.00E-17ca	43.22909200	-118.43362300	0.00	NULL	NULL	NULL	well_report_lat_long	160.00	NULL	12/17/2013	Livestock	1	0	0	0	0
HARN	52017	HARN0052017	19.00S/31.00E-13bb	43.93319195	-118.94207754	99.00	NULL	NULL	NULL	exempt_use_map	200.00	NULL	01/22/2014	Livestock	1	0	0	0	0
HARN	52022	HARN0052022	25.00S/28.00E-26dd	43.36793000	-119.31767000	10.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	720.00	720.00	02/12/2014	Livestock	1	0	0	0	0
HARN	52025	HARN0052025	22.00S/33.00E-34cc	43.60863000	-118.64940000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	615.00	615.00	03/18/2014	Livestock	1	0	0	0	0
HARN	52058	HARN0052058	23.00S/33.00E-14bb	43.57833000	-118.62500000	99.00	NULL	NULL	NULL	exempt_use_map	150.00	NULL	05/23/2014	Livestock	1	0	0	0	0
HARN	52094	HARN0052094	23.00S/26.00E-17ba	43.58108243	-119.62404205	5,280.00	NULL	NULL	NULL	well_report_plss	256.00	NULL	07/29/2014	Livestock	1	0	0	0	0
HARN	52095	HARN0052095	25.00S/29.00E-32dc	43.35847000	-119.26726000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	140.00	140.00	08/04/2014	Livestock	1	0	0	0	0
HARN	52096	HARN0052096	27.00S/28.00E-6bc	43.25551223	-119.41399110	0.13	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	80.00	80.00	08/08/2014	Livestock	1	0	0	0	0
HARN	52097	HARN0052097	25.00S/32.50E-16bd	43.40179857	-118.77549893	99.00	NULL	NULL	NULL	exempt_use_map	80.00	NULL	08/09/2014	Livestock	1	0	0	0	0
HARN	52098	HARN0052098	29.00S/33.00E-30cd	43.01921656	-118.68267103	100.00	NULL	NULL	NULL	exempt_use_map	43.00	NULL	08/12/2014	Livestock	0	1	0	0	0
HARN	52101	HARN0052101	29.00S/31.00E-8cc	43.06639000	-118.89857000	15.30	NULL	NULL	NULL	owrd_field_staff	310.00	310.00	08/18/2014	Livestock	1	0	0	0	0
HARN	52105	HARN0052105	22.00S/28.00E-36dd	43.61485000	-119.30681000	9.00	OWRD	GROUNDWATER SECTION	GPS	owrd_groundwater_staff	705.00	705.00	08/11/2014	Livestock	1	0	0	0	0
HARN	52115	HARN0052115	24.00S/27.00E-24db	43.48213000	-119.41724000	12.10	NULL	NULL	NULL	owrd_field_staff	129.00	NULL	04/29/2014	Livestock	1	0	0	0	0
HARN	52117	HARN0052117	25.00S/25.00E-22bb	43.39532052	-119.71386175	5,280.00	NULL	NULL	NULL	well_report_plss	420.00	NULL	05/29/2014	Livestock	1	0	0	0	0
HARN	52128	HARN0052128	23.00S/34.00E-19aa	43.56531000	-118.57118000	99.00	NULL	NULL	NULL	exempt_use_map	1,003.00	NULL	10/20/2014	Livestock	1	0	0	0	0
HARN	52134	HARN0052134	26.00S/34.00E-33aa	43.27467931	-118.52664219	5,280.00	NULL	NULL	NULL	well_report_plss	700.00	NULL	09/27/2014	Livestock	1	0	0	0	0
HARN	52139	HARN0052139	29.00S/33.00E-12aa	43.07313467	-118.58298272	99.00	NULL	NULL	NULL	exempt_use_map	185.00	NULL	12/19/2014	Livestock	1	0	0	0	0
HARN	52152	HARN0052152	24.00S/32.50E-33bc	43.44636000	-118.78663000	18.00	NULL	NULL	NULL	owrd_field_staff	223.00	223.00	01/27/2015	Livestock	1	0	0	0	0
HARN	52165	HARN0052165	29.00S/32.00E-20ad	43.03728345	-118.74119286	99.00	NULL	NULL	NULL	exempt_use_map	63.00	NULL	03/09/2015	Livestock	0	1	0	0	0
HARN	52167	HARN0052167	29.00S/32.00E-22ca	43.03958737	-118.74796178	5,280.00	NULL	NULL	NULL	well_report_plss	375.00	NULL	04/03/2015	Livestock	1	0	0	0	0
HARN	52177	HARN0052177	20.00S/30.00E-27ab	43.81139000	-119.10947000	99.00	NULL	NULL	NULL	exempt_use_map	203.00	203.00	04/01/2015	Livestock	1	0	0	0	0
HARN	52178	HARN0052178	NULL	43.82173000	-119.08913000	99.00	NULL	NULL	NULL	exempt_use_map	165.00	165.00	04/01/2015	Livestock	1	0	0	0	0
HARN	52180	HARN0052180	23.00S/31.00E-11ab	43.59932000	-118.97188000	0.00	NULL	NULL	NULL	owrd_field_staff	98.00	NULL	04/07/2015	Livestock	1	0	0	0	0
HARN	52182	HARN0052182	21.00S/30.00E-15ba	43.75840760	-119.10694127	99.00	NULL	NULL	NULL	exempt_use_map	303.00	NULL	04/07/2015	Livestock	1	0	0	0	0
HARN	52184	HARN0052184	26.00S/33.00E-21cc	43.31689134	-118.59156558	99.00	NULL	NULL	NULL	exempt_use_map	100.00	NULL	04/10/2015	Livestock	1	0	0	0	0
HARN	52190	HARN0052190	23.00S/24.00E-35da	43.53306302	-119.80086321	99.00	NULL	NULL	NULL	exempt_use_map	420.00	NULL	05/20/2015	Livestock	1	0	0	0	0
HARN	52194	HARN0052194	21.00S/30.00E-17ac	43.74915541	-119.14812013	99.00	NULL	NULL	NULL	exempt_use_map	465.00	465.00	05/10/2015	Livestock	1	0	0	0	0
HARN	52195	HARN0052195	26.00S/34.00E-27dd	43.27672197	-118.50657835	99.00	NULL	NULL	NULL	exempt_use_map	610.00	NULL	05/09/2015	Livestock	1	0	0	0	0
HARN	52199	HARN0052199	23.00S/31.00E-9aa	43.59995329	-119.00022504	99.00	NULL	NULL	NULL	exempt_use_map	68.00	NULL	06/03/2015	Livestock	1	0	0	0	0
HARN	52204	HARN0052204	23.00S/33.00E-19aa	43.56387676	-118.70798317	99.00	NULL	NULL	NULL	exempt_use_map	155.00	NULL	06/05/2015	Livestock	1	0	0	0	0
HARN	52205	HARN0052205	24.00S/33.00E-36da	43.44616000	-118.58974000	0.00	NULL	NULL	NULL	owrd_field_staff	0.00	NULL	05/16/2015	Livestock	0	0	0	0	1
HARN	52206	HARN0052206	25.00S/32.50E-10cd	43.41030947	-118.75796114	99.00	NULL	NULL	NULL	exempt_use_map	302.00	NULL	05/18/2015	Livestock	1	0	0	0	0
HARN	52207	HARN0052207	23.00S/30.00E-6cb	43.60804956	-119.17554373	5,280.00	NULL	NULL	NULL	well_report_plss	465.00	NULL	05/28/2015	Livestock	1	0	0	0	0
HARN	52208	HARN0052208	23.00S/30.00E-8ad	43.59043958	-119.14163156	5,280.00	NULL	NULL	NULL	well_report_plss	845.00	NULL	06/02/2015	Livestock	1	0	0	0	0
HARN	52209	HARN0052209	28.00S/33.00E-17dc	43.13339968	-118.67548744	99.00	NULL	NULL	NULL	exempt_use_map	204.00	NULL	05/21/2015	Livestock	1	0	0	0	0
HARN	52210	HARN0052210	24.00S/32.50E-20bc	43.47378296	-118.80486578	5,280.00	NULL	NULL	NULL	well_report_plss	40.00	NULL	05/29/2015	Livestock	1	0	0	0	0
HARN	52212	HARN0052212	21.00S/27.00E-16cd	43.74571551	-119.48405808	5,280.00	NULL	NULL	NULL	well_report_plss	405.00	405.00	05/18/2015	Livestock	1	0	0	0	0
HARN	52213	HARN0052213	21.00S/27.00E-16cd	43.73555000	-119.48500000	99.00	NULL	NULL	NULL	exempt_use_map	405.00	405.00	06/16/2015	Livestock	1	0	0	0	0
HARN	52222	HARN0052222	24.00S/31.00E-34da	43.44714639	-118.98530594	99.00	NULL	NULL	NULL	exempt_use_map	111.00	NULL	06/25/2015	Livestock	1	0	0	0	0
HARN	52224	HARN0052224	26.00S/33.00E-20cc	43.29140000	-118.67790000	99.00	NULL	NULL	NULL	exempt_use_map	90.00	NULL	06/20/2015	Livestock	1	0	0	0	0
HARN	52245	HARN0052245	23.00S/24.00E-15ad	43.57574253	-119.81948276	5,280.00	NULL	NULL	NULL	well_report_plss	740.00	NULL	07/16/2015	Livestock	1	0	0	0	0
HARN	52259	HARN0052259	27.00S/31.00E-12dc	43.23317400	-118.83106000	50.00	USGS	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	152.00	152.00	12/31/1963	Livestock	1	0	0	0	0
HARN	52261	HARN0052261	29.00S/32.00E-11ca	43.06923100	-118.72649900	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	115.00	115.00	12/31/1955	Livestock	1	0	0	0	0
HARN	52268	HARN0052268	24.00S/32.50E-22cb	43.47554435	-118.76664656	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52269	HARN0052269	25.00S/32.00E-7ab	43.42314478	-118.93350789	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	1,345.00	1,345.00	12/31/1952	Livestock	1	0	0	0	0
HARN	52270	HARN0052270	25.00S/32.00E-12ab	43.42383154	-118.83724695	250.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	50.00	50.00	NULL	Livestock	1	0	0	0	0
HARN	52272	HARN0052272	25.00S/32.00E-16cb	43.40488783	-118.89939145	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	60.00	NULL	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done: New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	52273	HARN0052273	25.00S/32.00E-24db	43.39145722	-118.83651387	100.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	60.00	60.00	NULL	Livestock	1	0	0	0	0
HARN	52277	HARN0052277	25.00S/32.50E-25aa	43.38020426	-118.71159457	700.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52278	HARN0052278	25.00S/26.00E-26aa	43.37922388	-118.73237853	1,000.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52283	HARN0052283	26.00S/32.00E-25bc	43.28309613	-118.71744560	125.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52285	HARN0052285	27.00S/34.00E-6dc	43.24931782	-118.57610686	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52288	HARN0052288	30.00S/32.00E-1cd	42.98860000	-118.70836400	100.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	370.00	370.00	03/01/1959	Livestock	1	0	0	0	0
HARN	52294	HARN0052294	23.00S/32.50E-9cc	43.58550250	-118.78583246	150.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	180.00	180.00	NULL	Livestock	1	0	0	0	0
HARN	52295	HARN0052295	23.00S/32.50E-14da	43.57942917	-118.73246061	150.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	104.00	104.00	NULL	Livestock	1	0	0	0	0
HARN	52296	HARN0052296	23.00S/32.50E-19ab	43.56840992	-118.82022712	150.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	180.00	180.00	NULL	Livestock	1	0	0	0	0
HARN	52297	HARN0052297	23.00S/32.50E-23ad	43.56077193	-118.73205957	300.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	64.00	64.00	NULL	Livestock	1	0	0	0	0
HARN	52298	HARN0052298	23.00S/32.50E-32bd	43.53002617	-118.79693656	125.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	314.00	314.00	NULL	Livestock	1	0	0	0	0
HARN	52302	HARN0052302	23.00S/33.00E-29dc	43.53766002	-118.68011032	500.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	300.00	300.00	NULL	Livestock	1	0	0	0	0
HARN	52303	HARN0052303	23.00S/33.00E-31ba	43.53539523	-118.69545959	500.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	300.00	300.00	NULL	Livestock	1	0	0	0	0
HARN	52304	HARN0052304	23.00S/33.00E-10ba	43.59245104	-118.63657365	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52305	HARN0052305	23.00S/32.00E-29ad	43.54666859	-118.90487383	5,280.00	NULL	NULL	NULL	well_report_plss	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52308	HARN0052308	25.00S/31.00E-13dc	43.39881410	-118.95152756	150.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	360.00	360.00	NULL	Livestock	1	0	0	0	0
HARN	52313	HARN0052313	24.00S/31.00E-1ba	43.52295476	-118.95073430	300.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52316	HARN0052316	24.00S/32.50E-20aa	43.48060056	-118.79080749	125.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52323	HARN0052323	NULL	43.34730984	-118.90395268	350.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	1,430.00	1,430.00	NULL	Livestock	1	0	0	0	0
HARN	52326	HARN0052326	NULL	43.27850924	-118.76589967	5,280.00	NULL	NULL	NULL	well_report_plss	80.00	80.00	NULL	Livestock	1	0	0	0	0
HARN	52337	HARN0052337	22.00S/33.00E-27bc	43.62870078	-118.64611771	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	100.00	NULL	Livestock	1	0	0	0	0
HARN	52344	HARN0052344	23.00S/32.00E-9bc	43.58987061	-118.89687834	1,000.00	OWRD	GROUNDWATER SECTION	1:125,000 MAP	owrd_groundwater_staff	36.00	36.00	NULL	Livestock	1	0	0	0	0
HARN	52350	HARN0052350	NULL	43.37267375	-118.80377098	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	30.00	30.00	NULL	Livestock	1	0	0	0	0
HARN	52353	HARN0052353	NULL	43.34892817	-118.69304200	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52354	HARN0052354	NULL	43.37501489	-118.76481032	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	48.00	48.00	NULL	Livestock	1	0	0	0	0
HARN	52357	HARN0052357	26.00S/28.00E-12bc	43.32915268	-119.31481200	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	100.00	NULL	Livestock	1	0	0	0	0
HARN	52358	HARN0052358	26.00S/29.00E-18ad	43.31466076	-119.28081410	5,280.00	NULL	NULL	NULL	well_report_plss	14.00	14.00	NULL	Livestock	1	0	0	0	0
HARN	52359	HARN0052359	26.00S/29.00E-27cc	43.28136860	-119.23608128	5,280.00	NULL	NULL	NULL	well_report_plss	34.00	34.00	NULL	Livestock	1	0	0	0	0
HARN	52368	HARN0052368	NULL	43.31015263	-118.88093259	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	54.00	54.00	NULL	Livestock	1	0	0	0	0
HARN	52370	HARN0052370	NULL	43.30436870	-118.86809012	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	15.00	15.00	NULL	Livestock	1	0	0	0	0
HARN	52375	HARN0052375	NULL	43.34834695	-118.77562130	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	12.00	12.00	NULL	Livestock	1	0	0	0	0
HARN	52376	HARN0052376	NULL	43.32116352	-118.74397007	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	14.50	14.50	NULL	Livestock	1	0	0	0	0
HARN	52377	HARN0052377	NULL	43.31931513	-118.74231125	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	45.00	45.00	NULL	Livestock	1	0	0	0	0
HARN	52379	HARN0052379	NULL	43.30789116	-118.72885940	9,999.00	USGS	WELL LOG	WELL LOG AND IMAGERY	owrd_groundwater_staff	33.00	33.00	NULL	Livestock	1	0	0	0	0
HARN	52380	HARN0052380	NULL	43.29907484	-118.73488029	250.00	USGS	WELL LOG	WELL LOG AND IMAGERY	owrd_groundwater_staff	12.00	12.00	NULL	Livestock	1	0	0	0	0
HARN	52381	HARN0052381	NULL	43.26628179	-118.80939225	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	67.00	NULL	Livestock	1	0	0	0	0
HARN	52386	HARN0052386	NULL	43.32054509	-118.60783358	1,000.00	USGS	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	157.00	157.00	NULL	Livestock	1	0	0	0	0
HARN	52399	HARN0052399	27.00S/31.00E-3cb	43.25650216	-118.87525714	5,280.00	NULL	NULL	NULL	well_report_plss	21.00	21.00	NULL	Livestock	1	0	0	0	0
HARN	52400	HARN0052400	27.00S/31.00E-4db	43.25648494	-118.89011357	5,280.00	NULL	NULL	NULL	well_report_plss	70.00	70.00	NULL	Livestock	1	0	0	0	0
HARN	52401	HARN0052401	NULL	43.25468902	-118.88762063	5,280.00	NULL	NULL	NULL	well_report_plss	130.00	130.00	NULL	Livestock	1	0	0	0	0
HARN	52402	HARN0052402	27.00S/31.00E-5da	43.25647864	-118.90000983	5,280.00	NULL	NULL	NULL	well_report_plss	100.00	100.00	NULL	Livestock	1	0	0	0	0
HARN	52423	HARN0052423	22.00S/32.00E-9dc	43.67394736	-118.89301105	99.00	NULL	NULL	NULL	exempt_use_map	560.00	NULL	08/14/2015	Livestock	1	0	0	0	0
HARN	52432	HARN0052432	25.00S/31.00E-6cb	43.43241000	-119.04499000	0.00	NULL	NULL	NULL	owrd_field_staff	165.00	NULL	09/02/2015	Livestock	0	1	0	0	0
HARN	52435	HARN0052435	25.00S/32.00E-10da	43.41770915	-118.86529376	99.00	NULL	NULL	NULL	exempt_use_map	65.00	NULL	09/28/2015	Livestock	1	0	0	0	0
HARN	52440	HARN0052440	29.00S/31.00E-23ab	43.04471000	-118.84962000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	125.00	125.00	09/29/2015	Livestock	1	0	0	0	0
HARN	52441	HARN0052441	27.00S/31.00E-6cb	43.25640719	-118.93442566	5,280.00	NULL	NULL	NULL	well_report_plss	140.00	NULL	09/30/2015	Livestock	1	0	0	0	0
HARN	52442	HARN0052442	22.00S/31.00E-34aa	43.62659295	-118.98038746	99.00	NULL	NULL	NULL	exempt_use_map	120.00	NULL	10/03/2015	Livestock	1	0	0	0	0
HARN	52449	HARN0052449	27.00S/34.00E-1cd	43.25018472	-118.47419738	99.00	NULL	NULL	NULL	exempt_use_map	186.00	NULL	10/21/2015	Livestock	1	0	0	0	0
HARN	52459	HARN0052459	20.00S/30.00E-23cc	43.81604565	-119.09617282	5,280.00	NULL	NULL	NULL	well_report_plss	344.00	NULL	11/09/2015	Livestock	1	0	0	0	0
HARN	52460	HARN0052460	24.00S/32.50E-13db	43.49160066	-118.72084525	99.00	NULL	NULL	NULL	exempt_use_map	400.00	NULL	11/24/2015	Livestock	1	0	0	0	0
HARN	52461	HARN0052461	25.00S/32.50E-20ba	43.39485256	-118.79460746	99.00	NULL	NULL	NULL	exempt_use_map	64.00	NULL	11/09/2015	Livestock	1	0	0	0	0
HARN	52463	HARN0052463	23.00S/30.00E-17bc	43.57480692	-119.15701233	99.00	NULL	NULL	NULL	exempt_use_map	1,012.00	NULL	11/20/2015	Livestock	1	0	0	0	0
HARN	52464	HARN0052464	28.00S/30.00E-1aa	43.17326761	-118.93938958	5,280.00	NULL	NULL	NULL	well_report_plss	350.00	NULL	12/07/2015	Livestock	1	0	0	0	0
HARN	52468	HARN0052468	30.00S/33.00E-4bc	42.99360000	-118.65980000	99.00	NULL	NULL	NULL	exempt_use_map	250.00	NULL	01/22/2016	Livestock	1	0	0	0	0
HARN	52471	HARN0052471	23.00S/26.00E-5dd	43.61018000	-119.63097000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	260.00	NULL	01/28/2016	Livestock	1	0	0	0	0
HARN	52472	HARN0052472	24.00S/30.00E-4bc	43.51801361	-119.13585643	99.00	NULL	NULL	NULL	exempt_use_map	160.00	NULL	02/05/2016	Livestock	1	0	0	0	0
HARN	52473	HARN0052473	23.00S/26.00E-7da	43.59065000	-119.64363000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	220.00	NULL	02/11/2016	Livestock	1	0	0	0	0
HARN	52476	HARN0052476	29.00S/33.00E-29aa	43.02750000	-118.66440000	99.00	NULL	NULL	NULL	exempt_use_map	385.00	NULL	04/05/2019	Livestock	1	0	0	0	0
HARN	52487	HARN0052487	26.00S/26.00E-10bb	43.33416798	-119.59624200	0.60	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	200.00	200.00	06/30/2015	Livestock	1	0	0	0	0
HARN	52488	HARN0052488	26.00S/25.00E-22bb	43.30897000	-119.70518000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	500.00	500.00	05/30/2015	Livestock	1	0	0	0	0
HARN	52505	HARN0052505	23.00S/32.00E-30ab	43.55434683	-118.93309964	99.00	NULL	NULL	NULL	exempt_use_map	503.00	503.00	04/27/2016	Livestock	1	0	0	0	0
HARN	52506	HARN0052506	33.00S/32.50E-21cc	42.69332798	-118.85071673	99.00	NULL	NULL	NULL	exempt_use_map	1,090.00	NULL	11/04/2015	Livestock	1	0	0	0	0
HARN	52509	HARN0052509	27.00S/34.00E-15cd	43.21851216	-118.51359344	99.00	NULL	NULL	NULL	exempt_use_map	165.00	NULL	05/12/2016	Livestock	1	0	0	0	0
HARN	52522	HARN0052522	21.00S/30.00E-3dd	43.77613281	-119.10025778	99.00	NULL	NULL	NULL	exempt_use_map	245.00	NULL	07/13/2016	Livestock	1	0	0	0	0
HARN	52525	HARN0052525	19.00S/32.00E-17cb	43.92508000	-118.91410000	0.00	NULL	NULL	NULL	well_report_lat_long	300.00	NULL	06/24/2016	Livestock	1	0	0	0	0
HARN	52526	HARN0052526	25.00S/32.50E-17ba	43.40750000	-118.79710000	99.00	NULL	NULL	NULL	exempt_use_map	60.00	NULL	06/24/2016	Livestock	1	0	0	0	0
HARN	52527	HARN0052527	23.00S/33.00E-18da	43.57447949	-118.69139607	5,280.00	NULL	NULL	NULL	well_report_plss	103.00	NULL	07/21/2016	Livestock	1	0	0	0	0
HARN	52533	HARN0052533	22.00S/32.00E-26bb	43.63970000	-118.86186900	99.00	NULL	NULL	NULL	exempt_use_map	160.00	NULL	07/20/2016	Livestock	1	0	0	0	0
HARN	52543	HARN0052543	27.00S/32.00E-29ac	43.19337500	-118.79143830	99.00	NULL	NULL	NULL	well_report_lat_long	340.00	NULL	07/14/2016	Livestock	1	0	0	0	0
HARN	52587	HARN0052587	24.00S/32.00E-9cb	43.50687334	-118.89927576	5,280.00	NULL	NULL	NULL	well_report_plss	82.00	NULL	09/21/2016	Livestock	0	0	0	1	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	Well Work Done				
															New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
HARN	52592	HARN0052592	25.00S/35.00E-32aa	43.36577000	-119.13949000	25.00	OWRD	GROUNDWATER SECTION	GPS IPAD	owrd_groundwater_staff	250.00	250.00	09/27/2016	Livestock	1	0	0	0	0
HARN	52599	HARN0052599	25.00S/29.00E-24ab	43.39575088	-119.19183080	0.10	OWRD	GROUNDWATER SECTION	GPS SURVEY GRADE	owrd_groundwater_staff	500.00	500.00	10/13/2016	Livestock	1	0	0	0	0
HARN	52613	HARN0052613	23.00S/31.00E-24aa	43.56900000	-118.94100000	99.00	NULL	NULL	NULL	exempt_use_map	248.00	NULL	11/11/2016	Livestock	1	0	0	0	0
HARN	52636	HARN0052636	NULL	43.10971000	-118.59858000	0.00	NULL	NULL	NULL	owrd_field_staff	400.00	613.00	04/11/2017	Livestock	1	0	0	0	0
HARN	52647	HARN0052647	25.00S/30.00E-33dd	43.35457092	-119.12109121	5,280.00	NULL	NULL	NULL	well_report_plss	340.00	NULL	06/06/2017	Livestock	1	0	0	0	0
HARN	52648	HARN0052648	26.00S/33.00E-19db	43.29900000	-118.69460000	99.00	NULL	NULL	NULL	exempt_use_map	78.00	NULL	06/01/2017	Livestock	1	0	0	0	0
HARN	52655	HARN0052655	NULL	43.55541100	-119.34574200	250.00	OWRD	GROUNDWATER SECTION	1:62,500 MAP	owrd_groundwater_staff	441.00	NULL	06/27/2017	Livestock	1	0	0	0	0
HARN	52669	HARN0052669	30.00S/32.00E-1cd	42.98876707	-118.70834689	5,280.00	NULL	NULL	NULL	well_report_plss	370.00	NULL	12/31/1959	Livestock	1	0	0	0	0
HARN	52670	HARN0052670	26.00S/33.00E-19ab	43.30550000	-118.69140000	99.00	NULL	NULL	NULL	exempt_use_map	100.00	NULL	07/26/2017	Livestock	1	0	0	0	0
HARN	52675	HARN0052675	25.00S/32.50E-20dc	43.38501093	-118.79809950	200.00	USGS	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	380.00	380.00	08/18/2017	Livestock	1	0	0	0	0
HARN	52676	HARN0052676	25.00S/32.50E-8bb	43.42206000	-118.80637200	500.00	ODEQ	GROUNDWATER SECTION	UNKNOWN	owrd_groundwater_staff	200.00	200.00	08/25/2017	Livestock	1	0	0	0	0
HARN	52684	HARN0052684	32.00S/33.00E-31dc	42.74908956	-118.64850864	5,280.00	NULL	NULL	NULL	well_report_plss	358.00	NULL	10/21/2017	Livestock	1	0	0	0	0
HARN	52690	HARN0052690	26.00S/29.00E-1bc	43.34501667	-119.19708314	150.00	OWRD	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	0.00	NULL	NULL	Livestock	1	0	0	0	0
HARN	52694	HARN0052694	25.00S/28.00E-23bd	43.38694000	-119.32500000	9,999.00	OTH	GROUNDWATER SECTION	OTHER	owrd_groundwater_staff	63.00	63.00	11/16/2017	Livestock	1	0	0	0	0
HARN	52712	HARN0052712	22.00S/31.00E-32bc	43.61961200	-119.03749939	5,280.00	NULL	NULL	NULL	well_report_plss	67.00	NULL	04/09/2018	Livestock	1	0	0	0	0
HARN	52713	HARN0052713	26.00S/31.00E-30dc	43.27816883	-118.92968964	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	03/30/2018	Livestock	1	0	0	0	0
HARN	52713	HARN0052713	26.00S/31.00E-30dc	43.28193589	-119.05156348	5,280.00	NULL	NULL	NULL	well_report_plss	60.00	NULL	03/30/2018	Livestock	1	0	0	0	0
HARN	52727	HARN0052727	19.00S/31.00E-12bb	43.94498000	-118.95734000	0.00	NULL	NULL	NULL	owrd_field_staff	135.00	135.00	06/29/2018	Livestock	1	0	0	0	0
HARN	52739	HARN0052739	24.00S/31.00E-20da	43.47897024	-119.02099369	99.00	NULL	NULL	NULL	exempt_use_map	65.00	NULL	08/02/2018	Livestock	1	0	0	0	0
HARN	52740	HARN0052740	21.00S/32.50E-3ac	43.77793783	-118.76070016	5,280.00	NULL	NULL	NULL	well_report_plss	284.00	NULL	08/16/2018	Livestock	1	0	0	0	0
HARN	52751	HARN0052751	22.00S/33.00E-20ca	43.64681188	-118.67607321	5,280.00	NULL	NULL	NULL	well_report_plss	280.00	NULL	10/22/2018	Livestock	0	1	0	0	0
HARN	52752	HARN0052752	22.00S/33.00E-20ca	43.64681188	-118.67607321	5,280.00	NULL	NULL	NULL	well_report_plss	240.00	NULL	10/23/2018	Livestock	0	1	0	0	0
HARN	52755	HARN0052755	22.00S/27.00E-31bd	43.61681000	-119.52561000	0.00	NULL	NULL	NULL	owrd_field_staff	0.00	NULL	05/25/2015	Livestock	1	0	0	0	0
HARN	52777	HARN0052777	26.00S/30.00E-15da	43.31827767	-119.10149755	5,280.00	NULL	NULL	NULL	well_report_plss	275.00	NULL	03/28/2019	Livestock	1	0	0	0	0
HARN	52779	HARN0052779	29.00S/33.00E-29aa	43.02739000	-118.66444000	0.00	NULL	NULL	NULL	owrd_field_staff	385.00	NULL	04/05/2019	Livestock	0	1	0	0	0
HARN	52801	HARN0052801	29.00S/31.00E-9ba	43.07090000	-118.88550000	99.00	NULL	NULL	NULL	exempt_use_map	140.00	NULL	07/01/2019	Livestock	1	0	0	0	0
HARN	52802	HARN0052802	29.00S/31.00E-9ba	43.07230000	-118.88290000	99.00	NULL	NULL	NULL	exempt_use_map	340.00	NULL	07/05/2019	Livestock	1	0	0	0	0
HARN	52811	HARN0052811	25.00S/32.50E-5cb	43.43383761	-118.80498723	5,280.00	NULL	NULL	NULL	well_report_plss	122.00	NULL	08/02/2019	Livestock	1	0	0	0	0
LAKE	4367	LAKE0004367	23.00S/23.00E-13ca	43.58004966	-119.90252850	5,280.00	NULL	NULL	NULL	well_report_plss	530.00	NULL	02/16/1990	Livestock	1	0	0	0	0
MALH	455	MALH0000455	28.00S/32.00E-17dc	43.13365398	-118.79207297	5,280.00	NULL	NULL	NULL	well_report_plss	310.00	NULL	04/08/1990	Livestock	1	0	0	0	0

Appendix A5:

Table listing livestock wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
															Well Work Done				
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	New Well	Deepen Well	Convert Well	Alter Well	Abandon Well

Notes:
The well locations listed are the best location available for each well listed as of September 2019
This table includes a duplicate OWRD well identification entry with a different latitude-longitude location for the following well: HARN 52713
Entry Possible for Multiple Columns
NULL: nothing entered and/or not known, applies to multiple columns
OTH or OTHER: not identified, applies to Latitude-Longitude Method and Well Primary Use columns
UNKNOWN: not known, applies to multiple columns
Entry Possible for Horizontal Error
0.00 to 9,999.00 feet
9,999.00 is an entry flag indicating the horizontal error is unknown and/or is likely very large
Entry Possible for Location Origin
ODEQ: Oregon Department of Environmental Quality
OTH or OTHER: not identified
OWRD: Oregon Water Resources Department
USGS: U.S. Geological Survey
Entry Possible for Location Source at OWRD
FIELD SERVICES SECTION: well location determined at OWRD by Field Service reviews and/or projects and/or field work
GROUNDWATER SECTION: well location determined at OWRD by Groundwater Section reviews and/or projects and/or field work
WATER RIGHT: well location determined at OWRD using information within water right materials filed and/or recorded
WELL LOG: well location determined at OWRD using information within water well report filed and/or recorded
Entry Possible for Latitude-Longitude Method
1:125,000 MAP: well location determined using a 1:125,000 scale map
1:62,500 MAP: well location determined using a 1:62,500 scale map
1:24,000 MAP: well location determined using a 1:24,000 scale map
MAP SCALE UNKNOWN: well location determined using a map of an unknown, uncertain, and/or undetermined scale
GPS: well location determined in the field at the well site using an unspecified Global Position System (GPS) unit
GPS FIELD OFFICE: well location determined in the field at the well site by OWRD field sevices staff using available GPS capabilities
GPS IPAD: well location determined in the field at the well site using the GPS capabilities within an Apple i-Pad unit
GPS SURVEY GRADE: well location determined in the field at the well site using a survey grade GPS unit
WATER RIGHT APPLICATION MAP: well location determined at OWRD using information on a map accompanying a water right application
WATER RIGHT FINAL PROOF MAP: well location determined at OWRD using information on a final proof map accompanying documents to "prove" a water right eligible to receive a certificate
WATER RIGHT TRANSFER MAP: well location determined at OWRD using information on a map accompanying a water right transfer application
WATER RIGHT UNKNOWN SOURCE: well location determined at OWRD using unidentified information within water right materials filed and/or recorded
WELL LOG AND IMAGERY: well location determined at OWRD using GPS and/or PLS location information on a water well report along with aerial and/or satellite imagery (often georeferenced) to see and establish the well location
Entry Possible for Latitude-Longitude Method Comment
exempt_use_map: the well location was determined from an exempt use map submitted to owrd documenting a non-water right well location on a map that can vary in quality and accuracy
owrd_field_staff: owrd field staff determined the well location
owrd_groundwater_staff: owrd groundwater staff determined the well location
well_report_lat_long: well location latitude-longitude is from latitude-longitude recorded on the water well report
well_report_plss: well location latitude-longitude is the center of the center of the smallest public land survey system (Township/Range-Section quarter-quarter-quarter) acreage tract reported
Notes for Well Work Done:
Abandon Well: water well report (well log) listed documents the abandonment of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Alter Well: water well report (well log) listed documents the alteration of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Convert Well: water well report (well log) listed documents the conversion of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Deepen Well: water well report (well log) listed documents the deepening of an existing well (1 = box on report form checked, 0 = box on report form not checked)
New Well: water well report (well log) listed documents the construction of a new well (1 = box on report form checked, 0 = box on report form not checked)
Data Sources:
Oregon Water Resources Department 2019a, 2019f

Appendix A6:

Table listing commercial-industrial wells used for Harney Basin groundwater use calculations
(See notes at end of table)

OWRD Well Identification			Public Land Survey (PLS) Location	Latitude / Longitude Location							Well Information on Water Well Report								
															Well Work Done				
County	Number	Groundwater Database	Township/Range-Section qtr qtr	Latitude (decimal)	Longitude (decimal)	Horizontal Error (ft)	Location Origin	Location Source at OWRD	Latitude-Longitude Method	Latitude-Longitude Method Comment	Well Completion Depth (ft)	Maximum Depth Drilled (ft)	Well Completion Date	Well Primary Use	New Well	Deepen Well	Convert Well	Alter Well	Abandon Well
Before 1999																			
GRAN	783	GRAN0000783	16.00S/31.00E-34dd	44.13482411	-118.97922307	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	groundwater	330.00	NULL	12/31/1930	UNKNOWN	1	0	0	0	0
GRAN	784	GRAN0000784	16.00S/31.00E-35bc	44.13931092	-118.97383809	5,280.00	NULL	NULL	NULL	well_report_plss	160.00	NULL	08/01/1978	Domestic	1	0	0	0	0
HARN	12	HARN0000012	19.00S/32.00E-18cb	43.92506981	-118.93759740	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	groundwater	32.00	32.00	NULL	Industrial	1	0	0	0	0
HARN	312	HARN0000312	23.00S/30.00E-26dd	43.54217407	-119.08273083	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	groundwater	218.00	218.00	04/07/1965	Industrial	1	0	0	0	0
HARN	313	HARN0000313	23.00S/30.00E-26ad	43.54721204	-119.08213165	5,280.00	NULL	NULL	NULL	well_report_plss	78.00	78.00	NULL	Industrial	1	0	0	0	0
HARN	314	HARN0000314	23.00S/30.00E-26ad	43.54877473	-119.08303009	100.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	groundwater	154.00	154.00	NULL	Industrial	1	0	0	0	0
HARN	315	HARN0000315	23.00S/30.00E-26ad	43.54743707	-119.08249084	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	groundwater	173.00	173.00	NULL	Industrial	1	0	0	0	0
HARN	320	HARN0000320	23.00S/30.00E-35aa	43.53997452	-119.08123401	100.00	OWRD	WATER RIGHT	WATER RIGHT FINAL PROOF MAP	groundwater	200.00	200.00	03/27/1965	Irrigation	1	0	0	0	0
After 1999																			
HARN	1043	HARN0001043	24.00S/33.00E-34bd	43.44071880	-118.64191242	100.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	groundwater	250.00	250.00	05/03/1984	OTHER	1	0	0	0	0
HARN	1044	HARN0001044	24.00S/33.00E-34ac	43.43991770	-118.64116146	100.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	groundwater	21.00	21.00	05/11/1932	UNKNOWN	1	0	0	0	0
HARN	50176	HARN0050176	23.00S/30.00E-26da	43.54850129	-119.08304849	9,999.00	OWRD	WATER RIGHT	WATER RIGHT UNKNOWN SOURCE	groundwater	805.00	805.00	01/06/1997	Thermal	1	0	0	0	0
HARN	51699	HARN0051699	23.00S/30.00E-23bb	43.55667000	-119.08121000	16.00	OWRD	WATER RIGHT	WATER RIGHT APPLICATION MAP	groundwater	180.00	180.00	04/24/2010	Thermal	1	0	0	0	0
HARN	51901	HARN0051901	24.00S/33.00E-34ac	43.44071055	-118.64177883	5,280.00	NULL	NULL	NULL	well_report_plss	403.00	403.00	01/11/2013	Thermal	1	0	0	0	0
HARN	52548	HARN0052548	24.00S/33.00E-34ac	43.44037000	-118.64104000	0.00	NULL	NULL	NULL	owrd_field_staff	260.00	NULL	09/01/2016	Thermal	1	0	0	0	0
HARN	52601	HARN0052601	24.00S/33.00E-34ac	43.44064000	-118.64153000	0.00	NULL	NULL	NULL	owrd_field_staff	192.00	NULL	09/21/2016	Domestic	1	0	0	0	0

Notes:
The well locations listed are the best location available for each well listed as of September 2019
See Appendix B16 to B18 and B20 for commercial-industrial facility associated with each well listed
Entry Possible for Multiple Columns
NULL: nothing entered and/or not known, applies to multiple columns
OTH or OTHER: not identified, applies to Latitude-Longitude Method and Well Primary Use columns
UNKNOWN: not known, applies to multiple columns
Entry Possible for Horizontal Error
0.00 to 9,999.00 feet
9,999.00 is an entry flag indicating the horizontal error is unknown and/or is likely very large
Entry Possible for Location Origin
ODEQ: Oregon Department of Environmental Quality
OTH or OTHER: not identified
OWRD: Oregon Water Resources Department
USGS: U.S. Geological Survey
Entry Possible for Location Source at OWRD
FIELD SERVICES SECTION: well location determined at OWRD by Field Service reviews and/or projects and/or field work
GROUNDWATER SECTION: well location determined at OWRD by Groundwater Section reviews and/or projects and/or field work
WATER RIGHT: well location determined at OWRD using information within water right materials filed and/or recorded
WELL LOG: well location determined at OWRD using information within water well report filed and/or recorded
Entry Possible for Latitude-Longitude Method
1:125,000 MAP: well location determined using a 1:125,000 scale map
1:62,500 MAP: well location determined using a 1:62,500 scale map
1:24,000 MAP: well location determined using a 1:24,000 scale map
MAP SCALE UNKNOWN: well location determined using a map of an unknown, uncertain, and/or undetermined scale
GPS: well location determined in the field at the well site using an unspecified Global Position System (GPS) unit
GPS FIELD OFFICE: well location determined in the field at the well site by OWRD field sevices staff using available GPS capabilities
GPS IPAD: well location determined in the field at the well site using the GPS capabilities within an Apple i-Pad unit
GPS SURVEY GRADE: well location determined in the field at the well site using a survey grade GPS unit
WATER RIGHT APPLICATION MAP: well location determined at OWRD using information on a map accompanying a water right application
WATER RIGHT FINAL PROOF MAP: well location determined at OWRD using information on a final proof map accompanying documents to "prove" a water right eligible to receive a certificate
WATER RIGHT TRANSFER MAP: well location determined at OWRD using information on a map accompanying a water right transfer application
WATER RIGHT UNKNOWN SOURCE: well location determined at OWRD using unidentified information within water right materials filed and/or recorded
WELL LOG AND IMAGERY: well location determined at OWRD using GPS and/or PLS location information on a water well report along with aerial and/or satellite imagery (often georeferenced) to see and establish the well location
Entry Possible for Latitude-Longitude Method Comment
exempt_use_map: the well location was determined from an exempt use map submitted to owrd documenting a non-water right well location on a map that can vary in quality and accuracy
owrd_field_staff: owrd field staff determined the well location
groundwater or owrd_groundwater_staff: owrd groundwater staff determined the well location
well_report_lat_long: well location latitude-longitude is from latitude-longitude recorded on the water well report
well_report_plss: well location latitude-longitude is the center of the center of the smallest public land survey system (Township/Range-Section quarter-quarter-quarter) acreage tract reported
Notes for Well Work Done:
Abandon Well: water well report (well log) listed documents the abandonment of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Alter Well: water well report (well log) listed documents the alteration of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Convert Well: water well report (well log) listed documents the conversion of an existing well (1 = box on report form checked, 0 = box on report form not checked)
Deepen Well: water well report (well log) listed documents the deepening of an existing well (1 = box on report form checked, 0 = box on report form not checked)
New Well: water well report (well log) listed documents the construction of a new well (1 = box on report form checked, 0 = box on report form not checked)
Data Sources:
Oregon Water Resources Department 2019a, 2019f, 2021a, 2021b, 2021c

Appendix B: Tables and calculations of municipal, community, rural domestic, livestock, and commercial-industrial non-irrigation groundwater use

Harney Basin Municipal Non-Irrigation Groundwater Use

Appendix B1 is a table showing the total annual groundwater volume discharged for municipal non-irrigation use by the towns of Burns, Hines, and Seneca individually and collectively for the 30-year period from water year 1988 through 2018 as reported to the Oregon Water Resources Department (2019b, 2019c, and 2019d). Excluded from the table is the volume discharged by the towns of Hines and Seneca to irrigate permitted acreages at their golf courses. That volume is outside the scope of this report.

Appendix B2 is a table showing the monthly groundwater volume discharged for municipal non-irrigation use by the towns of Burns, Hines, and Seneca individually and collectively for the 2000 and 2010 water years only. Those years include the period when the U.S. Census was conducted in the 2000 and 2010 calendar years. The volumes are as reported to the Oregon Water Resources Department (2019b, 2019c, and 2019d). The total population and total households for the towns individually and collectively is from the U.S. Census data as reported by the Portland State University Population Research Center (2019a, 2019b, and 2019c). The data is shown for the 2000 and 2010 years individually and as a two-year average.

Appendix B3 is a table showing the calculated monthly municipal non-irrigation groundwater volume used per capita and per household in the towns of Burns, Hines, and Seneca individually and collectively for the 2000 and 2010 water years. Those years include the period when the U.S. Census was conducted in the 2000 and 2010 calendar years. The calculations used the values found in appendix B2. The calculation results are for the 2000 and 2010 years individually and as a two-year average. The calculated two-year average results of the monthly per municipal household volume used were subsequently used to calculate a groundwater volume pumped by the GH2O Inc. community water system and by rural domestic households.

All the groundwater volume discharged for municipal non-irrigation use is assumed to be completely consumed given all the wastewater through 2019 discharged solely to evaporation ponds. This study assumes all leakage detected at the Seneca pre-2020 ponds (J.W. Sterger, Oregon Department of Environmental Quality, written commun., 2020) discharged to the adjacent Silvies River via lateral, shallow groundwater flow.

Harney Basin Community Non-Municipal, Non-Irrigation Groundwater Use

Appendix B4 consists of two tables related to the GH2O community water system adjacent to the town of Hines. The first table (table B4-1) shows the monthly and annual groundwater volume discharged for non-irrigation use as reported by GH2O to the Oregon Water Resources Department (2019e) for the 2013 to 2015 water years. Notes accompanying the reported data indicate flow meter readings were infrequent rather than monthly, and the volume difference between meter readings was evenly distributed over the intervening months. The Oregon Health Authority (2019b) indicates the GH2O system serves 30 household connections, which was used to calculate an average household use per month and water year. The 3-year annual average of 1.16 acre-feet per year per household calculated for the GH2O system households as shown in table B4-1 compares well to the 1.09 acre-feet per year per household calculated for the municipal households as shown in appendix B3 and the second appendix B4 table (table B4-2), column B.

The second appendix B4 table (table B4-2) shows the calculated monthly and annual groundwater volume discharged for non-irrigation use by the GH2O community water system using the monthly municipal per household volume in appendix B3 and the number of GH2O household connections. Table B4-2 is considered a better monthly representation of the GH2O community water system given the GH2O community water system flow meter readings were infrequent rather than monthly. Additionally, table B4-2 is considered a valid representation given the calculated annual average volume of water used per year per household for the GH2O households and municipal households are similar.

Table B4-2 additionally shows the calculated monthly and annual groundwater volumes divided into indoor use and outdoor use volumes and further divided into indoor and outdoor use volumes consumed or returned to groundwater. The table used a 0.05 acre-feet per household upper limit for monthly indoor use calculations based upon the average October to April municipal household volumes as shown in appendix B3. The table subsequently used monthly volumes exceeding 0.05 acre-feet per household for monthly outdoor use calculations. Household indoor use and outdoor use volumes consumed and returned to groundwater were calculated using a Washington Department of Ecology (2018) recommended methodology. That methodology was derived from U.S. Geological Survey (USGS) groundwater models constructed for Washington and published after 2000. Under this methodology, 10-percent of the indoor water use and 80-

percent of the outdoor water use is considered consumed by humans and evapotranspiration respectively. The remaining 90-percent of the indoor water use and 20-percent of the outdoor water use is considered returned to groundwater via septic systems and deep percolation respectively.

Appendix B5 consists of two tables related to all 25 Harney Basin community water systems found in the Oregon Health Authority Drinking Water System database (2019a, 2019b). These various non-municipal public water systems serve households, motels, schools, churches, campgrounds, restaurants, offices, and a rest area. The first appendix B5 table (table B5-1) shows the calculated annual groundwater volume discharged, consumed, and returned to groundwater for each system. The volumes shown for the GH2O community water system are copied from table B4-2. The volumes for the other 24 community water systems were calculated using published coefficients converted to gallons per day per population served by different public facilities multiplied by the daily population served by each community water system (see appendix A1) and the days per year the system serves that population. The calculations assume 10-percent of the groundwater volume discharged is consumed and the remaining 90-percent returns to groundwater via septic systems, equivalent to indoor water use. The second appendix B5 table (table B5-2) shows the calculated annual groundwater volume discharged, consumed, and returned to groundwater by the community water systems totaled for the basin and for unofficial and informal water budget "regions" intended for discussion and general comparison purposes only (S.B. Gingerich, written commun., 2020 and C.A. Garcia, written commun., 2020).

Harney Basin Rural Domestic Non-Irrigation Groundwater Use

Appendices B6 to B9 are tables showing the calculated monthly and annual groundwater volume discharged for non-irrigation use by rural domestic households using the monthly municipal per household volume in appendix B3 and the number of Harney Basin rural domestic water well reports found. The appendix B6 calculations relate to the entire basin. The appendix B7 to B9 calculations relate to the unofficial and informal division of the basin into north, west, and south water budget "regions" respectively. The "regions" are for discussion purposes and general comparison use only (S.B. Gingerich, U.S. Geological Survey, written commun., 2020 and C.A. Garcia, U.S. Geological Survey, written commun., 2020).

Appendices B6 to B9 additionally show the calculated monthly and annual groundwater volumes divided into indoor use and outdoor use volumes and further show indoor and outdoor use volumes consumed or returned to groundwater. The appendices used a 0.05 acre-feet per household upper limit for monthly rural domestic indoor household use calculations based upon the average October to April municipal household volumes as shown in appendix B3. The appendices subsequently used monthly volumes exceeding 0.05 acre-feet per household for monthly rural domestic outdoor household use calculations. Rural domestic household indoor use and outdoor use volumes consumed and returned to groundwater were calculated using a Washington Department of Ecology (2018) recommended methodology. That methodology was derived from USGS groundwater models constructed for Washington and published after 2000. Under this methodology, 10-percent of the indoor water use and 80-percent of the outdoor water use is considered consumed by humans and evapotranspiration respectively. The remaining 90-percent of the indoor water use and 20-percent of the outdoor water use is considered returned to groundwater via septic systems and deep percolation respectively.

Appendices B10 to B13 tables represent a different methodology and are included for completeness and comparison purposes. The tables show the calculated monthly and annual groundwater volume discharged for non-irrigation use by rural domestic households using the Nevada Division of Water Resources (2017) recommended annual volume per household and the number of Harney Basin rural domestic water well reports found. The appendix B10 table calculations relate to the entire basin. The appendix B11 to B13 table calculations relate to the unofficial and informal division of the basin into north, west, and south water budget "regions" previously noted. The Nevada Division of Water Resources (DWR) recommended annual volume of 1.0 acre-feet per household was distributed to monthly volumes using the monthly municipal per household volume in appendix B3 converted to a fraction of 1.0 acre-feet. For consistency with appendices B6 to B9, appendices B10 to B13 used a 0.05 acre-feet per household upper limit for monthly rural domestic indoor household use calculations based upon the average October to April municipal household volumes as shown in appendix B3. The appendices subsequently used monthly volumes exceeding 0.05 acre-feet per household for monthly rural domestic outdoor household use calculations. Unlike Washington, Nevada DWR assumes all the groundwater volume pumped for rural household use is consumed. That is shown in the appendices B10 to B13 tables.

The appendices B6 to B9 tables and the appendices B10 to B13 tables show similar total annual groundwater volume discharged for the entire basin, for each water budget region, and for each rural domestic household (1,198 acre-feet per year versus 1,103 acre-feet per year for the basin and 1.09 acre-feet per year versus 1.00 acre-feet per year per household). The appendices B6 to B9 tables and the appendices B10 to B13 tables show different volumes consumed and different volumes returned to groundwater. The appendices B6 to B9 tables show 42.4 percent of the annual groundwater volume consumed and 57.6 percent returned to groundwater. The appendices B10 to B13 tables show 100.0 percent of the annual groundwater volume consumed and 0.0 percent returned to groundwater. This investigation considers the appendices B6 to B9 tables more representative of Harney Basin rural domestic household groundwater use.

Harney Basin Livestock Non-Irrigation Groundwater Use

Appendix B14 is a table showing in both metric and English units table 9-1 found in National Academies of Sciences, Engineering, and Medicine (2016, p. 154). The table shows the variability of the total daily water intake per head of beef cattle of various type, size, and development under various environmental conditions. The total daily water intake per head can range from 4.0 to 20.6 gallons per day (15.1 to 78.0 liters per day). Lovelace (2009) determined a median daily water use coefficient per head of cattle of 12.0 gallons per day (45.4 liters per day).

Appendix B15 is a table showing the calculated annual groundwater volume discharged for non-irrigation use by cattle and sheep livestock in the Harney Basin. The total annual volume calculations for the entire Harney Basin used the U.S. Department of Agriculture (USDA) total cattle and sheep head estimates for Harney County (U.S. Department of Agriculture 2018, 2019a, 2019b) and the median daily water intake per head of cattle and sheep found in Lovelace (2009). The calculations assumed all head of cattle and sheep drink Harney Basin groundwater only (some drink surface water). The calculations further used the number of Harney Basin livestock water well reports found to determine a total annual volume discharged per livestock well. Lastly, the calculations determined a total annual groundwater volume discharged for cattle and sheep for each unofficial and informal division of the basin into north, west, and south water budget "regions" as previously noted above by using the total number of livestock wells with water well reports found in each "region" and the total annual volume discharged per livestock well.

Harney Basin Commercial-Industrial Non-Irrigation Groundwater Use

Appendix B16 is a table showing intermittently reported monthly groundwater discharge volumes for irrigation use and non-irrigation industrial (geothermal heating) use authorized by an Oregon groundwater right (file G-14645) (Oregon Water Resources Department 2021a, 2021c). All the September through October volumes are accounted as industrial use. The May through August volumes are excluded given they are accounted within the irrigation uses reported by Beamer and Hoskinson (2021). All the groundwater discharged is assumed consumed.

Appendix B17 is a table showing reported monthly groundwater discharge volumes for non-irrigation industrial (geothermal heating and cooling) use authorized by an Oregon groundwater right (file G-17424) (Oregon Water Resources Department 2021b, 2021c). All the volumes are accounted as industrial use. All the groundwater discharged is assumed returned to groundwater via an injection well (HARN 51698).

Appendix B18 is a table showing the maximum groundwater discharge volume allowed per month per well from 2003 to 2020 and total monthly and annual volumes allowed based on the maximum discharge rates authorized by an Oregon groundwater right for non-irrigation commercial use (file G-15732) (Oregon Water Resources Department 2021c). Actual groundwater discharge volumes were not reported, nor were they determined. All the groundwater discharged is assumed consumed.

Appendix B19 is a table that sums all the reported and estimated Harney Basin groundwater discharge volumes for commercial-industrial groundwater uses after 1999 (appendix B16 to B18). The sums are shown for the entire Harney Basin, the water budget regions, and the water budget lowlands and uplands.

Appendix B20 is a table showing for historical and comparison purposes calculated maximum annual groundwater discharge volumes allowed for industrial use before 1999. Six Oregon groundwater rights allowing a mix of industrial, railroad, fire protection, domestic (City of Seneca), and irrigation groundwater use were found. Maximum volumes allowed for the mixed uses are based on maximum discharge rates authorized by the rights. Maximum allowed industrial use volumes were calculated by excluding the maximum annual irrigation volume allowed based on the irrigated acreage allowed (assume 3 acre-feet per year volume per acre) and by excluding the average annual domestic volume for the City of Seneca (appendix B1).

Appendix B1:

Table of annual totals of reported groundwater volume pumped for municipal non-irrigation use
(See notes at end of table)

	Groundwater Volume Pumped (acre-feet)					
Water Year	**Burns**	**Hines**	**Seneca**	**Lowland Total[1]**	**Upland Total[2]**	**All Towns Total[2]**
1985	NULL	NULL	NULL	NULL	NULL	NULL
1986	NULL	NULL	NULL	NULL	NULL	NULL
1987	NULL	NULL	NULL	NULL	NULL	NULL
1988	1,163.97	889.15	NULL	2,053.12	NULL	NULL
1989	1,351.57	786.70	NULL	2,138.27	NULL	NULL
1990	1,499.18	892.26	NULL	2,391.44	NULL	NULL
1991	1,662.91	898.45	NULL	2,561.36	NULL	NULL
1992	1,478.73	825.53	NULL	2,304.25	NULL	NULL
1993	1,203.86	720.66	15.83	1,924.52	15.83	1,940.35
1994	1,285.11	959.47	30.25	2,244.58	30.25	2,274.82
1995	1,346.78	790.42	24.87	2,137.19	24.87	2,162.07
1996	1,340.29	814.09	16.93	2,154.38	16.93	2,171.31
1997	1,330.99	NULL	18.96	NULL	18.96	NULL
1998	1,201.52	1,022.61	101.06	2,224.13	101.06	2,325.19
1999	1,425.87	1,101.35	21.68	2,527.22	21.68	2,548.90
2000	1,199.41	1,112.39	16.33	2,311.80	16.33	2,328.13
2001	1,319.00	981.70	16.18	2,300.71	16.18	2,316.89
2002	1,057.56	1,007.76	71.24	2,065.33	71.24	2,136.57
2003	1,300.44	974.85	70.18	2,275.30	70.18	2,345.48
2004	1,370.82	974.30	59.78	2,345.12	59.78	2,404.90
2005	1,395.56	885.81	54.61	2,281.38	54.61	2,335.99
2006	1,424.99	1,072.81	66.88	2,497.80	66.88	2,564.68
2007	1,503.76	NULL	75.72	NULL	75.72	NULL
2008	1,544.22	908.54	60.60	2,452.76	60.60	2,513.36
2009	1,499.50	808.63	59.78	2,308.13	59.78	2,367.91
2010	1,298.15	716.46	66.84	2,014.61	66.84	2,081.45
2011	1,189.16	595.33	75.47	1,784.50	75.47	1,859.96
2012	893.62	704.81	64.95	1,598.43	64.95	1,663.38
2013	1,217.38	692.01	47.62	1,909.39	47.62	1,957.01
2014	1,252.35	693.12	99.70	1,945.47	99.70	2,045.17
2015	1,236.95	660.55	57.43	1,897.49	57.43	1,954.92
2016	1,289.37	694.03	46.09	1,983.40	46.09	2,029.49
2017	1,263.05	659.84	28.33	1,922.88	28.33	1,951.21
2018	1,239.30	625.70	59.49	1,865.01	59.49	1,924.50
2019	NULL	NULL	NULL	NULL	NULL	NULL
2020	NULL	NULL	NULL	NULL	NULL	NULL
Total (1993-2018)[3]	**30,794.28**	**20,177.23**	**1,232.13**	**50,971.51**	**1,232.13**	**52,203.64**
Average (1993-2018)[3]	**1,283.09**	**840.72**	**51.34**	**2,123.81**	**51.34**	**2,175.15**

Notes:
NULL: nothing entered and/or not known as of 12 September 2019
[1] Totals are for water years where data was found for Burns and Hines
[2] Totals are for water years where data was found for Seneca
[3] Totals and averages are for water years where data was found for all 3 towns
Groundwater volumes shown exclude volume pumped from wells dedicated to irrigation use
Burns and Hines are in the "North Region Lowland"
Seneca is in the "North Region Upland"
Data Sources: Oregon Water Resources Department 2019b, 2019c, 2019d

Appendix B2:

Table of monthly totals of reported groundwater volume pumped for municipal non-irrigation use in water years 2000 and 2010
(See notes at end of table)

	Burns, Hines, Seneca					
	Groundwater Volume Pumped (acre-feet) for Water Year 2000					
	Burns	**Hines**	**Seneca**	**Lowland Total**	**Upland Total**	**All Towns Total**
Population	3064	1623	223	4687	223	**4910**
Households	1272	641	95	1913	95	**2008**
Month	Groundwater Volume Pumped in 2000 (acre-feet)					
October	80.06	56.27	1.24	136.33	1.24	**137.57**
November	59.99	42.32	0.99	102.31	0.99	**103.29**
December	57.11	34.70	1.00	91.82	1.00	**92.82**
January	49.79	33.83	1.30	83.62	1.30	**84.92**
February	48.11	17.39	0.95	65.49	0.95	**66.44**
March	55.05	48.76	0.85	103.82	0.85	**104.66**
April	63.01	55.40	1.04	118.41	1.04	**119.46**
May	113.40	116.74	1.06	230.14	1.06	**231.20**
June	190.51	187.61	1.96	378.12	1.96	**380.08**
July	190.72	217.10	0.33	407.82	0.33	**408.16**
August	205.45	220.71	3.64	426.16	3.64	**429.80**
September	86.20	81.56	1.96	167.76	1.96	**169.72**
Total	**1,199.41**	**1,112.39**	**16.33**	**2,311.80**	**16.33**	**2,328.13**
Average	**99.95**	**92.70**	**1.36**	**192.65**	**1.36**	**194.01**
October-April Average	**59.02**	**41.24**	**1.05**	**100.26**	**1.05**	**101.31**
May-September Average	**157.26**	**164.74**	**1.79**	**322.00**	**1.79**	**323.79**

	Burns, Hines, Seneca					
	Groundwater Volume Pumped (acre-feet) for Water Year 2010					
	Burns	**Hines**	**Seneca**	**Lowland Total**	**Upland Total**	**All Towns Total**
Population	2806	1563	199	4369	199	**4568**
Households	1280	678	95	1958	95	**2053**
Month	Groundwater Volume Pumped in 2010 (acre-feet)					
October	81.65	33.24	2.67	114.89	2.67	**117.56**
November	69.45	28.29	2.46	97.74	2.46	**100.20**
December	74.68	28.57	4.20	103.25	4.20	**107.45**
January	67.86	25.87	3.74	93.72	3.74	**97.47**
February	62.92	24.11	3.11	87.03	3.11	**90.13**
March	77.28	28.14	3.18	105.42	3.18	**108.60**
April	71.37	27.54	2.60	98.91	2.60	**101.52**
May	85.16	37.69	5.75	122.86	5.75	**128.61**
June	139.18	88.33	4.58	227.50	4.58	**232.09**
July	232.61	162.94	15.47	395.55	15.47	**411.02**
August	207.72	152.08	13.31	359.80	13.31	**373.12**
September	128.27	79.65	5.76	207.92	5.76	**213.68**
Total	**1,298.15**	**716.46**	**66.84**	**2,014.61**	**66.84**	**2,081.45**
Average	**108.18**	**59.70**	**5.57**	**167.88**	**5.57**	**173.45**
October-April Average	**72.17**	**27.97**	**3.14**	**100.14**	**3.14**	**103.28**
May-September Average	**158.59**	**104.14**	**8.98**	**262.73**	**8.98**	**271.70**

	Burns, Hines, Seneca					
	Average of Groundwater Volume Pumped (acre-feet) for Water Years 2000 and 2010					
	Burns	**Hines**	**Seneca**	**Lowland Total**	**Upland Total**	**All Towns Total**
Population (2000 & 2010 avearge)	2935	1593	211	4528	211	**4739**
Households (2000 & 2010 avearge)	1276	660	95	1936	95	**2031**
Month	Average of Groundwater Volume Pumped in 2000 and 2010 (acre-feet)					
October	80.86	44.75	1.96	125.61	1.96	**127.57**
November	64.72	35.30	1.72	100.02	1.72	**101.75**
December	65.90	31.64	2.60	97.54	2.60	**100.13**
January	58.82	29.85	2.52	88.67	2.52	**91.19**
February	55.51	20.75	2.03	76.26	2.03	**78.29**
March	66.17	38.45	2.01	104.62	2.01	**106.63**
April	67.19	41.47	1.82	108.66	1.82	**110.49**
May	99.28	77.22	3.40	176.50	3.40	**179.90**
June	164.84	137.97	3.27	302.81	3.27	**306.08**
July	211.66	190.02	7.90	401.69	7.90	**409.59**
August	206.59	186.39	8.48	392.98	8.48	**401.46**
September	107.24	80.61	3.86	187.84	3.86	**191.70**
Total	**1,248.78**	**914.42**	**41.59**	**2,163.21**	**41.59**	**2,204.79**
Average	**104.07**	**76.20**	**3.47**	**180.27**	**3.47**	**183.73**
October-April Average	**65.60**	**34.60**	**2.10**	**100.20**	**2.10**	**102.29**
May-September Average	**157.92**	**134.44**	**5.38**	**292.36**	**5.38**	**297.75**

Notes

Burns and Hines are in the "North Region Lowland"

Seneca is in the "North Region Upland"

Data Sources:

Oregon Water Resources Department 2019b, 2019c, 2019d

Portland State University Population Research Center 2019a, 2019b, 2019c

Appendix: B3:

Calculated per capita and per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped
(See notes at end of table)

Burns, Hines, Seneca
Water Year 2000

Month	Total Volume (acre-feet)	Volume per Capita[1] (gallons / day)	Volume per Household[2] (acre-feet / month)	Volume per Household[2] (gallons / day)	Volume per Household[2] (cubic-feet / day)
October	137.57	294.52	0.069	720.17	96.27
November	103.29	228.50	0.051	558.74	74.69
December	92.82	198.70	0.046	485.87	64.95
January	84.92	181.80	0.042	444.55	59.43
February	66.44	157.48	0.033	385.07	51.48
March	104.66	224.07	0.052	547.89	73.24
April	119.46	264.26	0.059	646.17	86.38
May	231.20	494.95	0.115	1,210.26	161.79
June	380.08	840.79	0.189	2,055.92	274.84
July	408.16	873.78	0.203	2,136.58	285.62
August	429.80	920.13	0.214	2,249.91	300.77
September	169.72	375.45	0.085	918.05	122.73
Total	**2,328.13**		**1.159**		
Average	**194.01**	**423.30**	**0.097**	**1,035.07**	**138.37**
October-April Average	**101.31**	**221.33**	**0.050**	**541.21**	**72.35**
May-September Average	**323.79**	**701.02**	**0.161**	**1,714.14**	**229.15**

Burns, Hines, Seneca
Water Year 2010

Month	Total Volume (acre-feet)	Volume per Capita[3] (gallons / day)	Volume per Household[4] (acre-feet / month)	Volume per Household[4] (gallons / day)	Volume per Household[4] (cubic-feet / day)
October	117.56	270.52	0.057	601.93	80.47
November	100.20	238.26	0.049	530.14	70.87
December	107.45	247.25	0.052	550.15	73.54
January	97.47	224.28	0.047	499.02	66.71
February	90.13	229.63	0.044	510.93	68.30
March	108.60	249.90	0.053	556.04	74.33
April	101.52	241.38	0.049	537.08	71.80
May	128.61	295.94	0.063	658.48	88.03
June	232.09	551.85	0.113	1,227.88	164.14
July	411.02	945.80	0.200	2,104.44	281.32
August	373.12	858.57	0.182	1,910.36	255.38
September	213.68	508.09	0.104	1,130.52	151.13
Total	**2,081.45**		**1.014**		
Average	**173.45**	**406.79**	**0.084**	**905.12**	**121.00**
October-April Average	**103.28**	**243.03**	**0.050**	**540.76**	**72.29**
May-September Average	**271.70**	**632.05**	**0.132**	**1,406.34**	**188.00**

Burns, Hines, Seneca
Water Year 2000 and 2010

Month	2-Year Total Total Volume (acre-feet)	2-Year Average Total Volume (acre-feet)	2-Year Average Volume per Capita[5] (gallons / day)	2-Year Average Volume per Household[6] (acre-feet / month)	2-Year Average Volume per Household[6] (gallons / day)	2-Year Average Volume per Household[6] (cubic-feet / day)
October	255.14	127.57	282.96	0.063	660.39	88.28
November	203.50	101.75	233.21	0.050	544.28	72.76
December	200.27	100.13	222.10	0.049	518.37	69.30
January	182.39	91.19	202.27	0.045	472.09	63.11
February	156.58	78.29	192.25	0.039	448.70	59.98
March	213.27	106.63	236.52	0.053	552.01	73.79
April	220.97	110.49	253.23	0.054	591.02	79.01
May	359.81	179.90	399.04	0.089	931.31	124.50
June	612.16	306.08	701.53	0.151	1,637.32	218.88
July	819.18	409.59	908.49	0.202	2,120.33	283.45
August	802.92	401.46	890.46	0.198	2,078.25	277.82
September	383.40	191.70	439.37	0.094	1,025.46	137.08
Total	**4,409.58**	**2,204.79**		**1.086**		
Average	**367.47**	**183.73**	**415.34**	**0.090**	**969.37**	**129.59**
October-April Average		**102.29**	**231.79**	**0.050**	**540.98**	**72.32**
May-September Average		**297.75**	**667.78**	**0.147**	**1,558.53**	**208.35**

Notes:

[1] 2000 US Census data indicate 4910 total population in Burns, Hines, and Seneca

[2] 2000 US Census data indicate 2008 total households in Burns, Hines, and Seneca

[3] 2010 US Census data indicate 4568 total population in Burns, Hines, and Seneca

[4] 2010 US Census data indicate 2053 total households in Burns, Hines, and Seneca

[5] 2-year total volume divided by 2000 total population plus 2010 total population

[6] 2-year total volume divided by 2000 total households plus 2010 total households

Data Sources:

Oregon Water Resources Department 2019b, 2019c, 2019d

Portland State University Population Research Center 2019a, 2019b, 2019c

Appendix: B4:

Table B4-1. Reported GH2O Community System groundwater volume pumped and calculated three-year average system and per household volumes
(See notes at end of table)

G H 2 O Inc. Community Water System

	Water Year 2013			Water Year 2014			Water Year 2015			Water Years 2013, 2014, 2015	
Water Year Month	East Well[1] HARN 295 (acre-feet)	West Well[1] HARN 50578 (acre-feet)	Total (acre-feet)	East Well[1] HARN 295 (acre-feet)	West Well[1] HARN 50578 (acre-feet)	Total (acre-feet)	East Well[1] HARN 295 (acre-feet)	West Well[1] HARN 50578 (acre-feet)	Total (acre-feet)	System 3-Year Average (acre-feet)	Household[2] 3-Year Average (acre-feet)
October	0.057	Null	0.057	0.057	2.945	3.002	0.057	4.406	4.462	**2.507**	**0.084**
November	0.057	1.285	1.341	0.057	1.391	1.447	0.065	0.000	0.065	**0.951**	**0.032**
December	0.057	1.285	1.341	0.057	1.391	1.447	0.065	0.000	0.065	**0.951**	**0.032**
January	0.057	1.285	1.341	0.057	1.391	1.447	0.065	0.000	0.065	**0.951**	**0.032**
February	0.057	1.285	1.341	0.057	1.391	1.447	0.065	0.000	0.065	**0.951**	**0.032**
March	0.057	1.285	1.341	0.057	1.391	1.447	0.065	2.369	2.434	**1.741**	**0.058**
April	0.057	1.285	1.341	0.057	1.391	1.447	0.065	2.392	2.456	**1.748**	**0.058**
May	0.057	1.898	1.955	0.057	1.391	1.447	0.065	5.334	5.399	**2.934**	**0.098**
June	0.057	1.898	1.955	0.057	1.391	1.447	0.065	5.334	5.399	**2.934**	**0.098**
July	0.057	7.987	8.043	0.057	7.554	7.611	0.065	6.917	6.982	**7.545**	**0.252**
August	0.057	7.987	8.043	0.057	7.554	7.611	0.065	6.917	6.982	**7.545**	**0.252**
September	0.057	2.945	3.002	0.057	4.406	4.462	0.065	4.376	4.441	**3.968**	**0.132**
Water Year	**0.681**	**30.422**	**31.103**	**0.681**	**33.584**	**34.265**	**0.768**	**38.045**	**38.813**	**34.727**	**1.158**

Notes:

[1]Notes accompanying the volume data submitted to OWRD indicate flow meter readings were infrequent rather than monthly and the volume difference between readings was evenly distributed over the intervening months

[2]The Oregon Health Authority database indicates GH2O has 30 household connections which was used to calculate the average household water use in the GH2O water system (system 3-year average / 30 households)

Null: nothing entered and/or not known

GH2O Inc. is in the "North Region Lowland"

Data Sources:

Oregon Health Authority 2019b

Oregon Water Resources Department 2019e

Appendix: B4:

Table B4-2. Calculated Harney Basin GH2O Community System groundwater use: total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin GH2O Community System Groundwater Volume Pumped Based on OHA Drinking Water Program Data (System Connections) and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

	A	B	C = A x B	D	E = A x [B < or = 0.05]	F = A x [B > 0.05 or = 0.00]
Water Year Month	**Total Community System Household Connections[1]**	**Municipal Household Volume[2] (acre-feet / household-month)**	**Total Community System Volume[3] (acre-feet / month)**	**Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)**	**Total Indoor Household Volume[5] (acre-feet / month)**	**Total Outdoor Household Volume[6] (acre-feet / month)**
October	30	0.062827	1.884810	0.050000	1.500000	0.384810
November	30	0.050110	1.503300	0.050000	1.500000	0.003300
December	30	0.049315	1.479450	0.050000	1.479450	0.000000
January	30	0.044912	1.347360	0.050000	1.347360	0.000000
February	30	0.038556	1.156680	0.050000	1.156680	0.000000
March	30	0.052516	1.575480	0.050000	1.500000	0.075480
April	30	0.054413	1.632390	0.050000	1.500000	0.132390
May	30	0.088601	2.658030	0.050000	1.500000	1.158030
June	30	0.150742	4.522260	0.050000	1.500000	3.022260
July	30	0.201719	6.051570	0.050000	1.500000	4.551570
August	30	0.197715	5.931450	0.050000	1.500000	4.431450
September	30	0.094410	2.832300	0.050000	1.500000	1.332300
Year Total		**1.085836**	**32.575080**		**17.483490**	**15.091590**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin GH2O Community System Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

	A	B	C = A x B	D	E = [A x [B < or = 0.05]]*0.10	F = {[A x [B > 0.05]] x 0.80} or = 0.00	G = E + F
Water Year Month	**Total Community System Household Connections[1]**	**Municipal Household Volume[2] (acre-feet / household-month)**	**Total Community System Volume[3] (acre-feet / month)**	**Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)**	**Indoor GW Volume Consumed[7] (acre-feet / month)**	**Outdoor GW Volume Consumed[8] (acre-feet / month)**	**Total GW Volume Consumed[9] (acre-feet / month)**
October	30	0.062827	1.884810	0.050000	0.150000	0.307848	0.457848
November	30	0.050110	1.503300	0.050000	0.150000	0.002640	0.152640
December	30	0.049315	1.479450	0.050000	0.147945	0.000000	0.147945
January	30	0.044912	1.347360	0.050000	0.134736	0.000000	0.134736
February	30	0.038556	1.156680	0.050000	0.115668	0.000000	0.115668
March	30	0.052516	1.575480	0.050000	0.150000	0.060384	0.210384
April	30	0.054413	1.632390	0.050000	0.150000	0.105912	0.255912
May	30	0.088601	2.658030	0.050000	0.150000	0.926424	1.076424
June	30	0.150742	4.522260	0.050000	0.150000	2.417808	2.567808
July	30	0.201719	6.051570	0.050000	0.150000	3.641256	3.791256
August	30	0.197715	5.931450	0.050000	0.150000	3.545160	3.695160
September	30	0.094410	2.832300	0.050000	0.150000	1.065840	1.215840
Year Total		**1.085836**	**32.575080**		**1.748349**	**12.073272**	**13.821621**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin GH2O Community System Groundwater Volume Pumped is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

	A	B	C = A x B	D	E = [A x [B < or = 0.05]]*0.90	F = {[A x [B > 0.05]] x 0.20} or = 0.00	G = E + F
Water Year Month	**Total Community System Household Connections[1]**	**Municipal Household Volume[2] (acre-feet / household-month)**	**Total Community System Volume[3] (acre-feet / month)**	**Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)**	**Indoor GW Volume Returned[10] (acre-feet / month)**	**Outdoor GW Volume Returned[11] (acre-feet / month)**	**Total GW Volume Returned[12] (acre-feet / month)**
October	30	0.062827	1.884810	0.050000	1.350000	0.076962	1.426962
November	30	0.050110	1.503300	0.050000	1.350000	0.000660	1.350660
December	30	0.049315	1.479450	0.050000	1.331505	0.000000	1.331505
January	30	0.044912	1.347360	0.050000	1.212624	0.000000	1.212624
February	30	0.038556	1.156680	0.050000	1.041012	0.000000	1.041012
March	30	0.052516	1.575480	0.050000	1.350000	0.015096	1.365096
April	30	0.054413	1.632390	0.050000	1.350000	0.026478	1.376478
May	30	0.088601	2.658030	0.050000	1.350000	0.231606	1.581606
June	30	0.150742	4.522260	0.050000	1.350000	0.604452	1.954452
July	30	0.201719	6.051570	0.050000	1.350000	0.910314	2.260314
August	30	0.197715	5.931450	0.050000	1.350000	0.886290	2.236290
September	30	0.094410	2.832300	0.050000	1.350000	0.266460	1.616460
Year Total		**1.085836**	**32.575080**		**15.735141**	**3.018318**	**18.753459**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of GH2O community system household connections (see Oregon Health Authority 2019b)

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total volume pumped for the entire GH2O community system (the number of GH2O community system household connections in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total indoor groundwater use for the entire GH2O community system (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of GH2O community system household connections in column A)

[6] Calculated total outdoor groundwater use for the entire GH2O community system (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of GH2O community system household connections in column A)

[7] Calculated total indoor groundwater use for the entire GH2O community system that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total outdoor groundwater use for the entire GH2O community system that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total indoor and outdoor groundwater use for the entire GH2O community system that is consumed (column E added to column F)

[10] Calculated total indoor groundwater use for the entire GH2O community system that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total outdoor groundwater use for the entire GH2O community system that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total indoor and outdoor groundwater use for the entire GH2O community system that is returned to groundwater (column E added to column F)

GH2O Inc. is in the "North Region Lowland"

Data Sources:

Oregon Health Authority 2019b
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019e
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B5:

Table B5-1. Calculated groundwater use for Harney Basin Non-municipal Public Water Systems registered with Oregon Health Authority
(See notes at end of table)

Public Facility	Reported Unit	Published Water Use: Reported Rate (gallons / year) Minimum	Reported Rate (gallons / year) Maximum	Converted Rate (gallons / day)[1] Minimum	Converted Rate (gallons / day)[1] Maximum	Converted Rate (ac-ft / year) Minimum	Converted Rate (ac-ft / year) Maximum	Rate Used for Calculations: gallons / day-person	ac-ft / year-person
Highway Rest Area	per patron	547.50	1,277.50	1.50	3.50	0.0017	0.0039	3.50	0.0039
School[2]	per student	1,700.00	2,700.00	8.72	13.85	0.0052	0.0083	10.00	0.0112
Restaurant[3]	per seat	10,600.00	14,300.00	29.04	39.18	0.0325	0.0439	15.00	0.0168
Hotel/Motel[4]	per room	30,200.00	39,500.00	82.74	108.22	0.0927	0.1212	100.00	0.1120
Nursing Home/Assisted Living[4]	per bed	32,800.00	40,700.00	89.86	111.51	0.1007	0.1249	100.00	0.1120
Nursing Home/Assisted Living[4]	per apartment	25,400.00	39,600.00	69.59	108.49	0.0779	0.1215	100.00	0.1120

Calculated Groundwater Volume Pumped for Non-municipal Public Water Systems

Non-Municipal Public Water System (PWS) Name	Water Budget Region	Water Budget Low-Upland	Facility Type	Population Served A	Daily Rate gal / day-pop B	Days / Year C	Total Volume Pumped ac-ft / year D = (AxBxC)/(43,560x7.480520)	Volume Return to GW ac-ft / year E = D x 0.90	Volume Consumed ac-ft / year F = D x 0.10
BLM BURNS DISTRICT OFFICE	North	Lowland	Office[5]	70	10.00	365	0.78	0.71	0.08
BURNS MUNICIPAL AIRPORT	North	Lowland	Office-Airport[5]	16	10.00	365	0.18	0.16	0.02
CRANE LDS CHAPEL	North	Lowland	Church[6]	12	10.00	104	0.04	0.03	0.00
CRANE STORE & CAFE	North	Lowland	Restaurant	15	15.00	365	0.25	0.23	0.03
CRANE UNION HIGH/ELEM SD 1J	North	Lowland	School (live-in)[7]	200	100.00	273	16.76	15.08	1.68
CRYSTAL CRANE HOT SPRINGS	North	Lowland	Motel-Hotel	50	100.00	365	5.60	5.04	0.56
GH2O INC[8]	North	Lowland	Quasi-Municipal[8]	65		365	32.58	18.75	13.82
HORSESHOE INN	North	Lowland	Motel-Hotel	15	100.00	365	1.68	1.51	0.17
SILVIES VALLEY RANCH	North	Upland	Office-Visitor Ctr[5]	24	10.00	365	0.27	0.24	0.03
USFS FALLS CAMPGROUND	North	Upland	Campground[9]	10	10.00	273	0.08	0.08	0.01
USFS IDLEWILD CAMPGROUND	North	Upland	Campground[9]	15	10.00	273	0.13	0.11	0.01
USFS PARISH CABIN CAMPGROUND	North	Upland	Campground[9]	15	10.00	273	0.13	0.11	0.01
BLM PAGE SPRINGS REC SITE	South	Lowland	Campground[9]	30	10.00	273	0.25	0.23	0.03
DIAMOND SD #7	South	Lowland	School	17	10.00	195	0.10	0.09	0.01
FRENCHGLEN ELEM SD 16	South	Lowland	School	14	10.00	195	0.08	0.08	0.01
HOTEL DIAMOND	South	Lowland	Motel-Hotel	20	100.00	365	2.24	2.02	0.22
MALHEUR FIELD STATION	South	Lowland	Motel-Hotel	22	100.00	365	2.46	2.22	0.25
OPRD FRENCHGLEN HOTEL	South	Lowland	Motel-Hotel	25	100.00	365	2.80	2.52	0.28
STEENS MOUNTAIN WILDERNESS RESORT	South	Lowland	Motel-Hotel	30	100.00	365	3.36	3.02	0.34
USFWS MALHEUR WILDLIFE REFUGE	South	Lowland	Office-Visitor Ctr[5]	20	10.00	365	0.22	0.20	0.02
THE NARROWS	West	Lowland	Restaurant	40	15.00	365	0.67	0.60	0.07
SUNTEX ELEMENTARY SD 10	West	Lowland	School	13	10.00	195	0.08	0.07	0.01
BLM CHICKAHOMINY CAMPGROUND	West	Upland	Campground[9]	15	10.00	273	0.13	0.11	0.01
ODOT HD SAGE HEN HILL REST AREA	West	Upland	Rest Area	200	3.50	365	0.78	0.71	0.08
USFS DELINTMENT LAKE EAST HP	West	Upland	Heliport (live-in)[10]	45	231.79	273	8.74	7.86	0.87
Totals				**998**			**80.39**	**61.79**	**18.60**

Notes:

Calculations for each facility listed above (except GH20 Inc) assumes water use is indoor use with 10% consumed and 90% returned to groundwater via septic systems

Conversion factors used: 1 acre-foot = 43,560 cubic feet, 1 cubic foot = 7.48052 gallons

[1]Reported annual rate divided by 365 days except 195 days used for schools (5 days per week for 39 weeks)

[2]School use per person is assumed to occur 5 days per week for 39 weeks (9 months) per year for a total of 195 days per year

[3]Restaurant use assumes 2 persons per restaurant seat per day for 365 days per year

[4]Hotel/Motel and Nursing Home/Assisted Living use assumes 1 person per room, 1 person per bed per day for 365 days per year

[5]Office use assumes same daily rate per person as schools

[6]Church use assumes same daily rate per person as schools for 2 days per week for 52 weeks per year for a total of 104 days per year

[7]Crane School use assumes all students are live-in using water at the same rate as motel-hotel for 7 days per week for 39 weeks per year for a total of 273 days per year

[8]GH2O INC use calculation results found in Appendix B4

[9]Campground use assumes same daily rate as schools for 7 days per week for 39 weeks (9 months) per year for a total of 273 days per year

[10]USFS Heliport has live-in domestic use. Calculation assumes an indoor domestic use rate of 231.79 gallons per day per person as calculated in Appendix B3 (see October-April average for water years 2000 and 2010)

Data Sources:

Al-Kaisy and others 2011
Colorado WaterWise Council 2007
Oregon Health Authority 2019a
Oregon Health Authority 2019b

Appendix: B5:

Table B5-2. Calculated groundwater use for Harney Basin Non-municipal Public Water Systems summarized by basin and water-budget regions
(See notes at end of table)

	Calculated Groundwater Volume Pumped for Non-municipal Public Water Systems Summarized				
	Total Population Served	**Total Number of Wells**	**Total Volume Pumped (acre-feet / year)**	**Volume Return to GW (acre-feet / year)**	**Volume Consumed (acre-feet / year)**
Total Non-municipal Public Water System GW Use for Basin					
Entire Harney Basin	**998**	**29**	**80.39**	**61.79**	**18.60**
Total Non-municipal Public Water System GW Use by Region					
Entire North Region	507	14	58.47	42.06	16.41
Entire West Region	313	6	10.40	9.36	1.04
Entire South Region	178	9	11.53	10.37	1.15
Entire Region Total	**998**	**29**	**80.39**	**61.79**	**18.60**
Total Non-municipal Public Water System GW Use in Lowlands					
Entire Harney Basin Lowland	674	20	70.14	52.56	17.58
North Region Lowland	443	9	57.87	41.52	16.35
West Region Lowland	53	2	0.75	0.67	0.07
South Region Lowland	178	9	11.53	10.37	1.15
Region Lowland Total	**674**	**20**	**70.14**	**52.56**	**17.58**
Total Non-municipal Public Water System GW Use in Uplands					
Entire Harney Basin Upland	324	9	10.25	9.23	1.03
North Region Upland	64	5	0.60	0.54	0.06
West Region Upland	260	4	9.65	8.68	0.96
South Region Upland	0	0	0.00	0.00	0.00
Region Upland Total	**324**	**9**	**10.25**	**9.23**	**1.03**

Notes:
Calculations assume water use (except GH20 Inc) is indoor use with 10% consumed and 90% returned to groundwater via septic systems
Data Sources:
Al-Kaisy and others 2011
Colorado WaterWise Council 2007
Oregon Health Authority 2019a
Oregon Health Authority 2019b

Appendix: B6:

Table B6-1. Calculated total rural household groundwater use for the entire Harney Basin: total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	1,103	0.063	69.298	0.050	55.150	14.148
November	1,103	0.050	55.271	0.050	55.150	0.121
December	1,103	0.049	54.394	0.050	54.394	0.000
January	1,103	0.045	49.538	0.050	49.538	0.000
February	1,103	0.039	42.527	0.050	42.527	0.000
March	1,103	0.053	57.925	0.050	55.150	2.775
April	1,103	0.054	60.018	0.050	55.150	4.868
May	1,103	0.089	97.727	0.050	55.150	42.577
June	1,103	0.151	166.268	0.050	55.150	111.118
July	1,103	0.202	222.496	0.050	55.150	167.346
August	1,103	0.198	218.080	0.050	55.150	162.930
September	1,103	0.094	104.134	0.050	55.150	48.984
Year Total		**1.086**	**1,197.677**		**642.810**	**554.867**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	1,103	0.063	69.298	0.050	5.515	11.319	16.834
November	1,103	0.050	55.271	0.050	5.515	0.097	5.612
December	1,103	0.049	54.394	0.050	5.439	0.000	5.439
January	1,103	0.045	49.538	0.050	4.954	0.000	4.954
February	1,103	0.039	42.527	0.050	4.253	0.000	4.253
March	1,103	0.053	57.925	0.050	5.515	2.220	7.735
April	1,103	0.054	60.018	0.050	5.515	3.894	9.409
May	1,103	0.089	97.727	0.050	5.515	34.062	39.577
June	1,103	0.151	166.268	0.050	5.515	88.895	94.410
July	1,103	0.202	222.496	0.050	5.515	133.877	139.392
August	1,103	0.198	218.080	0.050	5.515	130.344	135.859
September	1,103	0.094	104.134	0.050	5.515	39.187	44.702
Year Total		**1.086**	**1,197.677**		**64.281**	**443.894**	**508.175**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	1,103	0.063	69.298	0.050	49.635	2.830	52.465
November	1,103	0.050	55.271	0.050	49.635	0.024	49.659
December	1,103	0.049	54.394	0.050	48.955	0.000	48.955
January	1,103	0.045	49.538	0.050	44.584	0.000	44.584
February	1,103	0.039	42.527	0.050	38.275	0.000	38.275
March	1,103	0.053	57.925	0.050	49.635	0.555	50.190
April	1,103	0.054	60.018	0.050	49.635	0.974	50.609
May	1,103	0.089	97.727	0.050	49.635	8.515	58.150
June	1,103	0.151	166.268	0.050	49.635	22.224	71.859
July	1,103	0.202	222.496	0.050	49.635	33.469	83.104
August	1,103	0.198	218.080	0.050	49.635	32.586	82.221
September	1,103	0.094	104.134	0.050	49.635	9.797	59.432
Year Total		**1.086**	**1,197.677**		**578.529**	**110.973**	**689.502**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the entire Harney Basin

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the entire Harney Basin (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the entire Harney Basin (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the entire Harney Basin (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the entire Harney Basin that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the entire Harney Basin that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the entire Harney Basin that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the entire Harney Basin that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin that is returned to groundwater (column E added to column F)

Data Sources:

Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B6:

Table B6-2. Calculated total rural household groundwater use for the entire Harney Basin Lowland: total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	958	0.063	60.188	0.050	47.900	12.288
November	958	0.050	48.005	0.050	47.900	0.105
December	958	0.049	47.244	0.050	47.244	0.000
January	958	0.045	43.026	0.050	43.026	0.000
February	958	0.039	36.937	0.050	36.937	0.000
March	958	0.053	50.310	0.050	47.900	2.410
April	958	0.054	52.128	0.050	47.900	4.228
May	958	0.089	84.880	0.050	47.900	36.980
June	958	0.151	144.411	0.050	47.900	96.511
July	958	0.202	193.247	0.050	47.900	145.347
August	958	0.198	189.411	0.050	47.900	141.511
September	958	0.094	90.445	0.050	47.900	42.545
Year Total		**1.086**	**1,040.231**		**558.306**	**481.925**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	958	0.063	60.188	0.050	4.790	9.831	14.621
November	958	0.050	48.005	0.050	4.790	0.084	4.874
December	958	0.049	47.244	0.050	4.724	0.000	4.724
January	958	0.045	43.026	0.050	4.303	0.000	4.303
February	958	0.039	36.937	0.050	3.694	0.000	3.694
March	958	0.053	50.310	0.050	4.790	1.928	6.718
April	958	0.054	52.128	0.050	4.790	3.382	8.172
May	958	0.089	84.880	0.050	4.790	29.584	34.374
June	958	0.151	144.411	0.050	4.790	77.209	81.999
July	958	0.202	193.247	0.050	4.790	116.277	121.067
August	958	0.198	189.411	0.050	4.790	113.209	117.999
September	958	0.094	90.445	0.050	4.790	34.036	38.826
Year Total		**1.086**	**1,040.231**		**55.831**	**385.540**	**441.370**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	958	0.063	60.188	0.050	43.110	2.458	45.568
November	958	0.050	48.005	0.050	43.110	0.021	43.131
December	958	0.049	47.244	0.050	42.519	0.000	42.519
January	958	0.045	43.026	0.050	38.723	0.000	38.723
February	958	0.039	36.937	0.050	33.243	0.000	33.243
March	958	0.053	50.310	0.050	43.110	0.482	43.592
April	958	0.054	52.128	0.050	43.110	0.846	43.956
May	958	0.089	84.880	0.050	43.110	7.396	50.506
June	958	0.151	144.411	0.050	43.110	19.302	62.412
July	958	0.202	193.247	0.050	43.110	29.069	72.179
August	958	0.198	189.411	0.050	43.110	28.302	71.412
September	958	0.094	90.445	0.050	43.110	8.509	51.619
Year Total		**1.086**	**1,040.231**		**502.476**	**96.385**	**598.860**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the entire Harney Basin Lowland

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the entire Harney Basin Lowland (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the entire Harney Basin Lowland (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the entire Harney Basin Lowland (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the entire Harney Basin Lowland that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the entire Harney Basin Lowland that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Lowland that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the entire Harney Basin Lowland that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the entire Harney Basin Lowland that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Lowland that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B6:

Table B6-3. Calculated total rural household groundwater use for the entire Harney Basin Upland: total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	145	0.063	9.110	0.050	7.250	1.860
November	145	0.050	7.266	0.050	7.250	0.016
December	145	0.049	7.151	0.050	7.151	0.000
January	145	0.045	6.512	0.050	6.512	0.000
February	145	0.039	5.591	0.050	5.591	0.000
March	145	0.053	7.615	0.050	7.250	0.365
April	145	0.054	7.890	0.050	7.250	0.640
May	145	0.089	12.847	0.050	7.250	5.597
June	145	0.151	21.858	0.050	7.250	14.608
July	145	0.202	29.249	0.050	7.250	21.999
August	145	0.198	28.669	0.050	7.250	21.419
September	145	0.094	13.689	0.050	7.250	6.439
Year Total		**1.086**	**157.446**		**84.504**	**72.943**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	145	0.063	9.110	0.050	0.725	1.488	2.213
November	145	0.050	7.266	0.050	0.725	0.013	0.738
December	145	0.049	7.151	0.050	0.715	0.000	0.715
January	145	0.045	6.512	0.050	0.651	0.000	0.651
February	145	0.039	5.591	0.050	0.559	0.000	0.559
March	145	0.053	7.615	0.050	0.725	0.292	1.017
April	145	0.054	7.890	0.050	0.725	0.512	1.237
May	145	0.089	12.847	0.050	0.725	4.478	5.203
June	145	0.151	21.858	0.050	0.725	11.686	12.411
July	145	0.202	29.249	0.050	0.725	17.599	18.324
August	145	0.198	28.669	0.050	0.725	17.135	17.860
September	145	0.094	13.689	0.050	0.725	5.152	5.877
Year Total		**1.086**	**157.446**		**8.450**	**58.354**	**66.805**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	145	0.063	9.110	0.050	6.525	0.372	6.897
November	145	0.050	7.266	0.050	6.525	0.003	6.528
December	145	0.049	7.151	0.050	6.436	0.000	6.436
January	145	0.045	6.512	0.050	5.861	0.000	5.861
February	145	0.039	5.591	0.050	5.032	0.000	5.032
March	145	0.053	7.615	0.050	6.525	0.073	6.598
April	145	0.054	7.890	0.050	6.525	0.128	6.653
May	145	0.089	12.847	0.050	6.525	1.119	7.644
June	145	0.151	21.858	0.050	6.525	2.922	9.447
July	145	0.202	29.249	0.050	6.525	4.400	10.925
August	145	0.198	28.669	0.050	6.525	4.284	10.809
September	145	0.094	13.689	0.050	6.525	1.288	7.813
Year Total		**1.086**	**157.446**		**76.053**	**14.589**	**90.642**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the entire Harney Basin Upland

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the entire Harney Basin Upland (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the entire Harney Basin Upland (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the entire Harney Basin Upland (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the entire Harney Basin Upland that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the entire Harney Basin Upland that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Upland that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the entire Harney Basin Upland that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the entire Harney Basin Upland that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Upland that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B7:

Table B7-1. Calculated total rural household groundwater use for the Harney Basin "Entire North Region": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	872	0.063	54.785	0.050	43.600	11.185
November	872	0.050	43.696	0.050	43.600	0.096
December	872	0.049	43.003	0.050	43.003	0.000
January	872	0.045	39.163	0.050	39.163	0.000
February	872	0.039	33.621	0.050	33.621	0.000
March	872	0.053	45.794	0.050	43.600	2.194
April	872	0.054	47.448	0.050	43.600	3.848
May	872	0.089	77.260	0.050	43.600	33.660
June	872	0.151	131.447	0.050	43.600	87.847
July	872	0.202	175.899	0.050	43.600	132.299
August	872	0.198	172.407	0.050	43.600	128.807
September	872	0.094	82.326	0.050	43.600	38.726
Year Total		**1.086**	**946.849**		**508.187**	**438.662**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	872	0.063	54.785	0.050	4.360	8.948	13.308
November	872	0.050	43.696	0.050	4.360	0.077	4.437
December	872	0.049	43.003	0.050	4.300	0.000	4.300
January	872	0.045	39.163	0.050	3.916	0.000	3.916
February	872	0.039	33.621	0.050	3.362	0.000	3.362
March	872	0.053	45.794	0.050	4.360	1.755	6.115
April	872	0.054	47.448	0.050	4.360	3.079	7.439
May	872	0.089	77.260	0.050	4.360	26.928	31.288
June	872	0.151	131.447	0.050	4.360	70.278	74.638
July	872	0.202	175.899	0.050	4.360	105.839	110.199
August	872	0.198	172.407	0.050	4.360	103.046	107.406
September	872	0.094	82.326	0.050	4.360	30.980	35.340
Year Total		**1.086**	**946.849**		**50.819**	**350.930**	**401.748**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	872	0.063	54.785	0.050	39.240	2.237	41.477
November	872	0.050	43.696	0.050	39.240	0.019	39.259
December	872	0.049	43.003	0.050	38.702	0.000	38.702
January	872	0.045	39.163	0.050	35.247	0.000	35.247
February	872	0.039	33.621	0.050	30.259	0.000	30.259
March	872	0.053	45.794	0.050	39.240	0.439	39.679
April	872	0.054	47.448	0.050	39.240	0.770	40.010
May	872	0.089	77.260	0.050	39.240	6.732	45.972
June	872	0.151	131.447	0.050	39.240	17.569	56.809
July	872	0.202	175.899	0.050	39.240	26.460	65.700
August	872	0.198	172.407	0.050	39.240	25.761	65.001
September	872	0.094	82.326	0.050	39.240	7.745	46.985
Year Total		**1.086**	**946.849**		**457.368**	**87.732**	**545.101**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "Entire North Region"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "Entire North Region" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "Entire North Region" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire North Region" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "Entire North Region" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire North Region" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire North Region" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "Entire North Region" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire North Region" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire North Region" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B7:

Table B7-2. Calculated total rural household groundwater use for the Harney Basin "North Region Lowland": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	765	0.063	48.063	0.050	38.250	9.813
November	765	0.050	38.334	0.050	38.250	0.084
December	765	0.049	37.726	0.050	37.726	0.000
January	765	0.045	34.358	0.050	34.358	0.000
February	765	0.039	29.495	0.050	29.495	0.000
March	765	0.053	40.175	0.050	38.250	1.925
April	765	0.054	41.626	0.050	38.250	3.376
May	765	0.089	67.780	0.050	38.250	29.530
June	765	0.151	115.318	0.050	38.250	77.068
July	765	0.202	154.315	0.050	38.250	116.065
August	765	0.198	151.252	0.050	38.250	113.002
September	765	0.094	72.224	0.050	38.250	33.974
Year Total		**1.086**	**830.665**		**445.829**	**384.836**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	765	0.063	48.063	0.050	3.825	7.850	11.675
November	765	0.050	38.334	0.050	3.825	0.067	3.892
December	765	0.049	37.726	0.050	3.773	0.000	3.773
January	765	0.045	34.358	0.050	3.436	0.000	3.436
February	765	0.039	29.495	0.050	2.950	0.000	2.950
March	765	0.053	40.175	0.050	3.825	1.540	5.365
April	765	0.054	41.626	0.050	3.825	2.701	6.526
May	765	0.089	67.780	0.050	3.825	23.624	27.449
June	765	0.151	115.318	0.050	3.825	61.654	65.479
July	765	0.202	154.315	0.050	3.825	92.852	96.677
August	765	0.198	151.252	0.050	3.825	90.402	94.227
September	765	0.094	72.224	0.050	3.825	27.179	31.004
Year Total		**1.086**	**830.665**		**44.583**	**307.868**	**352.451**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	765	0.063	48.063	0.050	34.425	1.963	36.388
November	765	0.050	38.334	0.050	34.425	0.017	34.442
December	765	0.049	37.726	0.050	33.953	0.000	33.953
January	765	0.045	34.358	0.050	30.922	0.000	30.922
February	765	0.039	29.495	0.050	26.546	0.000	26.546
March	765	0.053	40.175	0.050	34.425	0.385	34.810
April	765	0.054	41.626	0.050	34.425	0.675	35.100
May	765	0.089	67.780	0.050	34.425	5.906	40.331
June	765	0.151	115.318	0.050	34.425	15.414	49.839
July	765	0.202	154.315	0.050	34.425	23.213	57.638
August	765	0.198	151.252	0.050	34.425	22.600	57.025
September	765	0.094	72.224	0.050	34.425	6.795	41.220
Year Total		**1.086**	**830.665**		**401.246**	**76.967**	**478.213**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "North Region Lowland"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "North Region Lowland" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Lowland" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Lowland" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Lowland" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Lowland" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Lowland" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Lowland" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Lowland" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Lowland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B7:

Table B7-3. Calculated total rural household groundwater use for the Harney Basin "North Region Upland": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	107	0.063	6.722	0.050	5.350	1.372
November	107	0.050	5.362	0.050	5.350	0.012
December	107	0.049	5.277	0.050	5.277	0.000
January	107	0.045	4.806	0.050	4.806	0.000
February	107	0.039	4.125	0.050	4.125	0.000
March	107	0.053	5.619	0.050	5.350	0.269
April	107	0.054	5.822	0.050	5.350	0.472
May	107	0.089	9.480	0.050	5.350	4.130
June	107	0.151	16.129	0.050	5.350	10.779
July	107	0.202	21.584	0.050	5.350	16.234
August	107	0.198	21.156	0.050	5.350	15.806
September	107	0.094	10.102	0.050	5.350	4.752
Year Total		**1.086**	**116.184**		**62.358**	**53.827**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	107	0.063	6.722	0.050	0.535	1.098	1.633
November	107	0.050	5.362	0.050	0.535	0.009	0.544
December	107	0.049	5.277	0.050	0.528	0.000	0.528
January	107	0.045	4.806	0.050	0.481	0.000	0.481
February	107	0.039	4.125	0.050	0.413	0.000	0.413
March	107	0.053	5.619	0.050	0.535	0.215	0.750
April	107	0.054	5.822	0.050	0.535	0.378	0.913
May	107	0.089	9.480	0.050	0.535	3.304	3.839
June	107	0.151	16.129	0.050	0.535	8.624	9.159
July	107	0.202	21.584	0.050	0.535	12.987	13.522
August	107	0.198	21.156	0.050	0.535	12.644	13.179
September	107	0.094	10.102	0.050	0.535	3.801	4.336
Year Total		**1.086**	**116.184**		**6.236**	**43.061**	**49.297**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	107	0.063	6.722	0.050	4.815	0.274	5.089
November	107	0.050	5.362	0.050	4.815	0.002	4.817
December	107	0.049	5.277	0.050	4.749	0.000	4.749
January	107	0.045	4.806	0.050	4.325	0.000	4.325
February	107	0.039	4.125	0.050	3.713	0.000	3.713
March	107	0.053	5.619	0.050	4.815	0.054	4.869
April	107	0.054	5.822	0.050	4.815	0.094	4.909
May	107	0.089	9.480	0.050	4.815	0.826	5.641
June	107	0.151	16.129	0.050	4.815	2.156	6.971
July	107	0.202	21.584	0.050	4.815	3.247	8.062
August	107	0.198	21.156	0.050	4.815	3.161	7.976
September	107	0.094	10.102	0.050	4.815	0.950	5.765
Year Total		**1.086**	**116.184**		**56.122**	**10.765**	**66.887**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "North Region Upland"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "North Region Upland" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Upland" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Upland" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Upland" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Upland" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Upland" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Upland" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Upland" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Upland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B8:

Table B8-1. Calculated total rural household groundwater use for the Harney Basin "Entire West Region": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	110	0.063	6.911	0.050	5.500	1.411
November	110	0.050	5.512	0.050	5.500	0.012
December	110	0.049	5.425	0.050	5.425	0.000
January	110	0.045	4.940	0.050	4.940	0.000
February	110	0.039	4.241	0.050	4.241	0.000
March	110	0.053	5.777	0.050	5.500	0.277
April	110	0.054	5.985	0.050	5.500	0.485
May	110	0.089	9.746	0.050	5.500	4.246
June	110	0.151	16.582	0.050	5.500	11.082
July	110	0.202	22.189	0.050	5.500	16.689
August	110	0.198	21.749	0.050	5.500	16.249
September	110	0.094	10.385	0.050	5.500	4.885
Year Total		**1.086**	**119.442**		**64.106**	**55.336**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	110	0.063	6.911	0.050	0.550	1.129	1.679
November	110	0.050	5.512	0.050	0.550	0.010	0.560
December	110	0.049	5.425	0.050	0.542	0.000	0.542
January	110	0.045	4.940	0.050	0.494	0.000	0.494
February	110	0.039	4.241	0.050	0.424	0.000	0.424
March	110	0.053	5.777	0.050	0.550	0.221	0.771
April	110	0.054	5.985	0.050	0.550	0.388	0.938
May	110	0.089	9.746	0.050	0.550	3.397	3.947
June	110	0.151	16.582	0.050	0.550	8.865	9.415
July	110	0.202	22.189	0.050	0.550	13.351	13.901
August	110	0.198	21.749	0.050	0.550	12.999	13.549
September	110	0.094	10.385	0.050	0.550	3.908	4.458
Year Total		**1.086**	**119.442**		**6.411**	**44.269**	**50.679**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	110	0.063	6.911	0.050	4.950	0.282	5.232
November	110	0.050	5.512	0.050	4.950	0.002	4.952
December	110	0.049	5.425	0.050	4.882	0.000	4.882
January	110	0.045	4.940	0.050	4.446	0.000	4.446
February	110	0.039	4.241	0.050	3.817	0.000	3.817
March	110	0.053	5.777	0.050	4.950	0.055	5.005
April	110	0.054	5.985	0.050	4.950	0.097	5.047
May	110	0.089	9.746	0.050	4.950	0.849	5.799
June	110	0.151	16.582	0.050	4.950	2.216	7.166
July	110	0.202	22.189	0.050	4.950	3.338	8.288
August	110	0.198	21.749	0.050	4.950	3.250	8.200
September	110	0.094	10.385	0.050	4.950	0.977	5.927
Year Total		**1.086**	**119.442**		**57.696**	**11.067**	**68.763**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "Entire West Region"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "Entire West Region" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "Entire West Region" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire West Region" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "Entire West Region" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire West Region" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire West Region" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "Entire West Region" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire West Region" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire West Region" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B8:

Table B8-2. Calculated total rural household groundwater use for the Harney Basin "West Region Lowland": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	87	0.063	5.466	0.050	4.350	1.116
November	87	0.050	4.360	0.050	4.350	0.010
December	87	0.049	4.290	0.050	4.290	0.000
January	87	0.045	3.907	0.050	3.907	0.000
February	87	0.039	3.354	0.050	3.354	0.000
March	87	0.053	4.569	0.050	4.350	0.219
April	87	0.054	4.734	0.050	4.350	0.384
May	87	0.089	7.708	0.050	4.350	3.358
June	87	0.151	13.115	0.050	4.350	8.765
July	87	0.202	17.550	0.050	4.350	13.200
August	87	0.198	17.201	0.050	4.350	12.851
September	87	0.094	8.214	0.050	4.350	3.864
Year Total		**1.086**	**94.468**		**50.702**	**43.766**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	87	0.063	5.466	0.050	0.435	0.893	1.328
November	87	0.050	4.360	0.050	0.435	0.008	0.443
December	87	0.049	4.290	0.050	0.429	0.000	0.429
January	87	0.045	3.907	0.050	0.391	0.000	0.391
February	87	0.039	3.354	0.050	0.335	0.000	0.335
March	87	0.053	4.569	0.050	0.435	0.175	0.610
April	87	0.054	4.734	0.050	0.435	0.307	0.742
May	87	0.089	7.708	0.050	0.435	2.687	3.122
June	87	0.151	13.115	0.050	0.435	7.012	7.447
July	87	0.202	17.550	0.050	0.435	10.560	10.995
August	87	0.198	17.201	0.050	0.435	10.281	10.716
September	87	0.094	8.214	0.050	0.435	3.091	3.526
Year Total		**1.086**	**94.468**		**5.070**	**35.012**	**40.083**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	87	0.063	5.466	0.050	3.915	0.223	4.138
November	87	0.050	4.360	0.050	3.915	0.002	3.917
December	87	0.049	4.290	0.050	3.861	0.000	3.861
January	87	0.045	3.907	0.050	3.517	0.000	3.517
February	87	0.039	3.354	0.050	3.019	0.000	3.019
March	87	0.053	4.569	0.050	3.915	0.044	3.959
April	87	0.054	4.734	0.050	3.915	0.077	3.992
May	87	0.089	7.708	0.050	3.915	0.672	4.587
June	87	0.151	13.115	0.050	3.915	1.753	5.668
July	87	0.202	17.550	0.050	3.915	2.640	6.555
August	87	0.198	17.201	0.050	3.915	2.570	6.485
September	87	0.094	8.214	0.050	3.915	0.773	4.688
Year Total		**1.086**	**94.468**		**45.632**	**8.753**	**54.385**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "West Region Lowland"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "West Region Lowland" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Lowland" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Lowland" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Lowland" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Lowland" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Lowland" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Lowland" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Lowland" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Lowland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B8:

Table B8-3. Calculated total rural household groundwater use for the Harney Basin "West Region Upland": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	23	0.063	1.445	0.050	1.150	0.295
November	23	0.050	1.153	0.050	1.150	0.003
December	23	0.049	1.134	0.050	1.134	0.000
January	23	0.045	1.033	0.050	1.033	0.000
February	23	0.039	0.887	0.050	0.887	0.000
March	23	0.053	1.208	0.050	1.150	0.058
April	23	0.054	1.251	0.050	1.150	0.101
May	23	0.089	2.038	0.050	1.150	0.888
June	23	0.151	3.467	0.050	1.150	2.317
July	23	0.202	4.640	0.050	1.150	3.490
August	23	0.198	4.547	0.050	1.150	3.397
September	23	0.094	2.171	0.050	1.150	1.021
Year Total		**1.086**	**24.974**		**13.404**	**11.570**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	23	0.063	1.445	0.050	0.115	0.236	0.351
November	23	0.050	1.153	0.050	0.115	0.002	0.117
December	23	0.049	1.134	0.050	0.113	0.000	0.113
January	23	0.045	1.033	0.050	0.103	0.000	0.103
February	23	0.039	0.887	0.050	0.089	0.000	0.089
March	23	0.053	1.208	0.050	0.115	0.046	0.161
April	23	0.054	1.251	0.050	0.115	0.081	0.196
May	23	0.089	2.038	0.050	0.115	0.710	0.825
June	23	0.151	3.467	0.050	0.115	1.854	1.969
July	23	0.202	4.640	0.050	0.115	2.792	2.907
August	23	0.198	4.547	0.050	0.115	2.718	2.833
September	23	0.094	2.171	0.050	0.115	0.817	0.932
Year Total		**1.086**	**24.974**		**1.340**	**9.256**	**10.597**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	23	0.063	1.445	0.050	1.035	0.059	1.094
November	23	0.050	1.153	0.050	1.035	0.001	1.036
December	23	0.049	1.134	0.050	1.021	0.000	1.021
January	23	0.045	1.033	0.050	0.930	0.000	0.930
February	23	0.039	0.887	0.050	0.798	0.000	0.798
March	23	0.053	1.208	0.050	1.035	0.012	1.047
April	23	0.054	1.251	0.050	1.035	0.020	1.055
May	23	0.089	2.038	0.050	1.035	0.178	1.213
June	23	0.151	3.467	0.050	1.035	0.463	1.498
July	23	0.202	4.640	0.050	1.035	0.698	1.733
August	23	0.198	4.547	0.050	1.035	0.679	1.714
September	23	0.094	2.171	0.050	1.035	0.204	1.239
Year Total		**1.086**	**24.974**		**12.064**	**2.314**	**14.378**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "West Region Upland"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "West Region Upland" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Upland" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Upland" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Upland" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Upland" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Upland" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Upland" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Upland" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Upland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B9:

Table B9-1. Calculated total rural household groundwater use for the Harney Basin "Entire South Region": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	121	0.063	7.602	0.050	6.050	1.552
November	121	0.050	6.063	0.050	6.050	0.013
December	121	0.049	5.967	0.050	5.967	0.000
January	121	0.045	5.434	0.050	5.434	0.000
February	121	0.039	4.665	0.050	4.665	0.000
March	121	0.053	6.354	0.050	6.050	0.304
April	121	0.054	6.584	0.050	6.050	0.534
May	121	0.089	10.721	0.050	6.050	4.671
June	121	0.151	18.240	0.050	6.050	12.190
July	121	0.202	24.408	0.050	6.050	18.358
August	121	0.198	23.924	0.050	6.050	17.874
September	121	0.094	11.424	0.050	6.050	5.374
Year Total		**1.086**	**131.386**		**70.517**	**60.869**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	121	0.063	7.602	0.050	0.605	1.242	1.847
November	121	0.050	6.063	0.050	0.605	0.011	0.616
December	121	0.049	5.967	0.050	0.597	0.000	0.597
January	121	0.045	5.434	0.050	0.543	0.000	0.543
February	121	0.039	4.665	0.050	0.467	0.000	0.467
March	121	0.053	6.354	0.050	0.605	0.244	0.849
April	121	0.054	6.584	0.050	0.605	0.427	1.032
May	121	0.089	10.721	0.050	0.605	3.737	4.342
June	121	0.151	18.240	0.050	0.605	9.752	10.357
July	121	0.202	24.408	0.050	0.605	14.686	15.291
August	121	0.198	23.924	0.050	0.605	14.299	14.904
September	121	0.094	11.424	0.050	0.605	4.299	4.904
Year Total		**1.086**	**131.386**		**7.052**	**48.696**	**55.747**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	121	0.063	7.602	0.050	5.445	0.310	5.755
November	121	0.050	6.063	0.050	5.445	0.003	5.448
December	121	0.049	5.967	0.050	5.370	0.000	5.370
January	121	0.045	5.434	0.050	4.891	0.000	4.891
February	121	0.039	4.665	0.050	4.199	0.000	4.199
March	121	0.053	6.354	0.050	5.445	0.061	5.506
April	121	0.054	6.584	0.050	5.445	0.107	5.552
May	121	0.089	10.721	0.050	5.445	0.934	6.379
June	121	0.151	18.240	0.050	5.445	2.438	7.883
July	121	0.202	24.408	0.050	5.445	3.672	9.117
August	121	0.198	23.924	0.050	5.445	3.575	9.020
September	121	0.094	11.424	0.050	5.445	1.075	6.520
Year Total		**1.086**	**131.386**		**63.465**	**12.174**	**75.639**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "Entire South Region"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "Entire South Region" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "Entire South Region" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire South Region" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "Entire South Region" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire South Region" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire South Region" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "Entire South Region" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire South Region" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire South Region" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B9:

Table B9-2. Calculated total rural household groundwater use for the Harney Basin "South Region Lowland": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	106	0.063	6.660	0.050	5.300	1.360
November	106	0.050	5.312	0.050	5.300	0.012
December	106	0.049	5.227	0.050	5.227	0.000
January	106	0.045	4.761	0.050	4.761	0.000
February	106	0.039	4.087	0.050	4.087	0.000
March	106	0.053	5.567	0.050	5.300	0.267
April	106	0.054	5.768	0.050	5.300	0.468
May	106	0.089	9.392	0.050	5.300	4.092
June	106	0.151	15.979	0.050	5.300	10.679
July	106	0.202	21.382	0.050	5.300	16.082
August	106	0.198	20.958	0.050	5.300	15.658
September	106	0.094	10.007	0.050	5.300	4.707
Year Total		**1.086**	**115.099**		**61.775**	**53.324**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	106	0.063	6.660	0.050	0.530	1.088	1.618
November	106	0.050	5.312	0.050	0.530	0.009	0.539
December	106	0.049	5.227	0.050	0.523	0.000	0.523
January	106	0.045	4.761	0.050	0.476	0.000	0.476
February	106	0.039	4.087	0.050	0.409	0.000	0.409
March	106	0.053	5.567	0.050	0.530	0.213	0.743
April	106	0.054	5.768	0.050	0.530	0.374	0.904
May	106	0.089	9.392	0.050	0.530	3.273	3.803
June	106	0.151	15.979	0.050	0.530	8.543	9.073
July	106	0.202	21.382	0.050	0.530	12.866	13.396
August	106	0.198	20.958	0.050	0.530	12.526	13.056
September	106	0.094	10.007	0.050	0.530	3.766	4.296
Year Total		**1.086**	**115.099**		**6.177**	**42.659**	**48.836**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	106	0.063	6.660	0.050	4.770	0.272	5.042
November	106	0.050	5.312	0.050	4.770	0.002	4.772
December	106	0.049	5.227	0.050	4.705	0.000	4.705
January	106	0.045	4.761	0.050	4.285	0.000	4.285
February	106	0.039	4.087	0.050	3.678	0.000	3.678
March	106	0.053	5.567	0.050	4.770	0.053	4.823
April	106	0.054	5.768	0.050	4.770	0.094	4.864
May	106	0.089	9.392	0.050	4.770	0.818	5.588
June	106	0.151	15.979	0.050	4.770	2.136	6.906
July	106	0.202	21.382	0.050	4.770	3.216	7.986
August	106	0.198	20.958	0.050	4.770	3.132	7.902
September	106	0.094	10.007	0.050	4.770	0.941	5.711
Year Total		**1.086**	**115.099**		**55.597**	**10.665**	**66.262**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "South Region Lowland"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "South Region Lowland" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Lowland" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Lowland" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Lowland" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Lowland" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Lowland" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Lowland" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Lowland" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Lowland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B9:

Table B9-3. Calculated total rural household groundwater use for the Harney Basin "South Region Upland": total volume pumped, consumed, and returned to groundwater using State of Washington methodology
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = A x [B < or = 0.05] Total Indoor Household Volume[5] (acre-feet / month)	F = A x [B > 0.05 or = 0.00] Total Outdoor Household Volume[6] (acre-feet / month)
October	15	0.063	0.942	0.050	0.750	0.192
November	15	0.050	0.752	0.050	0.750	0.002
December	15	0.049	0.740	0.050	0.740	0.000
January	15	0.045	0.674	0.050	0.674	0.000
February	15	0.039	0.578	0.050	0.578	0.000
March	15	0.053	0.788	0.050	0.750	0.038
April	15	0.054	0.816	0.050	0.750	0.066
May	15	0.089	1.329	0.050	0.750	0.579
June	15	0.151	2.261	0.050	0.750	1.511
July	15	0.202	3.026	0.050	0.750	2.276
August	15	0.198	2.966	0.050	0.750	2.216
September	15	0.094	1.416	0.050	0.750	0.666
Year Total		**1.086**	**16.288**		**8.742**	**7.546**
Percent					**53.67%**	**46.33%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Washington Methodology: 10% of indoor use volume and 80% of outdoor volume is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.10 Indoor GW Volume Consumed[7] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.80} or = 0.00 Outdoor GW Volume Consumed[8] (acre-feet / month)	G = E + F Total GW Volume Consumed[9] (acre-feet / month)
October	15	0.063	0.942	0.050	0.075	0.154	0.229
November	15	0.050	0.752	0.050	0.075	0.001	0.076
December	15	0.049	0.740	0.050	0.074	0.000	0.074
January	15	0.045	0.674	0.050	0.067	0.000	0.067
February	15	0.039	0.578	0.050	0.058	0.000	0.058
March	15	0.053	0.788	0.050	0.075	0.030	0.105
April	15	0.054	0.816	0.050	0.075	0.053	0.128
May	15	0.089	1.329	0.050	0.075	0.463	0.538
June	15	0.151	2.261	0.050	0.075	1.209	1.284
July	15	0.202	3.026	0.050	0.075	1.821	1.896
August	15	0.198	2.966	0.050	0.075	1.773	1.848
September	15	0.094	1.416	0.050	0.075	0.533	0.608
Year Total		**1.086**	**16.288**		**0.874**	**6.037**	**6.911**
Percent					**5.37%**	**37.06%**	**42.43%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Washington Methodology: 90% of indoor use volume and 20% of outdoor use volume is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[1]	B Municipal Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[3] (acre-feet / month)	D Indoor vs. Outdoor Threshold[4] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[10] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[11] (acre-feet / month)	G = E + F Total GW Volume Returned[12] (acre-feet / month)
October	15	0.063	0.942	0.050	0.675	0.038	0.713
November	15	0.050	0.752	0.050	0.675	0.000	0.675
December	15	0.049	0.740	0.050	0.666	0.000	0.666
January	15	0.045	0.674	0.050	0.606	0.000	0.606
February	15	0.039	0.578	0.050	0.521	0.000	0.521
March	15	0.053	0.788	0.050	0.675	0.008	0.683
April	15	0.054	0.816	0.050	0.675	0.013	0.688
May	15	0.089	1.329	0.050	0.675	0.116	0.791
June	15	0.151	2.261	0.050	0.675	0.302	0.977
July	15	0.202	3.026	0.050	0.675	0.455	1.130
August	15	0.198	2.966	0.050	0.675	0.443	1.118
September	15	0.094	1.416	0.050	0.675	0.133	0.808
Year Total		**1.086**	**16.288**		**7.868**	**1.509**	**9.377**
Percent					**48.30%**	**9.27%**	**57.57%**

Notes:

[1] Total number of rural domestic well logs found for the Harney Basin "South Region Upland"

[2] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[3] Calculated total rural household volume pumped for the Harney Basin "South Region Upland" (the number of rural domestic well logs in column A times the calculated monthly per municipal household groundwater use in column B)

[4] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[5] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Upland" (the calculated monthly per municipal household groundwater use in column B up to the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[6] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Upland" (the calculated monthly per municipal household groundwater use in column B exceeding the 0.050 acre-feet per month threshold times the number of rural domestic well logs in column A)

[7] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Upland" that is consumed (10% of the indoor rural groundwater use)

[8] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Upland" that is consumed (80% of the outdoor rural groundwater use)

[9] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Upland" that is consumed (column E added to column F)

[10] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Upland" that is returned to groundwater (90% of the indoor rural groundwater use)

[11] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Upland" that is returned to groundwater (20% of the outdoor rural groundwater use)

[12] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Upland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B10:

Table B10-1. Calculated total rural household groundwater use for the Entire Harney Basin: total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	1,103	0.058	63.820	0.050	55.150	8.670	63.820
November	1,103	0.046	50.902	0.050	50.902	0.000	50.902
December	1,103	0.045	50.095	0.050	50.095	0.000	50.095
January	1,103	0.041	45.622	0.050	45.622	0.000	45.622
February	1,103	0.036	39.165	0.050	39.165	0.000	39.165
March	1,103	0.048	53.346	0.050	53.346	0.000	53.346
April	1,103	0.050	55.273	0.050	55.150	0.123	55.273
May	1,103	0.082	90.002	0.050	55.150	34.852	90.002
June	1,103	0.139	153.125	0.050	55.150	97.975	153.125
July	1,103	0.186	204.908	0.050	55.150	149.758	204.908
August	1,103	0.182	200.840	0.050	55.150	145.690	200.840
September	1,103	0.087	95.902	0.050	55.150	40.752	95.902
Year Total		**1.000**	**1,103.000**		**625.180**	**477.820**	**1,103.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	1,103	0.058	63.820	0.050	0.000	0.000	0.000
November	1,103	0.046	50.902	0.050	0.000	0.000	0.000
December	1,103	0.045	50.095	0.050	0.000	0.000	0.000
January	1,103	0.041	45.622	0.050	0.000	0.000	0.000
February	1,103	0.036	39.165	0.050	0.000	0.000	0.000
March	1,103	0.048	53.346	0.050	0.000	0.000	0.000
April	1,103	0.050	55.273	0.050	0.000	0.000	0.000
May	1,103	0.082	90.002	0.050	0.000	0.000	0.000
June	1,103	0.139	153.125	0.050	0.000	0.000	0.000
July	1,103	0.186	204.908	0.050	0.000	0.000	0.000
August	1,103	0.182	200.840	0.050	0.000	0.000	0.000
September	1,103	0.087	95.902	0.050	0.000	0.000	0.000
Year Total		**1.000**	**1,103.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the entire Harney Basin

[4] Calculated total rural household volume pumped for the entire Harney Basin (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the entire Harney Basin that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the entire Harney Basin that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the entire Harney Basin that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the entire Harney Basin that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin that is returned to groundwater (column E added to column F)

Data Sources:

Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B10:

Table B10-2. Calculated total rural household groundwater use for the Entire Harney Basin Lowland: total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	958	0.058	55.430	0.050	47.900	7.530	55.430
November	958	0.046	44.211	0.050	44.211	0.000	44.211
December	958	0.045	43.509	0.050	43.509	0.000	43.509
January	958	0.041	39.624	0.050	39.624	0.000	39.624
February	958	0.036	34.017	0.050	34.017	0.000	34.017
March	958	0.048	46.333	0.050	46.333	0.000	46.333
April	958	0.050	48.007	0.050	47.900	0.107	48.007
May	958	0.082	78.170	0.050	47.900	30.270	78.170
June	958	0.139	132.995	0.050	47.900	85.095	132.995
July	958	0.186	177.971	0.050	47.900	130.071	177.971
August	958	0.182	174.438	0.050	47.900	126.538	174.438
September	958	0.087	83.295	0.050	47.900	35.395	83.295
Year Total		**1.000**	**958.000**		**542.994**	**415.006**	**958.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	958	0.058	55.430	0.050	0.000	0.000	0.000
November	958	0.046	44.211	0.050	0.000	0.000	0.000
December	958	0.045	43.509	0.050	0.000	0.000	0.000
January	958	0.041	39.624	0.050	0.000	0.000	0.000
February	958	0.036	34.017	0.050	0.000	0.000	0.000
March	958	0.048	46.333	0.050	0.000	0.000	0.000
April	958	0.050	48.007	0.050	0.000	0.000	0.000
May	958	0.082	78.170	0.050	0.000	0.000	0.000
June	958	0.139	132.995	0.050	0.000	0.000	0.000
July	958	0.186	177.971	0.050	0.000	0.000	0.000
August	958	0.182	174.438	0.050	0.000	0.000	0.000
September	958	0.087	83.295	0.050	0.000	0.000	0.000
Year Total		**1.000**	**958.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the entire Harney Basin Lowland

[4] Calculated total rural household volume pumped for the entire Harney Basin Lowland (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the entire Harney Basin Lowland that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the entire Harney Basin Lowland that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Lowland that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the entire Harney Basin Lowland that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the entire Harney Basin Lowland that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Lowland that is returned to groundwater (column E added to column F)

Data Sources:

Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B10:

Table B10-3. Calculated total rural household groundwater use for the Entire Harney Basin Upland: total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	145	0.058	8.390	0.050	7.250	1.140	8.390
November	145	0.046	6.692	0.050	6.692	0.000	6.692
December	145	0.045	6.585	0.050	6.585	0.000	6.585
January	145	0.041	5.997	0.050	5.997	0.000	5.997
February	145	0.036	5.149	0.050	5.149	0.000	5.149
March	145	0.048	7.013	0.050	7.013	0.000	7.013
April	145	0.050	7.266	0.050	7.250	0.016	7.266
May	145	0.082	11.832	0.050	7.250	4.582	11.832
June	145	0.139	20.130	0.050	7.250	12.880	20.130
July	145	0.186	26.937	0.050	7.250	19.687	26.937
August	145	0.182	26.402	0.050	7.250	19.152	26.402
September	145	0.087	12.607	0.050	7.250	5.357	12.607
Year Total		**1.000**	**145.000**		**82.186**	**62.814**	**145.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	145	0.058	8.390	0.050	0.000	0.000	0.000
November	145	0.046	6.692	0.050	0.000	0.000	0.000
December	145	0.045	6.585	0.050	0.000	0.000	0.000
January	145	0.041	5.997	0.050	0.000	0.000	0.000
February	145	0.036	5.149	0.050	0.000	0.000	0.000
March	145	0.048	7.013	0.050	0.000	0.000	0.000
April	145	0.050	7.266	0.050	0.000	0.000	0.000
May	145	0.082	11.832	0.050	0.000	0.000	0.000
June	145	0.139	20.130	0.050	0.000	0.000	0.000
July	145	0.186	26.937	0.050	0.000	0.000	0.000
August	145	0.182	26.402	0.050	0.000	0.000	0.000
September	145	0.087	12.607	0.050	0.000	0.000	0.000
Year Total		**1.000**	**145.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the entire Harney Basin Upland

[4] Calculated total rural household volume pumped for the entire Harney Basin Upland (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the entire Harney Basin Upland that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the entire Harney Basin Upland that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Upland that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the entire Harney Basin Upland that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the entire Harney Basin Upland that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the entire Harney Basin Upland that is returned to groundwater (column E added to column F)

Data Sources:

Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B11:

Table B11-1. Calculated total rural household groundwater use for the Harney Basin "Entire North Region": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	872	0.058	50.454	0.050	43.600	6.854	50.454
November	872	0.046	40.242	0.050	40.242	0.000	40.242
December	872	0.045	39.603	0.050	39.603	0.000	39.603
January	872	0.041	36.067	0.050	36.067	0.000	36.067
February	872	0.036	30.963	0.050	30.963	0.000	30.963
March	872	0.048	42.174	0.050	42.174	0.000	42.174
April	872	0.050	43.697	0.050	43.600	0.097	43.697
May	872	0.082	71.153	0.050	43.600	27.553	71.153
June	872	0.139	121.056	0.050	43.600	77.456	121.056
July	872	0.186	161.994	0.050	43.600	118.394	161.994
August	872	0.182	158.779	0.050	43.600	115.179	158.779
September	872	0.087	75.818	0.050	43.600	32.218	75.818
Year Total		**1.000**	**872.000**		**494.249**	**377.751**	**872.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	872	0.058	50.454	0.050	0.000	0.000	0.000
November	872	0.046	40.242	0.050	0.000	0.000	0.000
December	872	0.045	39.603	0.050	0.000	0.000	0.000
January	872	0.041	36.067	0.050	0.000	0.000	0.000
February	872	0.036	30.963	0.050	0.000	0.000	0.000
March	872	0.048	42.174	0.050	0.000	0.000	0.000
April	872	0.050	43.697	0.050	0.000	0.000	0.000
May	872	0.082	71.153	0.050	0.000	0.000	0.000
June	872	0.139	121.056	0.050	0.000	0.000	0.000
July	872	0.186	161.994	0.050	0.000	0.000	0.000
August	872	0.182	158.779	0.050	0.000	0.000	0.000
September	872	0.087	75.818	0.050	0.000	0.000	0.000
Year Total		**1.000**	**872.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "Entire North Region"

[4] Calculated total rural household volume pumped for the Harney Basin "Entire North Region" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "Entire North Region" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire North Region" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire North Region" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "Entire North Region" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire North Region" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire North Region" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B11:

Table B11-2. Calculated total rural household groundwater use for the Harney Basin "North Region Lowland": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	765	0.058	44.263	0.050	38.250	6.013	44.263
November	765	0.046	35.304	0.050	35.304	0.000	35.304
December	765	0.045	34.744	0.050	34.744	0.000	34.744
January	765	0.041	31.642	0.050	31.642	0.000	31.642
February	765	0.036	27.164	0.050	27.164	0.000	27.164
March	765	0.048	36.999	0.050	36.999	0.000	36.999
April	765	0.050	38.335	0.050	38.250	0.085	38.335
May	765	0.082	62.422	0.050	38.250	24.172	62.422
June	765	0.139	106.202	0.050	38.250	67.952	106.202
July	765	0.186	142.116	0.050	38.250	103.866	142.116
August	765	0.182	139.295	0.050	38.250	101.045	139.295
September	765	0.087	66.514	0.050	38.250	28.264	66.514
Year Total		**1.000**	**765.000**		**433.602**	**331.398**	**765.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	765	0.058	44.263	0.050	0.000	0.000	0.000
November	765	0.046	35.304	0.050	0.000	0.000	0.000
December	765	0.045	34.744	0.050	0.000	0.000	0.000
January	765	0.041	31.642	0.050	0.000	0.000	0.000
February	765	0.036	27.164	0.050	0.000	0.000	0.000
March	765	0.048	36.999	0.050	0.000	0.000	0.000
April	765	0.050	38.335	0.050	0.000	0.000	0.000
May	765	0.082	62.422	0.050	0.000	0.000	0.000
June	765	0.139	106.202	0.050	0.000	0.000	0.000
July	765	0.186	142.116	0.050	0.000	0.000	0.000
August	765	0.182	139.295	0.050	0.000	0.000	0.000
September	765	0.087	66.514	0.050	0.000	0.000	0.000
Year Total		**1.000**	**765.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "North Region Lowland"

[4] Calculated total rural household volume pumped for the Harney Basin "North Region Lowland" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Lowland" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Lowland" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Lowland" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Lowland" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Lowland" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Lowland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B11:

Table B11-3. Calculated total rural household groundwater use for the Harney Basin "North Region Upland": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	107	0.058	6.191	0.050	5.350	0.841	6.191
November	107	0.046	4.938	0.050	4.938	0.000	4.938
December	107	0.045	4.860	0.050	4.860	0.000	4.860
January	107	0.041	4.426	0.050	4.426	0.000	4.426
February	107	0.036	3.799	0.050	3.799	0.000	3.799
March	107	0.048	5.175	0.050	5.175	0.000	5.175
April	107	0.050	5.362	0.050	5.350	0.012	5.362
May	107	0.082	8.731	0.050	5.350	3.381	8.731
June	107	0.139	14.854	0.050	5.350	9.504	14.854
July	107	0.186	19.878	0.050	5.350	14.528	19.878
August	107	0.182	19.483	0.050	5.350	14.133	19.483
September	107	0.087	9.303	0.050	5.350	3.953	9.303
Year Total		**1.000**	**107.000**		**60.648**	**46.352**	**107.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	107	0.058	6.191	0.050	0.000	0.000	0.000
November	107	0.046	4.938	0.050	0.000	0.000	0.000
December	107	0.045	4.860	0.050	0.000	0.000	0.000
January	107	0.041	4.426	0.050	0.000	0.000	0.000
February	107	0.036	3.799	0.050	0.000	0.000	0.000
March	107	0.048	5.175	0.050	0.000	0.000	0.000
April	107	0.050	5.362	0.050	0.000	0.000	0.000
May	107	0.082	8.731	0.050	0.000	0.000	0.000
June	107	0.139	14.854	0.050	0.000	0.000	0.000
July	107	0.186	19.878	0.050	0.000	0.000	0.000
August	107	0.182	19.483	0.050	0.000	0.000	0.000
September	107	0.087	9.303	0.050	0.000	0.000	0.000
Year Total		**1.000**	**107.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "North Region Upland"

[4] Calculated total rural household volume pumped for the Harney Basin "North Region Upland" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Upland" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Upland" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Upland" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "North Region Upland" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "North Region Upland" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "North Region Upland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B12:

Table B12-1. Calculated total rural household groundwater use for the Harney Basin "Entire West Region": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	110	0.058	6.365	0.050	5.500	0.865	6.365
November	110	0.046	5.076	0.050	5.076	0.000	5.076
December	110	0.045	4.996	0.050	4.996	0.000	4.996
January	110	0.041	4.550	0.050	4.550	0.000	4.550
February	110	0.036	3.906	0.050	3.906	0.000	3.906
March	110	0.048	5.320	0.050	5.320	0.000	5.320
April	110	0.050	5.512	0.050	5.500	0.012	5.512
May	110	0.082	8.976	0.050	5.500	3.476	8.976
June	110	0.139	15.271	0.050	5.500	9.771	15.271
July	110	0.186	20.435	0.050	5.500	14.935	20.435
August	110	0.182	20.029	0.050	5.500	14.529	20.029
September	110	0.087	9.564	0.050	5.500	4.064	9.564
Year Total		**1.000**	**110.000**		**62.348**	**47.652**	**110.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	110	0.058	6.365	0.050	0.000	0.000	0.000
November	110	0.046	5.076	0.050	0.000	0.000	0.000
December	110	0.045	4.996	0.050	0.000	0.000	0.000
January	110	0.041	4.550	0.050	0.000	0.000	0.000
February	110	0.036	3.906	0.050	0.000	0.000	0.000
March	110	0.048	5.320	0.050	0.000	0.000	0.000
April	110	0.050	5.512	0.050	0.000	0.000	0.000
May	110	0.082	8.976	0.050	0.000	0.000	0.000
June	110	0.139	15.271	0.050	0.000	0.000	0.000
July	110	0.186	20.435	0.050	0.000	0.000	0.000
August	110	0.182	20.029	0.050	0.000	0.000	0.000
September	110	0.087	9.564	0.050	0.000	0.000	0.000
Year Total		**1.000**	**110.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "Entire West Region"

[4] Calculated total rural household volume pumped for the Harney Basin "Entire West Region" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "Entire West Region" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire West Region" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire West Region" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "Entire West Region" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire West Region" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire West Region" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B12:

Table B12-2. Calculated total rural household groundwater use for the Harney Basin "West Region Lowland": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	87	0.058	5.034	0.050	4.350	0.684	5.034
November	87	0.046	4.015	0.050	4.015	0.000	4.015
December	87	0.045	3.951	0.050	3.951	0.000	3.951
January	87	0.041	3.598	0.050	3.598	0.000	3.598
February	87	0.036	3.089	0.050	3.089	0.000	3.089
March	87	0.048	4.208	0.050	4.208	0.000	4.208
April	87	0.050	4.360	0.050	4.350	0.010	4.360
May	87	0.082	7.099	0.050	4.350	2.749	7.099
June	87	0.139	12.078	0.050	4.350	7.728	12.078
July	87	0.186	16.162	0.050	4.350	11.812	16.162
August	87	0.182	15.841	0.050	4.350	11.491	15.841
September	87	0.087	7.564	0.050	4.350	3.214	7.564
Year Total		**1.000**	**87.000**		**49.312**	**37.688**	**87.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	87	0.058	5.034	0.050	0.000	0.000	0.000
November	87	0.046	4.015	0.050	0.000	0.000	0.000
December	87	0.045	3.951	0.050	0.000	0.000	0.000
January	87	0.041	3.598	0.050	0.000	0.000	0.000
February	87	0.036	3.089	0.050	0.000	0.000	0.000
March	87	0.048	4.208	0.050	0.000	0.000	0.000
April	87	0.050	4.360	0.050	0.000	0.000	0.000
May	87	0.082	7.099	0.050	0.000	0.000	0.000
June	87	0.139	12.078	0.050	0.000	0.000	0.000
July	87	0.186	16.162	0.050	0.000	0.000	0.000
August	87	0.182	15.841	0.050	0.000	0.000	0.000
September	87	0.087	7.564	0.050	0.000	0.000	0.000
Year Total		**1.000**	**87.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "West Region Lowland"

[4] Calculated total rural household volume pumped for the Harney Basin "West Region Lowland" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Lowland" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Lowland" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Lowland" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Lowland" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Lowland" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Lowland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B12:

Table B12-3. Calculated total rural household groundwater use for the Harney Basin "West Region Upland": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	23	0.058	1.331	0.050	1.150	0.181	1.331
November	23	0.046	1.061	0.050	1.061	0.000	1.061
December	23	0.045	1.045	0.050	1.045	0.000	1.045
January	23	0.041	0.951	0.050	0.951	0.000	0.951
February	23	0.036	0.817	0.050	0.817	0.000	0.817
March	23	0.048	1.112	0.050	1.112	0.000	1.112
April	23	0.050	1.153	0.050	1.150	0.003	1.153
May	23	0.082	1.877	0.050	1.150	0.727	1.877
June	23	0.139	3.193	0.050	1.150	2.043	3.193
July	23	0.186	4.273	0.050	1.150	3.123	4.273
August	23	0.182	4.188	0.050	1.150	3.038	4.188
September	23	0.087	2.000	0.050	1.150	0.850	2.000
Year Total		**1.000**	**23.000**		**13.036**	**9.964**	**23.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	23	0.058	1.331	0.050	0.000	0.000	0.000
November	23	0.046	1.061	0.050	0.000	0.000	0.000
December	23	0.045	1.045	0.050	0.000	0.000	0.000
January	23	0.041	0.951	0.050	0.000	0.000	0.000
February	23	0.036	0.817	0.050	0.000	0.000	0.000
March	23	0.048	1.112	0.050	0.000	0.000	0.000
April	23	0.050	1.153	0.050	0.000	0.000	0.000
May	23	0.082	1.877	0.050	0.000	0.000	0.000
June	23	0.139	3.193	0.050	0.000	0.000	0.000
July	23	0.186	4.273	0.050	0.000	0.000	0.000
August	23	0.182	4.188	0.050	0.000	0.000	0.000
September	23	0.087	2.000	0.050	0.000	0.000	0.000
Year Total		**1.000**	**23.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "West Region Upland"

[4] Calculated total rural household volume pumped for the Harney Basin "West Region Upland" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Upland" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Upland" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Upland" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "West Region Upland" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "West Region Upland" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "West Region Upland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B13:

Table B13-1. Calculated total rural household groundwater use for the Harney Basin "Entire South Region": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	121	0.058	7.001	0.050	6.050	0.951	7.001
November	121	0.046	5.584	0.050	5.584	0.000	5.584
December	121	0.045	5.495	0.050	5.495	0.000	5.495
January	121	0.041	5.005	0.050	5.005	0.000	5.005
February	121	0.036	4.296	0.050	4.296	0.000	4.296
March	121	0.048	5.852	0.050	5.852	0.000	5.852
April	121	0.050	6.064	0.050	6.050	0.014	6.064
May	121	0.082	9.873	0.050	6.050	3.823	9.873
June	121	0.139	16.798	0.050	6.050	10.748	16.798
July	121	0.186	22.479	0.050	6.050	16.429	22.479
August	121	0.182	22.032	0.050	6.050	15.982	22.032
September	121	0.087	10.521	0.050	6.050	4.471	10.521
Year Total		**1.000**	**121.000**		**68.583**	**52.417**	**121.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	121	0.058	7.001	0.050	0.000	0.000	0.000
November	121	0.046	5.584	0.050	0.000	0.000	0.000
December	121	0.045	5.495	0.050	0.000	0.000	0.000
January	121	0.041	5.005	0.050	0.000	0.000	0.000
February	121	0.036	4.296	0.050	0.000	0.000	0.000
March	121	0.048	5.852	0.050	0.000	0.000	0.000
April	121	0.050	6.064	0.050	0.000	0.000	0.000
May	121	0.082	9.873	0.050	0.000	0.000	0.000
June	121	0.139	16.798	0.050	0.000	0.000	0.000
July	121	0.186	22.479	0.050	0.000	0.000	0.000
August	121	0.182	22.032	0.050	0.000	0.000	0.000
September	121	0.087	10.521	0.050	0.000	0.000	0.000
Year Total		**1.000**	**121.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "Entire South Region"

[4] Calculated total rural household volume pumped for the Harney Basin "Entire South Region" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "Entire South Region" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire South Region" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire South Region" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "Entire South Region" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "Entire South Region" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "Entire South Region" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B13:

Table B13-2. Calculated total rural household groundwater use for the Harney Basin "South Region Lowland": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	106	0.058	6.133	0.050	5.300	0.833	6.133
November	106	0.046	4.892	0.050	4.892	0.000	4.892
December	106	0.045	4.814	0.050	4.814	0.000	4.814
January	106	0.041	4.384	0.050	4.384	0.000	4.384
February	106	0.036	3.764	0.050	3.764	0.000	3.764
March	106	0.048	5.127	0.050	5.127	0.000	5.127
April	106	0.050	5.312	0.050	5.300	0.012	5.312
May	106	0.082	8.649	0.050	5.300	3.349	8.649
June	106	0.139	14.716	0.050	5.300	9.416	14.716
July	106	0.186	19.692	0.050	5.300	14.392	19.692
August	106	0.182	19.301	0.050	5.300	14.001	19.301
September	106	0.087	9.216	0.050	5.300	3.916	9.216
Year Total		**1.000**	**106.000**		**60.081**	**45.919**	**106.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	106	0.058	6.133	0.050	0.000	0.000	0.000
November	106	0.046	4.892	0.050	0.000	0.000	0.000
December	106	0.045	4.814	0.050	0.000	0.000	0.000
January	106	0.041	4.384	0.050	0.000	0.000	0.000
February	106	0.036	3.764	0.050	0.000	0.000	0.000
March	106	0.048	5.127	0.050	0.000	0.000	0.000
April	106	0.050	5.312	0.050	0.000	0.000	0.000
May	106	0.082	8.649	0.050	0.000	0.000	0.000
June	106	0.139	14.716	0.050	0.000	0.000	0.000
July	106	0.186	19.692	0.050	0.000	0.000	0.000
August	106	0.182	19.301	0.050	0.000	0.000	0.000
September	106	0.087	9.216	0.050	0.000	0.000	0.000
Year Total		**1.000**	**106.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "South Region Lowland"

[4] Calculated total rural household volume pumped for the Harney Basin "South Region Lowland" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Lowland" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Lowland" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Lowland" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Lowland" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Lowland" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Lowland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B13:

Table B13-3. Calculated total rural household groundwater use for the Harney Basin "South Region Upland": total volume pumped, consumed, and returned to groundwater using State of Nevada assumed annual pumpage
(See notes at end of table)

Calculated Harney Basin Rural Household Groundwater Volume Pumped Based on Total Rural Domestic Well Logs and Reported Municipal Groundwater Volume Pumped Converted to Household Volume

Water Year Month	Harney Basin Municipal Household Volume[1] (acre-feet / household-month)	Harney Basin Municipal Household Monthly Fraction of Year Total (month total / year total)	Harney Basin Municipal Household Monthly Percent of Year Total (month total / year total) x 100	Nevada Rural Household Volume[2] (acre-feet / household-month)
October	0.063	0.058	5.786	0.058
November	0.050	0.046	4.615	0.046
December	0.049	0.045	4.542	0.045
January	0.045	0.041	4.136	0.041
February	0.039	0.036	3.551	0.036
March	0.053	0.048	4.836	0.048
April	0.054	0.050	5.011	0.050
May	0.089	0.082	8.160	0.082
June	0.151	0.139	13.883	0.139
July	0.202	0.186	18.577	0.186
August	0.198	0.182	18.209	0.182
September	0.094	0.087	8.695	0.087
Year Total	**1.086**	**1.000**	**100.000**	**1.000**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Consumed (State of Nevada Methodology: 100% of all volume assumed pumped is consumed)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*1.00 Indoor GW Volume Consumed[6] (acre-feet / month)	F = {[A x [B > 0.05]] x 1.00} or = 0.00 Outdoor GW Volume Consumed[7] (acre-feet / month)	G = E + F Total GW Volume Consumed[8] (acre-feet / month)
October	15	0.058	0.868	0.050	0.750	0.118	0.868
November	15	0.046	0.692	0.050	0.692	0.000	0.692
December	15	0.045	0.681	0.050	0.681	0.000	0.681
January	15	0.041	0.620	0.050	0.620	0.000	0.620
February	15	0.036	0.533	0.050	0.533	0.000	0.533
March	15	0.048	0.725	0.050	0.725	0.000	0.725
April	15	0.050	0.752	0.050	0.750	0.002	0.752
May	15	0.082	1.224	0.050	0.750	0.474	1.224
June	15	0.139	2.082	0.050	0.750	1.332	2.082
July	15	0.186	2.787	0.050	0.750	2.037	2.787
August	15	0.182	2.731	0.050	0.750	1.981	2.731
September	15	0.087	1.304	0.050	0.750	0.554	1.304
Year Total		**1.000**	**15.000**		**8.502**	**6.498**	**15.000**
Percent					**56.68%**	**43.32%**	**100.00%**

Calculated Harney Basin Rural Household Groundwater Volume Pumped that is Returned to Groundwater (State of Nevada Methodology: 0.00% of all volume assumed pumped is returned to groundwater)

Water Year Month	A Total Rural Domestic Well-Logs[3]	B Rural Household Volume[2] (acre-feet / household-month)	C = A x B Total Rural Household Volume[4] (acre-feet / month)	D Indoor vs. Outdoor Threshold[5] (acre-feet / household-month)	E = [A x [B < or = 0.05]]*0.90 Indoor GW Volume Returned[9] (acre-feet / month)	F = {[A x [B > 0.05]] x 0.20} or = 0.00 Outdoor GW Volume Returned[10] (acre-feet / month)	G = E + F Total GW Volume Returned[11] (acre-feet / month)
October	15	0.058	0.868	0.050	0.000	0.000	0.000
November	15	0.046	0.692	0.050	0.000	0.000	0.000
December	15	0.045	0.681	0.050	0.000	0.000	0.000
January	15	0.041	0.620	0.050	0.000	0.000	0.000
February	15	0.036	0.533	0.050	0.000	0.000	0.000
March	15	0.048	0.725	0.050	0.000	0.000	0.000
April	15	0.050	0.752	0.050	0.000	0.000	0.000
May	15	0.082	1.224	0.050	0.000	0.000	0.000
June	15	0.139	2.082	0.050	0.000	0.000	0.000
July	15	0.186	2.787	0.050	0.000	0.000	0.000
August	15	0.182	2.731	0.050	0.000	0.000	0.000
September	15	0.087	1.304	0.050	0.000	0.000	0.000
Year Total		**1.000**	**15.000**		**0.000**	**0.000**	**0.000**
Percent					**0.00%**	**0.00%**	**0.00%**

Notes:

[1] Calculated per municipal household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[2] Rural household volume (Nevada) = Harney Basin municipal monthly fraction of year total times the State of Nevada assumed annual pumpage per rural domestic well (acre-feet per year per well)

[3] Total number of rural domestic well logs found for the Harney Basin "South Region Upland"

[4] Calculated total rural household volume pumped for the Harney Basin "South Region Upland" (the number of rural Harney Basin domestic well logs in column A times the rural household volume (Nevada) in column B)

[5] The assumed maximum monthly threshold volume for per household indoor groundwater use based on the average of calculated October to April per household groundwater use from reported 2000 and 2010 municipal groundwater volume pumped (see appendix B3)

[6] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Upland" that is consumed (100% of the indoor rural groundwater use)

[7] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Upland" that is consumed (100% of the outdoor rural groundwater use)

[8] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Upland" that is consumed (column E added to column F)

[9] Calculated total rural household indoor groundwater use for the Harney Basin "South Region Upland" that is returned to groundwater (0.00% of the indoor rural groundwater use)

[10] Calculated total rural household outdoor groundwater use for the Harney Basin "South Region Upland" that is returned to groundwater (0.00% of the outdoor rural groundwater use)

[11] Calculated total rural household indoor and outdoor groundwater use for the Harney Basin "South Region Upland" that is returned to groundwater (column E added to column F)

Data Sources:

Garcia, C. Amanda, written communication, 02/13/2020, 10/08/2020, 10/13/2020, 10/14/2020
Gingerich, Stephen B., written communication, 02/07/2020
Nevada Division of Water Resources 2017
Oregon Water Resources Department 2019b, 2019c, 2019d, 2019f
Portland State University Population Research Center 2019a, 2019b, 2019c
Washington Department of Ecology 2018

Appendix: B14:

Daily water intake of beef cattle as published by National Academies of Sciences, Engineering, and Medicine (2016)
(See notes at end of table)

Approximate Total Daily Water Intake of Beef Cattle

Cattle Weight Kilograms	Table in Metric Units Ambient Temperature (Degrees Celsius: °C)[1] 4.4	10.0	14.4	21.1	26.6	32.2	Cattle Weight Pounds	Table Converted to English Units Ambient Temperature (Degrees Fahrenheit: °F)[1] 39.9	50.0	57.9	70.0	79.9	90.0
	Growing heifers, steers, and bulls							**Growing heifers, steers, and bulls**					
	(liters)	**(liters)**	**(liters)**	**(liters)**	**(liters)**	**(liters)**		**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**
182	15.1	16.3	18.9	22.0	25.4	36.0	**401**	4.0	4.3	5.0	5.8	6.7	9.5
273	20.1	22.0	25.0	29.5	33.7	48.1	**602**	5.3	5.8	6.6	7.8	8.9	12.7
364	23.0	25.7	29.9	34.8	40.1	56.8	**803**	6.1	6.8	7.9	9.2	10.6	15.0
	Finishing cattle							**Finishing cattle**					
	(liters)	**(liters)**	**(liters)**	**(liters)**	**(liters)**	**(liters)**		**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**
273	22.7	24.6	28.0	32.9	37.9	54.1	**602**	6.0	6.5	7.4	8.7	10.0	14.3
364	27.6	29.9	34.4	40.5	46.6	65.9	**803**	7.3	7.9	9.1	10.7	12.3	17.4
454	32.9	35.6	40.9	47.7	54.9	78.0	**1,001**	8.7	9.4	10.8	12.6	14.5	20.6
	Wintering pregnant cows[2]							**Wintering pregnant cows[2]**					
	(liters)	**(liters)**	**(liters)**	**(liters)**	**(liters)**	**(liters)**		**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**
409	25.4	27.3	31.4	36.7	Null	Null	**902**	6.7	7.2	8.3	9.7	Null	Null
500	22.7	24.6	28.0	32.9	Null	Null	**1,103**	6.0	6.5	7.4	8.7	Null	Null
	Lactating cows[3]							**Lactating cows[3]**					
	(liters)	**(liters)**	**(liters)**	**(liters)**	**(liters)**	**(liters)**		**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**
409	43.1	47.7	54.9	64.0	67.8	61.3	**902**	11.4	12.6	14.5	16.9	17.9	16.2
	Mature bulls							**Mature bulls**					
	(liters)	**(liters)**	**(liters)**	**(liters)**	**(liters)**	**(liters)**		**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**	**(gallons)**
636	30.3	32.6	37.5	44.3	50.7	71.9	**1,402**	8.0	8.6	9.9	11.7	13.4	19.0
727	32.9	35.6	40.9	47.7	54.9	78.0	**1,603**	8.7	9.4	10.8	12.6	14.5	20.6

Notes:

[1]Water intake of a given class of cattle in a specific management regime is a function of dry matter intake and ambient temperature. Water intake quite constant up to 4.4°C (39.92°F)

[2]Dry matter intake has a major influence on water intake. Heavier cows are assumed to be higher in body condition and to require less dry matter and, thus, less water intake

[3]Cows larger than 409 kilograms (902 pounds) are included in this recommendation

Null: nothing entered and/or not known

Data Sources:

National Academies of Sciences, Engineering, and Medicine (2016) (see table 9-1 on p. 154)

Winchester and Morris (1956)

Appendix: B15:

Calculated groundwater use for Harney Basin livestock
(See notes at end of table)

			Livestock Census and Livestock Water Demand				
	Measurement Unit	**Calculation Formula**	**Cattle[1]**	**Sheep[2]**	**Totals**		
Livestock Census							
Total Livestock	(total head)	A	105,000	2,385	**107,385**		
Livestock Water Demand[3]							
Gallons per head per day	(gallons / head-day)	B	12.00	2.00			
			Calculated Groundwater Volume Pumped for Livestock			**Groundwater Volume per Livestock Well**	
	Measurement Unit	**Calculation Formula**	**Cattle[4]**	**Sheep[5]**	**Totals**	**Calculation Formula**	**GW Pumped per Well**
Total Livestock GW Use for Basin							
Entire Harney Basin (590 wells)	(gallons / day)	C = (A x B)	1,260,000.00	4,770.00	**1,264,770.00**	C-Total / 590 wells	**2,143.68**
Entire Harney Basin (590 wells)	(cubic-feet / day)	D = C / (7.48052 gal / ft3)	168,437.49	637.66	**169,075.14**	D-Total / 590 wells	**286.57**
Entire Harney Basin (590 wells)	(acre-feet / day)	E = D / (43,560 ft3 / ac-ft)	3.87	0.01	**3.88**	E-Total / 590 wells	**0.01**
Entire Harney Basin (590 wells)	(acre-feet / year)	F = E x 365	**1,411.38**	**5.34**	**1,416.72**	F-Total / 590 wells	**2.40**
Total Livestock GW Use by Region							
North Region (339 wells)	(acre-feet / year)	G = F x (339 / 590)	810.95	3.07	**814.02**	G-Total / 339 wells	**2.40**
West Region (113 wells)	(acre-feet / year)	H = F x (113 / 590)	270.32	1.02	**271.34**	H-Total / 113 wells	**2.40**
South Region (138 wells)	(acre-feet / year)	I = F x (138 / 590)	330.12	1.25	**331.37**	I-Total / 138 wells	**2.40**
Region Total			**1,411.38**	**5.34**	**1,416.72**		
Total Livestock GW Use in Lowlands							
Harney Basin Lowland (451 wells)	(acre-feet / year)	J = F x (451 / 590)	**1,078.87**	**4.08**	**1,082.95**	J-Total / 451 wells	**2.40**
North Region Lowland (281 wells)	(acre-feet / year)	K = F x (281 / 590)	672.20	2.54	**674.74**	K-Total / 281 wells	**2.40**
West Region Lowland (70 wells)	(acre-feet / year)	L = F x (70 / 590)	167.45	0.63	**168.09**	L-Total / 70 wells	**2.40**
South Region Lowland (100 wells)	(acre-feet / year)	M = F x (100 / 590)	239.22	0.91	**240.12**	I-Total / 100 wells	**2.40**
Region Total			**1,078.87**	**4.08**	**1,082.95**		
Total Livestock GW Use in Uplands							
Harney Basin Upland (139 wells)	(acre-feet / year)	N = F x (139 / 590)	**332.51**	**1.26**	**333.77**	N-Total / 139 wells	**2.40**
North Region Upland (58 wells)	(acre-feet / year)	O = F x (58 / 590)	138.75	0.53	**139.27**	O-Total / 58 wells	**2.40**
West Region Upland (43 wells)	(acre-feet / year)	P = F x (43 / 590)	102.86	0.39	**103.25**	P-Total / 43 wells	**2.40**
South Region Upland (38 wells)	(acre-feet / year)	Q = F x (38 / 590)	90.90	0.34	**91.25**	Q-Total / 38 wells	**2.40**
Region Total			**332.51**	**1.26**	**333.77**		

Notes:

[1]USDA census for total head of cattle in Harney County was 100,000 head for the years 2014 and 2018 and 105,000 head for the years 2015, 2016, 2017, and 2019

[2]USDA census for total head of sheep and lambs in Harney County was 2,385 head for the year 2012

[3]The median water use coefficient for cattle and for sheep found in table 1 of Lovelace (2009) was used

[4]Calculations of groundwater use by cattle assumes all the cattle in Harney County are in the Harney Basin, they consume groundwater only, and all the groundwater pumped for livestock is consumed

[5]Calculations of groundwater use by sheep assumes all the sheep in Harney County are in the Harney Basin, they consume groundwater only, and all the groundwater pumped for sheep is consumed

Cattle and sheep in the Grant County portion of the Harney Basin are assumed represented by assuming all cattle and sheep in Harney County are in the Harney Basin

Other livestock in the Harney Basin are assumed represented by assuming all cattle and sheep in Harney County are in the Harney Basin

Data Sources:

Lovelace 2009

Oregon Water Resources Department 2019f

U.S. Department of Agriculture 2018, 2019a, 2019b

Appendix: B16:

Reported Christopher and Danielle Gregg and Rattlesnake Creek Land and Cattle Company groundwater volume pumped for commercial-industrial use and calculated averages
(See notes at end of table)

Christopher and Danielle Gregg and Rattlesnake Creek Land and Cattle Company
OWRD Water Right File G-14645

Water Year	Production Well[1]	Water Year Month[2]												Water Year	Water Year	Water Year
		October (acre-feet)	November (acre-feet)	December (acre-feet)	January (acre-feet)	February (acre-feet)	March (acre-feet)	April (acre-feet)	May (acre-feet)	June (acre-feet)	July (acre-feet)	August (acre-feet)	September (acre-feet)	Total (acre-feet)	Industrial[3] (acre-feet)	Irrigation[4] (acre-feet)
2002	HARN 50176 (L-11232)	155.90	150.87	155.90	155.90	140.80	155.90	105.60	0.00	63.83	15.96	131.93	143.96	1,376.55	1,164.83	211.72
2004	HARN 50176 (L-11232)	75.43	150.87	155.90	155.90	145.83	156.08	80.44	0.00	51.07	0.00	131.93	0.00	1,103.45	920.45	183.00
2005	HARN 50176 (L-11232)	155.90	150.87	155.90	155.90	140.80	155.90	105.60	0.00	63.83	15.96	131.93	143.96	1,376.55	1,164.83	211.72
2008	HARN 50176 (L-11232)	131.35	127.05	131.35	131.35	117.85	131.35	62.91	0.00	62.91	15.96	0.00	0.00	912.08	833.21	78.87
2015	HARN 50176 (L-11232)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016	HARN 50176 (L-11232)	0.00	0.00	0.00	Null	Null	Null	Null	Null	Null	Null	Null	Null	0.00	0.00	0.00
2017	HARN 50176 (L-11232)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Calculated Average (2002 - 2008)	129.65	144.91	149.76	149.76	136.32	149.81	88.64	0.00	60.41	11.97	98.95	71.98	1,192.16	1,020.83	171.33
	Calculated Average (2002 - 2005)	129.08	150.87	155.90	155.90	142.48	155.96	97.21	0.00	59.58	10.64	131.93	95.97	1,285.52	1,083.37	202.15
	Calculated Average (2002 & 2005)[5]	155.90	150.87	155.90	155.90	140.80	155.90	105.60	0.00	63.83	15.96	131.93	143.96	1,376.55	1,164.83	211.72

Notes:

[1]Well is in the waterbudget lowland of the water budget north region

[2]Notes accompanying the volume data submitted to OWRD indicate the volume was determined from conversion of power meter data

[3]September through April volume: assume volume is geothermal use only and the entire volume is consumed (no return to groundwater)

[4]May through August volume: assume volume is accounted within irrigation use reported by Beamer and Hoskinsn (2021)

[5]The 2002 and 2005 data appears to be the most complete set of data. The average of the 2002 and 2005 data is used to represent this use. Assume 100% of the volume is consumed, no return to groundwater

NULL: nothing entered and/or not known as of 2 March 2021

The permitted use (OWRD water right file G-14645) is for geothermal heating year-round and additionally for irrigation from 1 March to 1 September annually

The Claim of Beneficial Use submitted to OWRD indicates the geothermal tail-water moves through 8,500 feet of 15 inch PVC pipe to open discharge onto the irrigation acreage

The water right permit was signed in September 1998

Data Sources:

Oregon Water Resources Department 2021a, 2021c

Appendix: B17:

Reported Harney Electric Cooperative Inc. groundwater volume pumped for commercial-industrial use and calculated averages
(See notes at end of table)

Harney Electric Cooperative Inc.
OWRD Water Right File G-17424

Water Year	Production Well[1]	Water Year Month[2]												Water Year
		October (acre-feet)	November (acre-feet)	December (acre-feet)	January (acre-feet)	February (acre-feet)	March (acre-feet)	April (acre-feet)	May (acre-feet)	June (acre-feet)	July (acre-feet)	August (acre-feet)	September (acre-feet)	Total (acre-feet)
2013	HARN 51699 (L-102511)	0.11	0.18	0.34	0.34	0.26	0.18	0.11	0.09	10.78	14.13	8.65	20.79	55.94
2014	HARN 51699 (L-102511)	27.85	6.06	5.57	10.18	6.52	28.51	3.98	19.79	11.53	16.10	11.81	15.77	163.66
2015	HARN 51699 (L-102511)	3.86	11.32	12.09	9.17	5.68	3.63	26.37	20.23	4.25	1.99	14.86	14.11	127.55
2016	HARN 51699 (L-102511)	3.86	4.41	7.11	6.36	20.29	13.83	14.08	18.86	14.69	16.83	15.70	18.04	154.04
2017	HARN 51699 (L-102511)	9.02	4.72	7.64	4.72	9.09	6.63	14.07	11.19	13.29	15.49	17.10	18.22	131.15
2018	HARN 51699 (L-102511)	5.19	4.24	7.22	5.06	4.91	6.40	13.59	11.71	13.02	15.45	17.21	17.96	121.96
2019	HARN 51699 (L-102511)	5.30	4.41	9.78	5.84	26.03	28.60	5.46	19.58	4.17	27.90	25.98	28.33	191.37
2020	HARN 51699 (L-102511)	3.08	8.16	9.80	6.08	21.51	290.22	9.71	11.20	20.82	2.00	26.08	27.14	435.81
	Calculated Average (2013 - 2020)	7.28	5.44	7.44	5.97	11.79	47.25	10.92	14.08	11.57	13.73	17.17	20.04	172.69
	Calculated Average (2014 - 2019)[3]	9.18	5.86	8.23	6.89	12.09	14.60	12.93	16.89	10.16	15.62	17.11	18.74	148.29

Notes:

[1]Well is in the waterbudget lowland of the water budget north region

[2]Notes accompanying the volume data submitted to OWRD indicate the flow meter was read and recorded monthly

[3]The 2014 to 2019 data appears to be the most consistent set of data. The average of the 2014 to 2019 data is used to represent this use.

The permitted use is for geothermal heating and cooling. All groundwater pumped is returned to groundwater.

The permitted use (OWRD water right file G-17424) requires all the volume pumped return to groundwater via injection well(s) which is HARN 51698 constructed similarly to the production well

The water right permit was signed in May 2011

Data Sources:

Oregon Water Resources Department 2021a, 2021c

Appendix: B18:

Estimated Kryger-Crystal Crane Hot Springs annual groundwater volume pumped for commercial-industrial use
(See notes at end of table)

Denise Kryger - Crystal Crane Hot Springs
OWRD Water Right File G-15732

Water Year	Production Wells[1]	Maximum Rate (ft^3 / sec)	Water Year Month October (acre-feet)	November (acre-feet)	December (acre-feet)	January (acre-feet)	February (acre-feet)	March (acre-feet)	April (acre-feet)	May (acre-feet)	June (acre-feet)	July (acre-feet)	August (acre-feet)	September (acre-feet)	Water Year Total (acre-feet)
Use Under Original Permit[2]															
2003	HARN 1043 (L-95128)	0.44	27.05	26.18	27.05	27.05	24.44	27.05	26.18	27.05	26.18	27.05	27.05	26.18	**318.55**
to	HARN 1044	0.28	17.22	16.66	17.22	17.22	15.55	17.22	16.66	17.22	16.66	17.22	17.22	16.66	**202.71**
2020	No Water Well Report	0.28	17.22	16.66	17.22	17.22	15.55	17.22	16.66	17.22	16.66	17.22	17.22	16.66	**202.71**
	Total[3]	**1.00**	**61.49**	**59.50**	**61.49**	**61.49**	**55.54**	**61.49**	**59.50**	**61.49**	**59.50**	**61.49**	**61.49**	**59.50**	**723.97**
Use After Permit Amendment[4]															
2021	HARN 1043 (L-95128)														
	HARN 1044														
to	HARN 51901 (L-109048)	1.00	61.49	59.50	61.49	61.49	55.54	61.49	59.50	61.49	59.50	61.49	61.49	59.50	**723.97**
	HARN 52548 (L-123037)														
future	HARN 52601 (L-123039)														

Notes:

[1]Wells listed are in the waterbudget lowland of the water budget north region. Originally 3 wells from 2003 to 2020, increasing to 5 wells after 2020.

[2]Original permit under OWRD water right file G-15732 assigned a maximum pumping rate per well

[3]The estimated volume per month and per water year assumes the maximum total rate is used every day of each month and water year

[4]Amended permit under OWRD water right file G-15732 assigns a total maximum pumping rate that can be variously distributed among the production wells

The permitted use is for commercial use (hot spring resort)

The permitted use (OWRD water right file G-15732) does not require returning the volume pumped to groundwater. Assume all groundwater pumped is consumed.

The permitted use (OWRD water right file G-15732) requires installing and maintaining a flow meter, but reserves requirement to record and report volumes.

The original water right permit was signed in December 2002

The amended water right permit was signed in February 2021

Data Sources:

Oregon Water Resources Department 2021c

Appendix: B19:

Reported and estimated groundwater use for Harney Basin commercial-industrial uses after 1999 summarized by basin and water-budget regions
(See notes at end of table)

	Total Number of Wells	Total Volume Pumped (acre-feet / year)	Volume Return to GW (acre-feet / year)	Volume Consumed (acre-feet / year)
Total Non-municipal Public Water System GW Use for Basin				
Entire Harney Basin	**5**	**2,037.09**	**148.29**	**1,888.80**
Total Non-municipal Public Water System GW Use by Region				
Entire North Region	5	2,037.09	148.29	1,888.80
Entire West Region	0	0.00	0.00	0.00
Entire South Region	0	0.00	0.00	0.00
Entire Region Total	**5**	**2,037.09**	**148.29**	**1,888.80**
Total Non-municipal Public Water System GW Use in Lowlands				
Entire Harney Basin Lowland	5	2,037.09	148.29	1,888.80
North Region Lowland	5	2,037.09	148.29	1,888.80
West Region Lowland	0	0.00	0.00	0.00
South Region Lowland	0	0.00	0.00	0.00
Region Lowland Total	**5**	**2,037.09**	**148.29**	**1,888.80**
Total Non-municipal Public Water System GW Use in Uplands				
Entire Harney Basin Upland	0	0.00	0.00	0.00
North Region Upland	0	0.00	0.00	0.00
West Region Upland	0	0.00	0.00	0.00
South Region Upland	0	0.00	0.00	0.00
Region Upland Total	**0**	**0.00**	**0.00**	**0.00**

Notes:
See Appendix B16, B17, B18 for details
Data Sources:
Oregon Water Resources Department 2021a, 2021b, 2021c

Appendix: B20:

Groundwater rights found for Harney Basin commercial-industrial uses before 1999
(See notes at end of table)

File	Water Right Permit	Water Right Certificate	Owner Name	Priority Date	Permit Signature Date	Use	Status	Area	Water Budget Region	Water Budget Lowland / Upland	Well Identification[1] County	Well Identification[1] Number	Wells Total	Maximum Use Allowed[2] All Uses Rate (ft^3 / sec)	Maximum Use Allowed[2] All Uses Volume[3] (ac-ft / yr)	Calculated Non-Industrial[4] Volume (ac-ft / yr)	Calculated Industrial[5] Volume (ac-ft / yr)
U-29	U-49	10145	Edward Hines Western Pine Co.	06/09/1933	06/14/1933	Fire Industrial Irrigation[6]	Not Cancelled	Hines	North	Lowland	HARN HARN HARN	313 314 315	3	5.50	3,981.82	397.50	3,584.32
U-30	U-70	10146	Edward Hines Western Pine Co.	06/09/1933	07/20/1933	Railroad Domestic[7] Industrial	Not Cancelled	Seneca	North	Upland	GRAN	783	1	1.33	962.88	51.34	911.54
U-31	U-71	10147	Edward Hines Western Pine Co.	06/09/1933	07/20/1933	Railroad	Not Cancelled	Silvies Valley	North	Upland	HARN	12	1	1.01	731.21	0.00	731.21
G-3121	G-2913	39674	Edward Hines Lumber Co.	05/25/1965	08/23/1965	Industrial	Not Cancelled	Hines	North	Lowland	HARN	312	1	3.30	2,389.09	0.00	2,389.09
G-3122	G-2914	39660	Edward Hines Lumber Co.	05/25/1965	08/23/1965	Industrial	Not Cancelled	Hines	North	Lowland	HARN	320	1	3.30	2,389.09	0.00	2,389.09
G-10078	G-9164	None	Edward Hines Lumber Co.	12/31/1980	03/03/1981	Industrial	Cancelled 04/02/1987	Seneca	North	Upland	GRAN	784	1	0.85	612.91	0.00	612.91
												Basin Total	**8**	**15.29**	**11,066.99**	**448.84**	**10,618.15**
												North Lowland Total	**5**	**12.10**	**8,760.00**	**397.50**	**8,362.50**
												North Upland Total	**3**	**3.19**	**2,306.99**	**51.34**	**2,255.65**

Notes:

[1]Oregon Water Resources Department well identification by original water well report (well log) for the well. Subsequent water well reports for any deepenings, alterations, etc. are not shown.

[2]Maximum rate and volune as allowed by water right. Actual rate and volume used is undetermined

[3]Maximum volume allowed was calculated by multiplying maximum rate by full year.

[4]Non-industrial includes uses designated as irrigation and domestic (municipal)

[5]Industrial includes uses designated as industrial, railroad, and fire

[6]Irrigation under this water right is limited to a maximum rate of 1.66 ft^3/sec for 132.5 acres (likely maximum volume of 397.50 ac-ft/yr, assuming usual 3 ac-ft/yr maximum volume allowed per acre)

[7]Domestic use under this right continues after 1985 as municipal use reported by City of Seneca (51.34 ac-ft/yr average, see appendix B1)

Data Sources:

Oregon Water Resources Department 2019a, 2019f, 2021c