WALLA WALLA BASIN
WATERSHED COUNCIL

Water Year 2021

Oregon Walla Walla Basin Aquifer Recharge Report

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Oregon Walla Walla Basin Aquifer Recharge Report

Prepared by:

Walla Walla Basin Watershed Council

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February 2022

EXECUTIVE SUMMARY

This report summarizes aquifer recharge operations at the Anspach, Barrett, Chuckhole, East Trolley Lane, Fruitvale, Gallagher, Johnson, LeFore, Locust Road, Miller Road, Mud Creek, North Sunquist, NW Umapine, Ruby Lane, Triangle Road, Trumbull, and West Ringer Road sites during water year (WY) 2021 and supporting water quality, spring flow, and groundwater level data. Thirteen aquifer recharge sites were operated under Limited License 1621 (LL-1621) and 15 aquifer recharge sites, including two new sites (Miller Road, Ruby Lane), were operated under the new Limited License 1848 (LL-1848) issued by Oregon Water Resources Department. This report was prepared per Condition 11 of LL-1621 and per Condition 10 of LL-1848, which requires annual reporting of aquifer recharge site operations.

Source water for the 15 aquifer recharge sites was diverted from the Walla Walla River at the Little Walla Walla Diversion in Milton-Freewater, OR. The water was delivered through existing irrigation water delivery systems to each site's turnout. The WY 2021 recharge season started November 18, 2020 and ended May 15, 2021 but recharge did not occur continuously during this period due to operational and maintenance considerations. The total amount of water diverted and recharged under LL-1621 and LL-1848 for the WY 2021 recharge season, including estimated seepage losses from the conveyance system, was 8,121 acre-feet (ac-ft). One of the objectives of conducting managed recharge is to mimic lost floodplain processes. If this year's recharge water had instead been flood waters, the volume recharged would have covered the roughly 13 mi^2 central portion of the alluvial fan with almost one foot of water if it had been released instantaneously.

Groundwater level, spring flow, and water quality data were collected in accordance with the approved monitoring plan for LL-1621 and for LL-1848. At several groundwater monitoring wells located near recharge sites, groundwater levels increased at the start of recharge and decreased after recharge ended. At other wells, water levels responded to seepage from other sources, such as rivers, streams, irrigation ditches or canals, and deep percolation from irrigation.

Flow data from Little Mud Creek and Swartz Creek, both spring-fed creeks down-gradient of multiple recharge sites, show an increase in flows since the recharge program expanded in 2012-2013.

Groundwater and surface water quality data collected during aquifer recharge activities indicate that aquifer recharge activities are not degrading groundwater quality; rather, recharge activities typically improve groundwater quality due to the generally high quality of the source water.

Continued operation of the 17 existing sites, including three new aquifer recharge sites will occur under LL-1848 in 2022.

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LIST OF ACRONYMS

ac-ft	acre-foot
bgs	below ground (or grade) surface
°C	degrees Centigrade
cfs	cubic feet per second
EPA	U.S. Environmental Protection Agency
gpm	gallons per minute
FWUA	Fruitvale Water Users Association
GW_##	Groundwater monitoring well #, e.g. GW_14, GW_171
HBDIC	Hudson Bay District Improvement Company
LL	Limited License
mg/L	milligrams per liter
ND	not detected
ODEQ	Oregon Department of Environmental Quality
OWRD	Oregon Water Resources Department
µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
WWBWC	Walla Walla Basin Watershed Council
WWRID	Walla Walla River Irrigation District
WY	water year

INTRODUCTION

This report describes groundwater level data, surface and groundwater quality data, and aquifer recharge operations during water year (WY) 2021 (October 1, 2020 – September 30, 2021) for the managed aquifer recharge program conducted by the Walla Walla Basin Watershed Council (WWBWC) in cooperation with the Hudson Bay District Improvement Company (HBDIC), Fruitvale Water Users Association, and Walla Walla River Irrigation District. The recharge program began operating in 2004 at one site and gradually expanded to the 17 sites operational in WY 2021. Figure 1 shows recharge volumes by year.

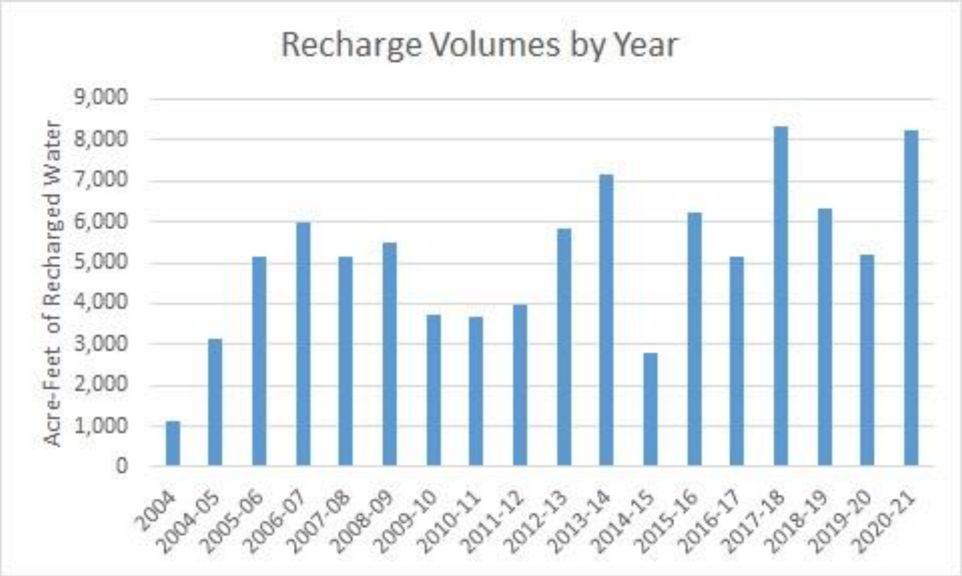

Figure 1. Recharge volumes by year

In the Walla Walla basin, declines in the alluvial aquifer and interconnected surface waters have resulted from the channelization of the Walla Walla River distributary system, increased irrigation efficiencies, and increased use of groundwater (pumping) for irrigation and drinking water. As described in the *Walla Walla Basin Aquifer Recharge Strategic Plan* (WWBWC, 2013), the following benefits are expected if the annual volume recharged reaches 20,000 ac-ft:

> "Reversing the loss of storage within the alluvial aquifer will minimize seepage loss in the valley's rivers and streams, increase spring performance and related groundwater input to surface water features, and allow groundwater resources of the alluvial aquifer to continue to be used as a sustainable resource with a secondary or alternative-use benefit to surface water." (p. 79).

During WY 2021, active recharge sites were Anspach, Barrett, Chuckhole, East Trolley Lane, Fruitvale, Gallagher, Johnson, Locust Road, Miller Road, Mud Creek, NW Umapine, Ringer Road, Ruby Lane, Triangle Road, and Trumbull. Figure 2 shows WY 2021 recharge volumes by site, including estimated conveyance losses (i.e. canal seepage) that become groundwater recharge. The Lefore and Sunquist recharge sites didn't operate because site management and operational procedures were not yet fully developed.

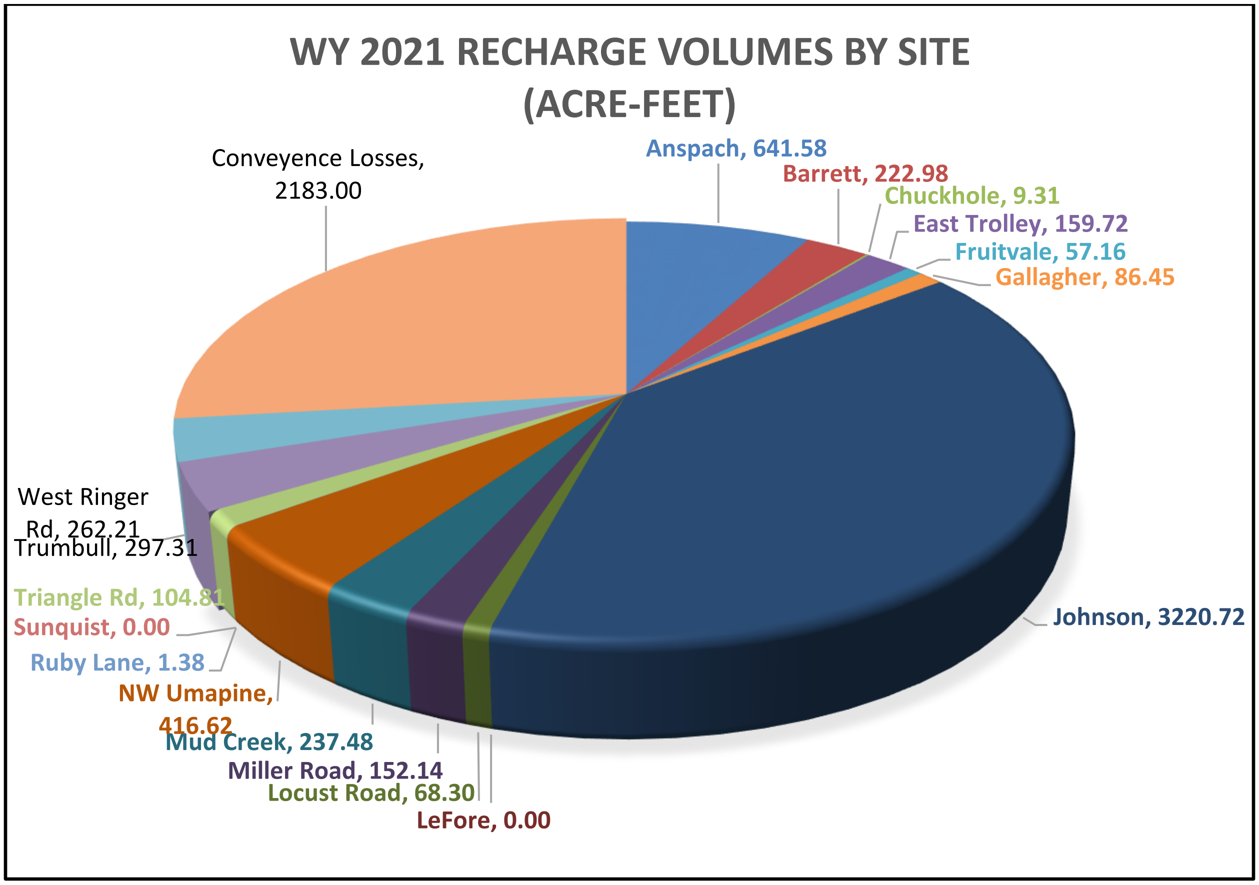

Figure 2. Recharge volumes by site during WY 2021

The sites were operated under Limited License LL-1621 (Appendix A) issued by the Oregon Water Resources Department (OWRD) on October 18, 2016 and the new Limited License LL-1848 (Appendix B) issued on January 04, 2021. Source water for aquifer recharge was diverted from the Walla Walla River near Milton-Freewater between November 18, 2020 and May 15, 2021. The various recharge sites operated from 32 to 147 days depending primarily on water availability and landowner participation. The total amount of water diverted was 8,121 acre-feet (ac-ft)[1], with the Johnson site and conveyance losses recharging the highest proportions of the total diversion amount, 40 and 27%, respectively (Figure 2 and **Error! Reference source not found.**). While the smaller recharge sites contribute a relatively small proportion, they are still an integral and important part of the program due, in part, to the conveyances losses that occur during water delivery to the sites as well as the distribution of recharge over a larger area of the alluvial fan.

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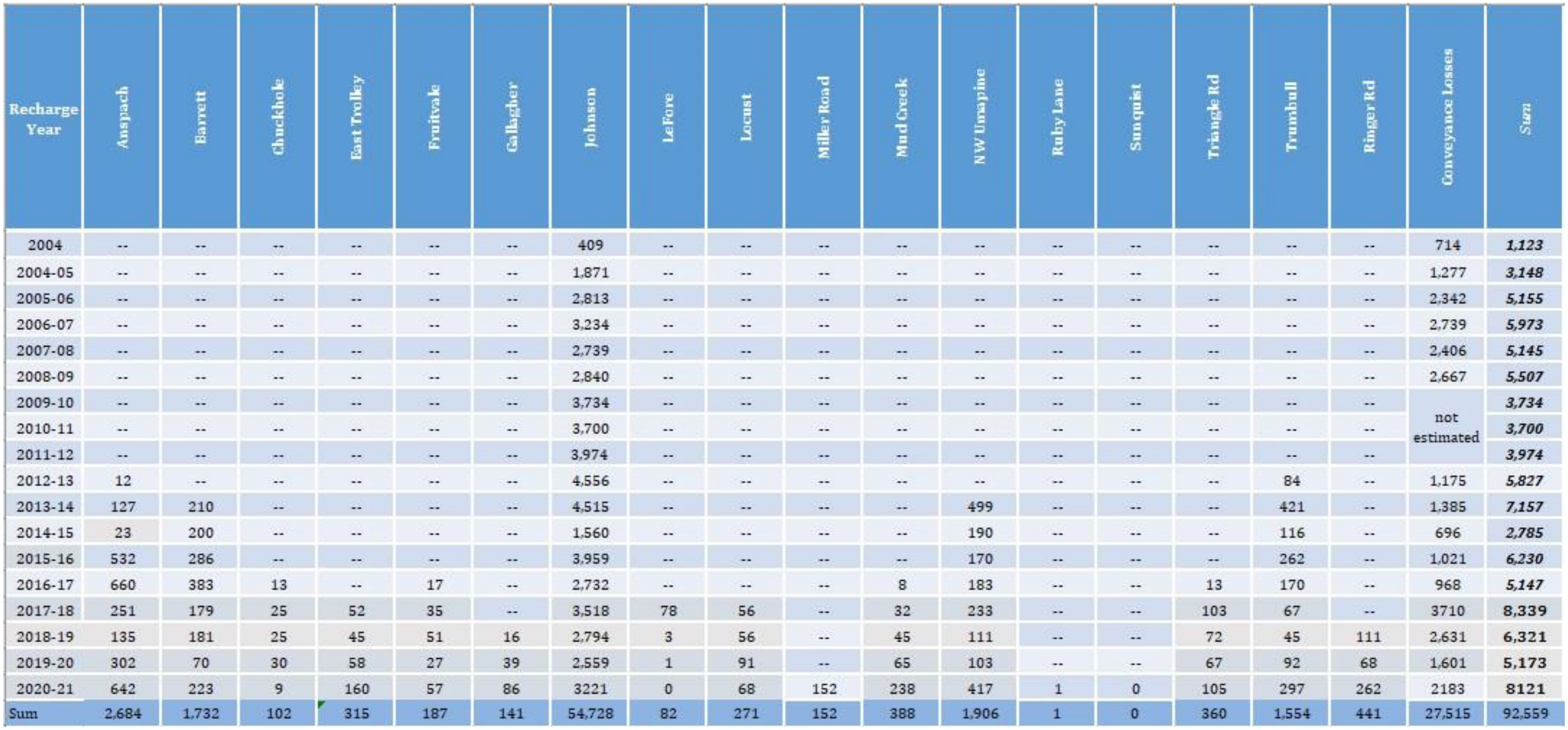
[1] One acre foot is the amount of water needed to cover one acre (a little less than a football field) with one foot of water.

Table 1. Annual recharge volumes (ac-ft) by site, WY 2004-2021.



Recharge Year	Anspach	Barrett	Chuckhole	East Trolley	Fruitvale	Gallagher	Johnson	LeFore	Locust	Miller Road	Mud Creek	NW Umapine	Ruby Lane	Sunquist	Triangle Rd	Trumbull	Ringer Rd	Conveyance Losses	*Sum*
2004	--	--	--	--	--	--	409	--	--	--	--	--	--	--	--	--	--	714	***1,123***
2004-05	--	--	--	--	--	--	1,871	--	--	--	--	--	--	--	--	--	--	1,277	***3,148***
2005-06	--	--	--	--	--	--	2,813	--	--	--	--	--	--	--	--	--	--	2,342	***5,155***
2006-07	--	--	--	--	--	--	3,234	--	--	--	--	--	--	--	--	--	--	2,739	***5,973***
2007-08	--	--	--	--	--	--	2,739	--	--	--	--	--	--	--	--	--	--	2,406	***5,145***
2008-09	--	--	--	--	--	--	2,840	--	--	--	--	--	--	--	--	--	--	2,667	***5,507***
2009-10	--	--	--	--	--	--	3,734	--	--	--	--	--	--	--	--	--	--	not estimated	***3,734***
2010-11	--	--	--	--	--	--	3,700	--	--	--	--	--	--	--	--	--	--		***3,700***
2011-12	--	--	--	--	--	--	3,974	--	--	--	--	--	--	--	--	--	--		***3,974***
2012-13	12	--	--	--	--	--	4,556	--	--	--	--	--	--	--	--	84	--	1,175	***5,827***
2013-14	127	210	--	--	--	--	4,515	--	--	--	--	499	--	--	--	421	--	1,385	***7,157***
2014-15	23	200	--	--	--	--	1,560	--	--	--	--	190	--	--	--	116	--	696	***2,785***
2015-16	532	286	--	--	--	--	3,959	--	--	--	--	170	--	--	--	262	--	1,021	***6,230***
2016-17	660	383	13	--	17	--	2,732	--	--	--	8	183	--	--	13	170	--	968	***5,147***
2017-18	251	179	25	52	35	--	3,518	78	56	--	32	233	--	--	103	67	--	3710	**8,339**
2018-19	135	181	25	45	51	16	2,794	3	56	--	45	111	--	--	72	45	111	2,631	**6,321**
2019-20	302	70	30	58	27	39	2,559	1	91	--	65	103	--	--	67	92	68	1,601	**5,173**
2020-21	642	223	9	160	57	86	3221	0	68	152	238	417	1	0	105	297	262	2183	**8121**
Sum	2,684	1,732	102	315	187	141	54,728	82	271	152	388	1,906	1	0	360	1,554	441	27,515	92,559

HYDROLOGIC SETTING

The Walla Walla River system is a bi-state watershed located in northeast Oregon and southeast Washington (Figure 3). The headwaters are located in the Blue Mountains, the crest of which defines the eastern extent of the watershed. The Walla Walla River, Mill Creek and the Touchet River are the three primary surface water channels of the system. They coalesce within the Walla Walla Valley then flow to the Columbia River. The scope of this report is the Oregon portion of the basin, including the Walla Walla River and its distributary network, especially where they flow onto and across the Milton-Freewater alluvial fan.

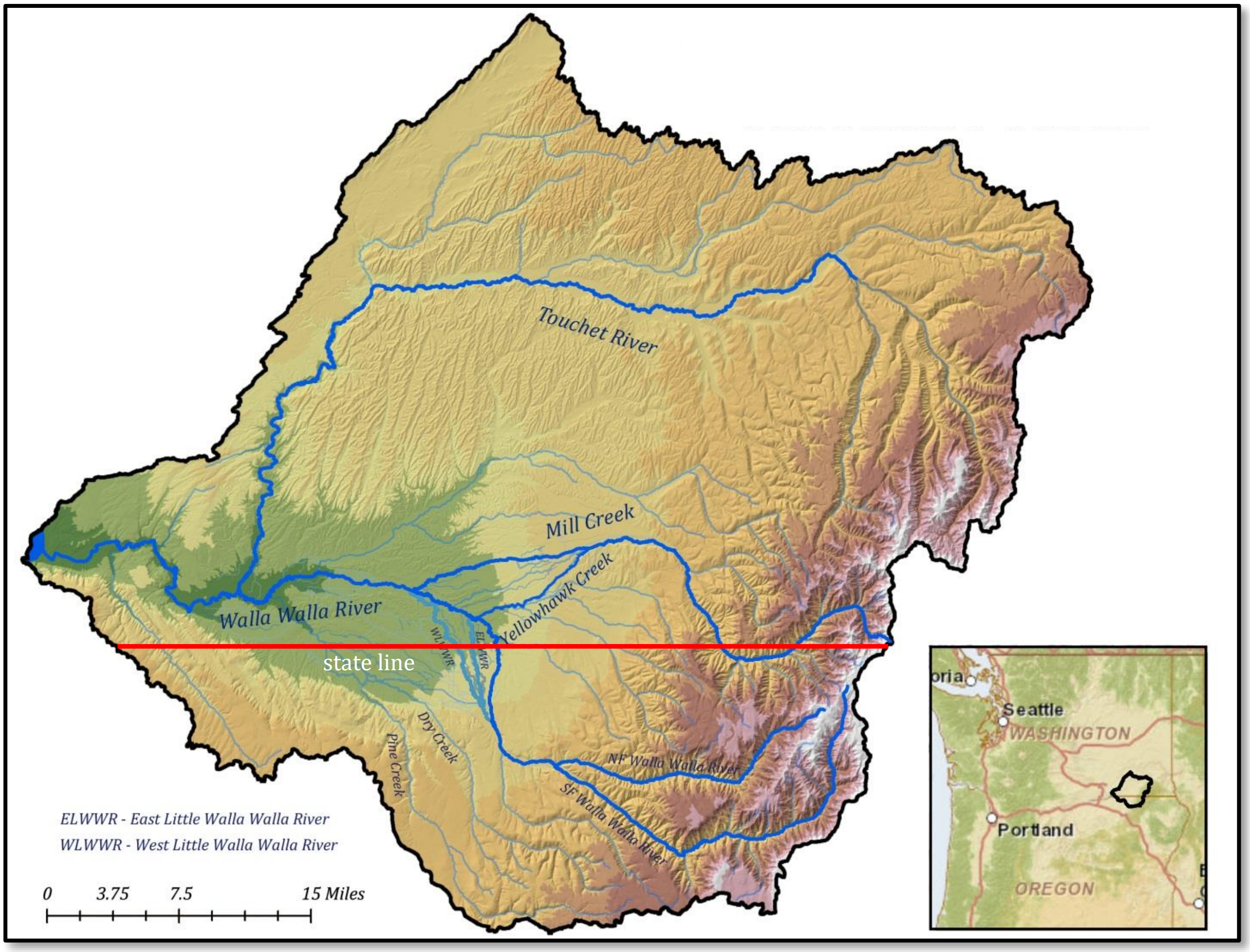


Figure 3. The Walla Walla Watershed, including the Walla Walla River and its major tributaries and distributaries.

Groundwater in the Walla Walla basin occurs in two principal aquifer systems: (1) the unconfined to confined suprabasalt sediment (alluvial) aquifer system; and (2) the underlying confined basalt aquifer system (Newcomb, 1965). The basalt aquifer system is regional in character, having limited hydraulic connection to the Walla Walla River, primarily in the canyons of the Blue Mountains. The alluvial aquifer system is the focus of the aquifer recharge program because of its high degree of hydraulic connection with streams on the valley floor. The alluvial aquifer system, or alluvial aquifer, is found within a sequence of continental clastic sediments overlying the top of basalt (the Mio-Pliocene strata (upper coarse, fine and lower coarse units) and the Quaternary coarse unit). Beneath the Walla Walla Valley floor these sediments, and the alluvial aquifer system, is up to 800 feet thick. The majority of the productive portions of the alluvial aquifer system are hosted by the Mio-Pliocene conglomerate although, at least locally, it is hosted in the overlying Quaternary coarse unit. The alluvial aquifer is generally characterized as unconfined, but it does, at least locally, display evidence of confined conditions. Preferential groundwater flow within the alluvial aquifer is inferred to largely reflect the distribution of coarse sedimentary strata. General groundwater flow direction is from east to west based on contoured groundwater elevations in the alluvial aquifer (Figure 4).

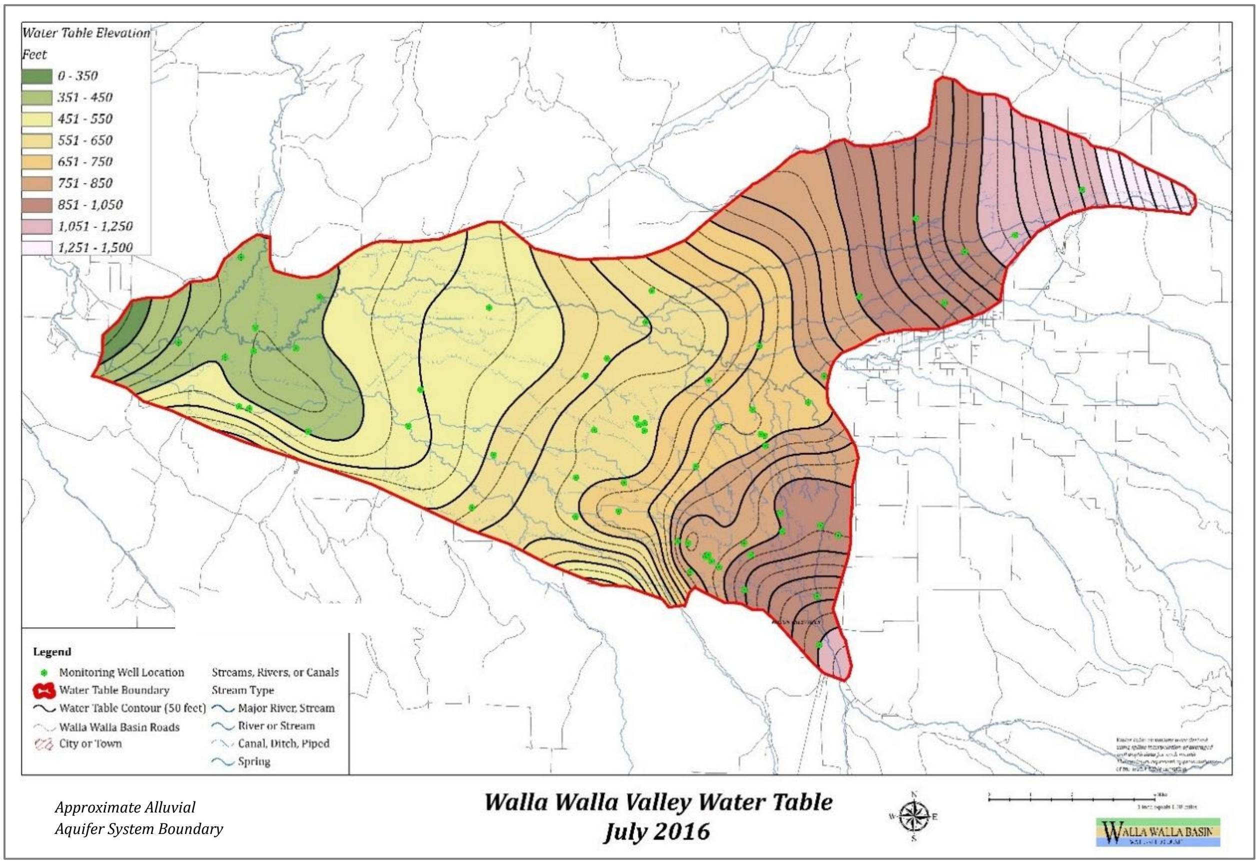


Figure 4. Water table elevation contours for the alluvial aquifer system in July 2016.

South of Milton-Freewater, the Walla Walla River exits the steep-walled canyon in the foothills surrounding the valley, divides into a distributary stream system on an alluvial fan on the valley floor, and then, as the distributary streams flow west, coalesce into the main Walla Walla River (Figure 5). A similar pattern exists in the Mill Creek distributary system in Washington. The distributary channels are known today as the East Little Walla Walla River, West Little Walla Walla River, Mud Creek, Yellowhawk Creek, and Garrison Creek.

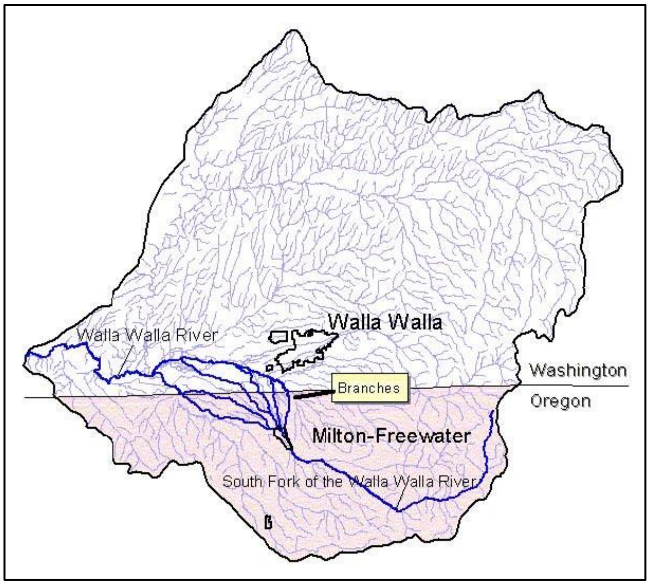


Figure 5. Distributary stream networks of the Walla Walla River originating on the Milton-Freewater alluvial fan.

Prior to the development of water resources in the valley, the distributary channels conveyed large amounts of energy and water across the alluvial fan. The complex channels provided habitat for aquatic species, recharge to the alluvial aquifer system, and cooler water to the Walla Walla River in the form of springs and subsurface inflows to the river resulting from recharge to the aquifer. A headgate installed in the Little Walla Walla River in the 1930’s shunted wintertime flows away from the Little Walla Walla River, significantly reducing the system’s complexity. Then, in the 1950’s, seven miles of levees were constructed along the Walla Walla River to protect the Milton-Freewater area from flooding, severing the connection between the floodplain and the alluvial aquifer. Increasing development led to increasing reliance on the alluvial aquifer as a source of water for irrigation and drinking. In recent years, the listing of steelhead and bull trout as threatened under the Endangered Species Act and the reintroduction of spring Chinook salmon led to out-of-court settlement agreements between irrigators and federal fishery agencies to enhance flows in the Walla Walla River. Since 2003, HBDIC and the Walla Walla River Irrigation District leave 25 to 27 cfs of their surface water rights in the Walla Walla River – roughly one-quarter of their typical summertime diversions during the 1990s – further de-watering the Little Walla Walla River.

Alluvial aquifer groundwater levels have declined in some places. Of the 11 long-term OWRD observation wells in the alluvial aquifer, all had downward groundwater level trends and three were completely dry by 2009 (Bower and Lindsey, 2010). Declines at observation well GW_19 located near Old Milton Highway illustrate the long-term trend in portions of the aquifer (Figure 6).

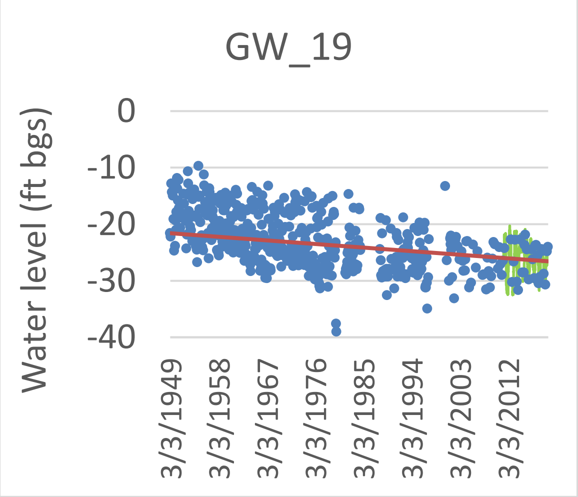


Figure 6. Long-term hydrograph for monitoring well GW_19.

Because of the interconnectedness between the alluvial aquifer and the streams in the basin, declining groundwater levels result in decreased groundwater contributions to the Walla Walla River and other surface waters, including during critical low-flow periods. The loss of groundwater to streams affects not only the amount of flow in the river but also leads to increased surface water temperature during the low-flow periods, affecting aquatic species and the stream ecosystem. Historically, the estimated yield from 57 mapped springs on the Milton-Freewater and Mill Creek alluvial fans was 50,000 ac-ft (Oregon State Water Resources Board, 1963), or 69 cfs on an annual basis. In contrast, in 2017 the combined annual discharge from five of the largest springs sourced in the Milton-Freewater alluvial fan was 15.5 cfs (WWBWC, 2019). Flows at McEvoy and Dugger springs were 4-6 cfs and 8-10 cfs, respectively, during summers in the 1930s. By 2009 both springs were dry for portions of the year (Figure 7). However, even under altered modern conditions, groundwater still provides a cooling function to the river. In one study conducted in the summer of 2009, cold water inflows into the Walla Walla River just south of the state line provided an effective cooling of approximately 3.15 ˚C (Gryczkowski, 2015). The cold water inflows consisted of groundwater discharge and hyporheic[2] exchange. Groundwater discharge was calculated to contribute 20% of the total flow in the river during the study. The steep gradients and high hydraulic connectivity between the groundwater levels and water in the river results in high seepage losses -- in some reaches greater than 30 percent (WWBWC, 2017) (Figure 8).

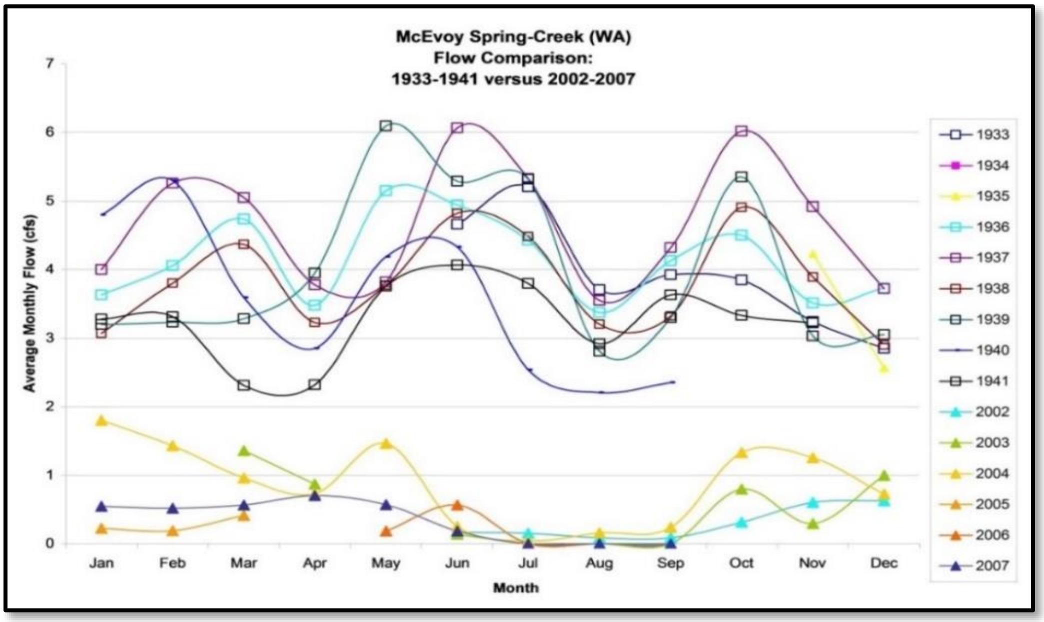


Figure 7. Hydrograph for McEvoy Spring Creek, 1933-1941 versus 2002-2007.

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[2] The hyporheic zone is a porous area beneath and alongside a stream bed, where shallow groundwater and surface water mix together.

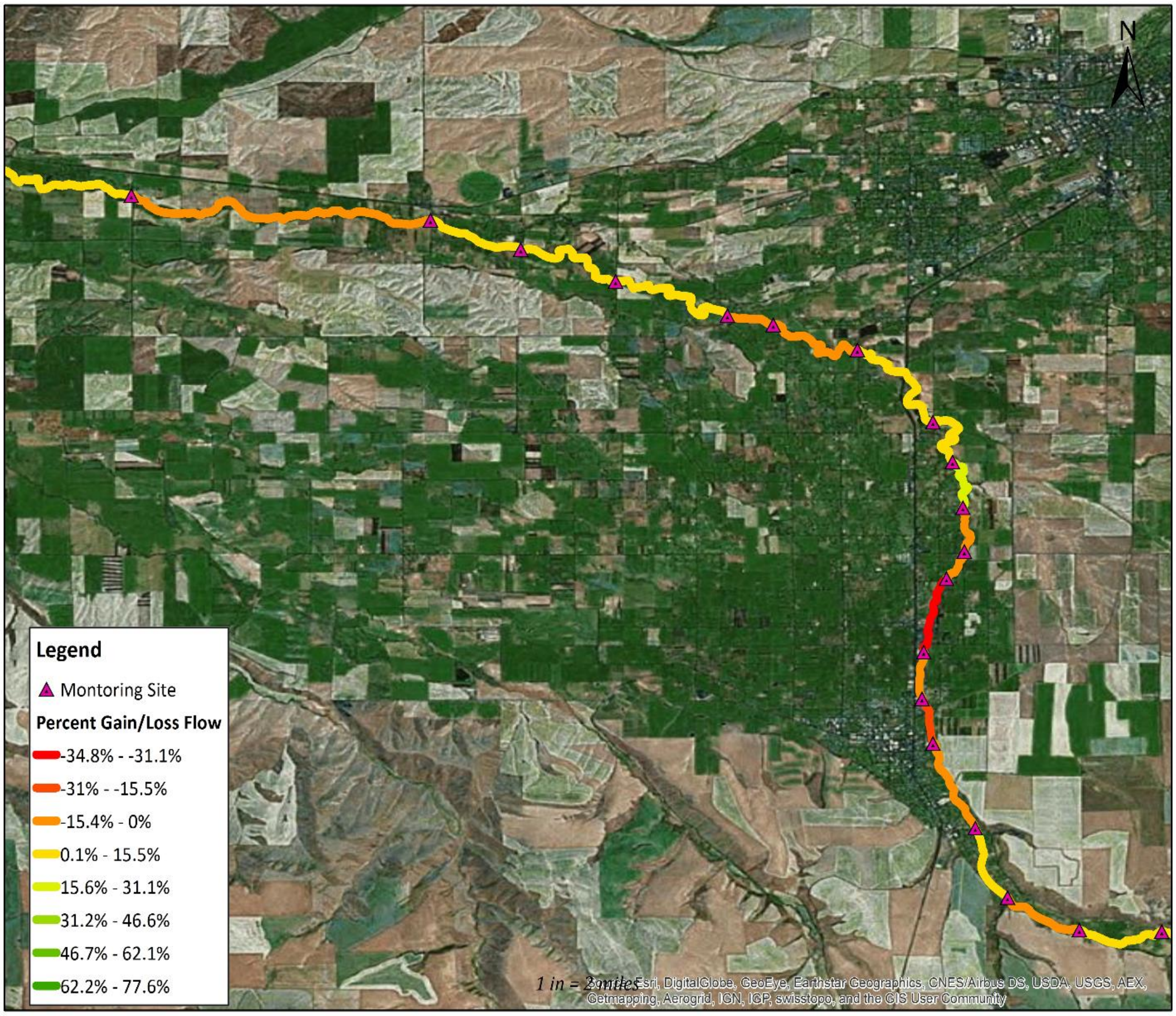


Figure 8. Average percent gains or losses in flow of a segment of the Walla Walla River during seepage runs conducted 2004-2016. Gains (positive values, greens and yellows) indicate groundwater discharging to the river. Losses (negative values, reds and oranges) indicate surface water seeping into the ground (see WWBWC, 2017, for details).

The existing 17 aquifer recharge sites are distributed across the Milton-Freewater alluvial fan (Figure 9), mimicking the floodplain process of recharge to the aquifer that was lost when the headgate shunted wintertime water to the Walla Walla River and the levees nearly eliminated flooding near Milton-Freewater.

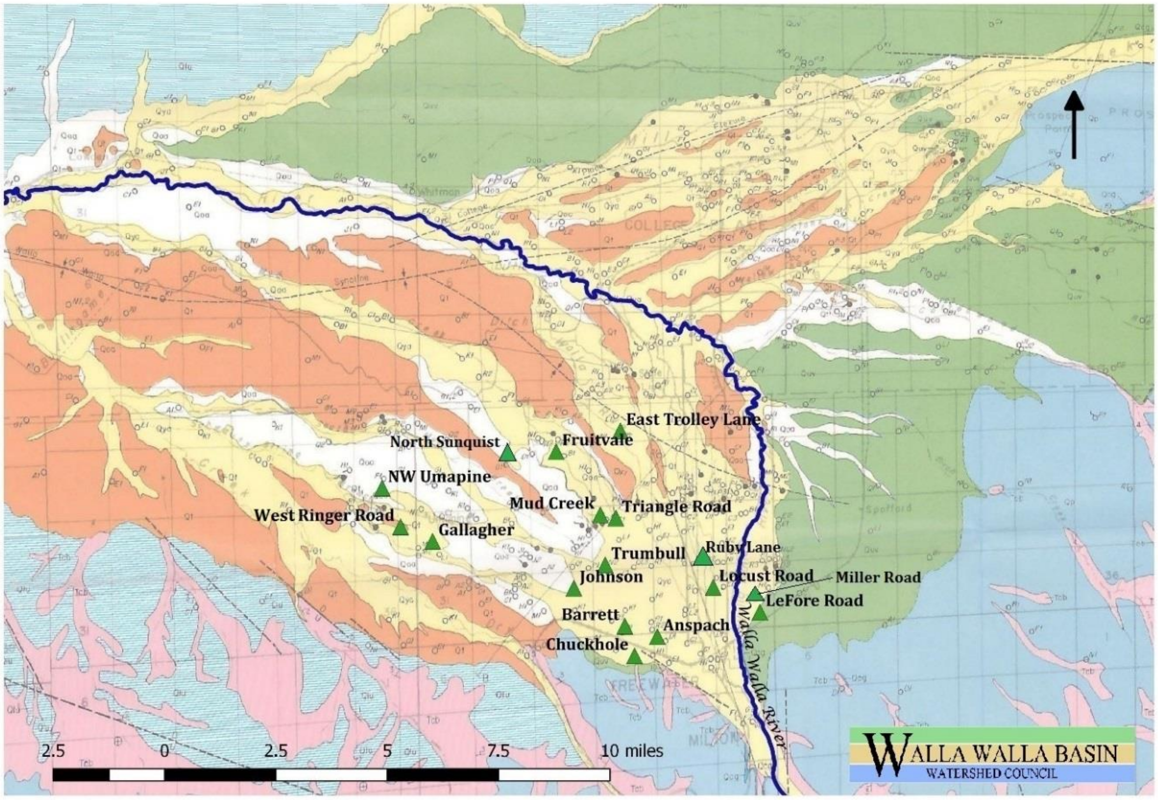


Figure 9. Recharge sites in the Oregon portion of the Walla Walla basin during WY 2021 and their location across the alluvial fan.

OPERATIONS

Managed aquifer recharge program operations are summarized, by site, in Table 2. As in previous years, sites typically operated at less than the maximum design capacity listed in the limited license. Depending on the site, this is commonly due to site conditions or operational limitations such as the volume of the source water being unable to completely fill the site's inflow pipe, biofouling of inlet screens, frozen ditches, reduced infiltration rates, competing demands for water (stock watering or irrigation), equipment failures, plugged subsurface inlet lines, etc.

Table 1. Summary of MAR operations in WY 2021

Site	Operated by	Number of Days Operated	Average Recharge Rate (cfs)	Operational Comments
Anspach	WWBWC	142	2.27	Moisture got into the meter and made the display foggy. Couldn't read values between 12/17/20 to 2/25/21.
Barrett	HBDIC	144	0.78	Head pressure issue when irrigation water is needed downstream, causes the flow meter to read empty pipe.
Chuckhole	Landowner	48	0.10	Intermittent head pressure issue, causes the flow meter to read empty pipe. The flow meter didn't capture all the water that went into the site.
East Trolley	Landowner	146	0.55	Landowner removed screen debris daily
Fruitvale	Landowner	96	0.30	Landowner turned off the site when he needed water for irrigation.
Gallagher	WWBWC/ Landowner	134	0.41	Landowner turns off the site intermittently when he needs water for irrigation.
Johnson	HBDIC/ WWBWC	141	11.97	Lower infiltration rate in the basins than in past years. Possible maintenance needed.
LeFore	Landowner	0	--	Developing operational procedures with landowner.
Locust Rd	Landowner	89	0.39	Flow meter batteries died. Water was over the flow meter during operation and couldn't replace batteries. Estimated flow to be 222 gal/min between 4/1/21 to 5/15/21.
Miller Road	WWBWC	35	2.19	--
Mud Creek	FWUA	96	1.06	Recharge volume calculated based on manual flow measurements with velocity meter taken at basin inflow and outflow.
North Sunquist	Landowner	0	--	Developing operational procedures with landowner.
NW Umapine	HBDIC	129	1.63	--
Ruby Lane	WWBWC	32	0.02	Insufficient water delivered to recharge site intake to operate at full capacity.
Triangle Road	FWUA/Landowner	96	0.55	--
Trumbull	HBDIC	138	1.09	--
West Ringer Road	WWBWC	147	1.05	--

MONITORING

This section describes water availability, individual site operations, groundwater level monitoring, and source and groundwater quality monitoring results. Laboratory water quality testing results are provided in Appendix C. Diverted surface water volumes, recharge volumes and rates, groundwater levels, source water quality and ground-water quality data were collected in accordance with the approved monitoring plans for LL-1621 and LL-1848. Groundwater level data in the OWRD-requested digital format will be submitted separately to OWRD.

LL-1621 allowed for up to 70 cfs to be diverted from the Walla Walla River for the purpose of testing artificial recharge. The new limited license, LL-1848, caps the allowable diversion rate at 45 cfs. Per the conditions of LL-1621 and LL-1848, a minimum instream flow amount is required to remain in the Tum-A-Lum reach of the Walla Walla River depending on the time of year (Table 3). WWBWC coordinated with HBDIC to ensure that this condition of LL-1621 and LL-1848 was met during recharge operations in WY 2021. Managed recharge under the limited license did not begin until November 18, 2020 because minimum flow requirements were not met prior to this date. Recharge was interrupted from February 1st to March 4th for the annual maintenance of fish screens at the Little Walla Walla River diversion, which ceases delivery of water to canals and ditches from which the recharge sites receive their water. Diversions for aquifer recharge ended on May 15, 2021, as required by the limited license.

Table 2. Minimum instream flows that must be met before water can be diverted for recharge under LL-1621.

Minimum Instream Flow Values for Limited Licenses 1621 and 1848		
Nov 1 thru Nov 30	***Dec 1 thru Jan 31***	***Feb 1 thru May 15***
64 cfs	***95 cfs***	***150 cfs***

Not all the water diverted from the Walla Walla River reaches the recharge sites due to seepage through unlined portions of the canal and ditch system and/or evaporative losses. Because recharge operations occur during winter and spring months, evaporative losses are assumed to be negligible. To estimate ditch seepage losses during diversion, different seepage rates were applied to different segments of the conveyance system for the duration of recharge (Table 4). The seepage rates were calculated based on measured seepage losses, diversion rates needed to supply the maximum inflow rates to each recharge site, and duration of the recharge periods. The resulting estimated cumulative seepage loss for WY 2021 was 2,183 ac-ft.

Table 3. Seepage loss estimates by site

Site	Segment (s)	Seepage Rate cfs/mi	Seepage Rate AF/day	Length miles	Seepage rate AF/mi/day	Recharge duration (days)	Seepage loss AF	Basis
Anspach	LWWR Diversion to the Anspach turnout/Zerba Weir			2.37	0.00	142	0	Piped from the White Ditch, no additional open canal. White Ditch seepage already accounted for in Johnson calculation. Anspach operated only when Johnson was also operating during WY 2020
Barrett	LWWR Diversion to Barrett turnout			3.01	0.00	144	0	Piped from the White Ditch, no additional open canal. White Ditch seepage already accounted for in Johnson calculation. Barrett operated only when Johnson was also operating during WY 2020
Johnson	LWWR Diversion to the Duff Weir + Duff Weir to Johnson			3.78	1.56	141	831	Seepage rate in the upper White Ditch sourced from Patten, 2014, who subtracted recharge inflow rates from LWW diversion flows during a period when the diversion was delivering recharge water only.
Trumbull	Duff Weir to Trumbull pipeline			0.71	1.56	138	153	Seepage in the White Ditch from the LWW diversion to the Duff Weir is already accounted for in the Johnson calculation. Trumbull operated only when Johnson was also operating in WY 2020.
NW Umapine	Richartz Ditch to NW Umpine		2.82			129	364	Calculated in 2014 during a 30 day period when the Richartz Ditch was feeding only NW Umapine recharge and 1 other diversion. Volume at Richartz Weir - recharge volume at NW Umapine during those 30 days = ditch loss during that time, enabling us to calculate an AF/day rate of loss.
Gallagher	LWW Diversion to Johnson site +1.06 miles White Ditch from Hodgen Rd to Meharry Rd + 0.91 miles of Dugger Creek to Gallagher turnout.		0.00			134	0	1.06 mi of white ditch from Hodgen Rd to S407, then 0.91 miles of Dugger creek. Based on Reach 1 of WWBWC's unpublished 2017 White Ditch seepage study. Negligible losses are likely in this section of the White Ditch and probably Dugger Creek as well. Used a 0 seepage rate to avoid overestimating recharge volumes.

Chuckhole	Powell and Milton pipelines		0.00			48	0	Fed from Powell and Milton pipelines. No open ditches.
East Trolley	Fruitvale diversion (S318) to East Trolley	0.50		1.82	0.99	146	263	See seepage rate explanation for Fruitvale Recharge Site below. Segment length calculated from Fruitvale diversion (S318) to East Trolley Recharge because seepage losses up-gradient of S318 are accounted for in Fruitvale Recharge calculations.
Fruitvale	From Frog to Fruitvale	0.50		5.09	0.99	96	484	Seepage rate based on CTUIR and The Freshwater Trust study that found 0.8 cfs lost/mile in the Little Walla Walla system. We assumed a lower rate (0.5 cfs loss/mile) since their study was conducted during summer flows, when the ditch was full and ground was empty. Recharge season occurs when ditch flow is lower and ground saturation is higher, presumably reducing the seepage rate.) This rate should be updated when more data become available.
LeFore	Eastside Diversion to LeFore recharge turnout	0.00				0		fed from pipeline, no open ditches
Locust Rd	From Frog to Locust Rd recharge turnout	0.50		0.98	0.99	89	86	See seepage rate explanation for Fruitvale Recharge Site
Mud Creek	From Frog to Mud Creek recharge pond	0.50		3.48	0.99	0	0	See seepage rate explanation for Fruitvale Recharge Site. Days operated is 96 total days run - 96 days Fruitvale running (since losses during those 96 days are already accounted for).
Triangle Rd	Frog to Triangle Rd turnout	0.00			0.00	96	0	Seepage losses accounted for in Fruitvale and Mud Creek calculations.
West Ringer Rd	White Ditch, Gallagher to Ringer Rd		0.00			147	0	Based on Reach 2 data from WWBWC's unpublished 2017 White Ditch seepage study. Seepages losses negligible during spring. Losses more likely during fall. Used a 0 seepage rate to avoid overestimating recharge volumes.
SUM							2,183	

GROUNDWATER LEVELS

The groundwater monitoring network for the aquifer recharge program consists of 28 wells (Figure 10). The following section presents, by site, the amount of water recharged during WY 2021, a map of groundwater monitoring wells associated with each site, and results from monitoring groundwater levels. Each well's hydrograph and the annual shallowest and deepest groundwater levels (the peaks and troughs in the hydrographs) are evaluated.

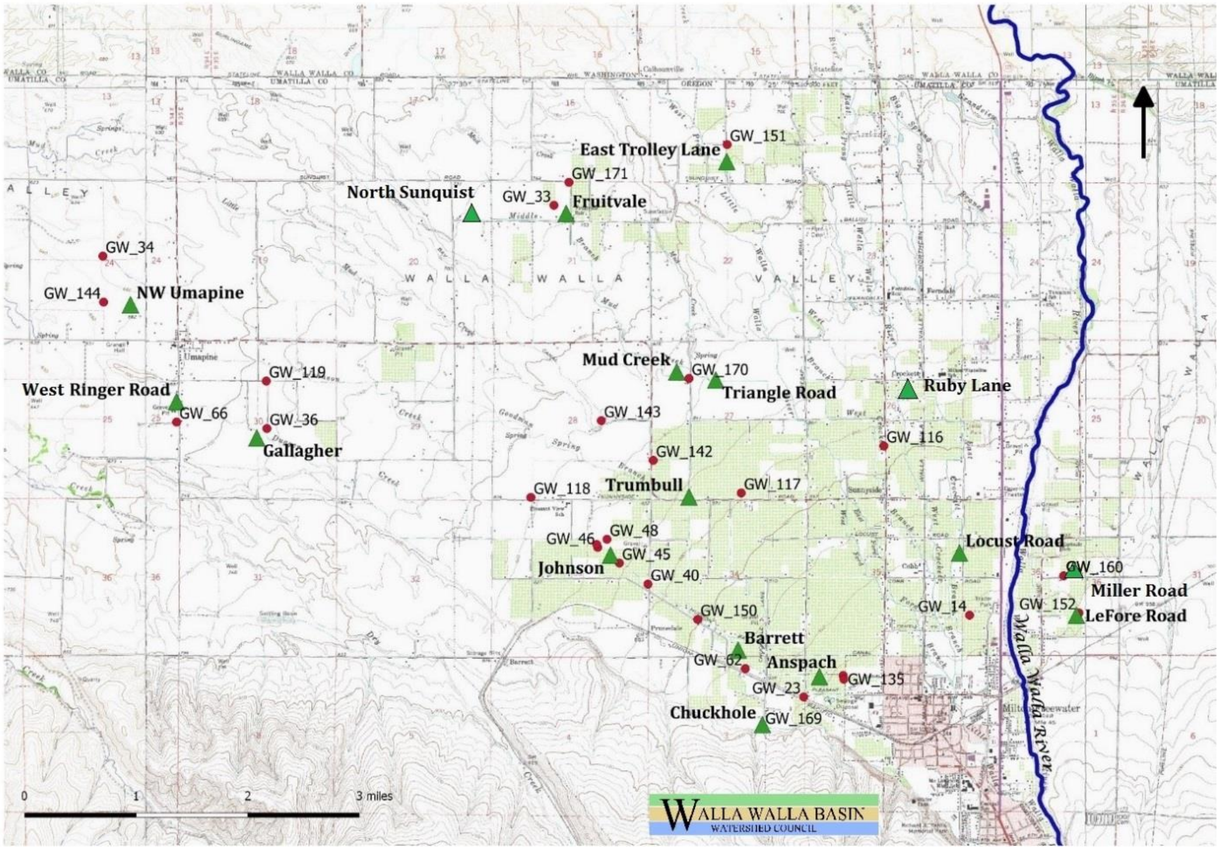


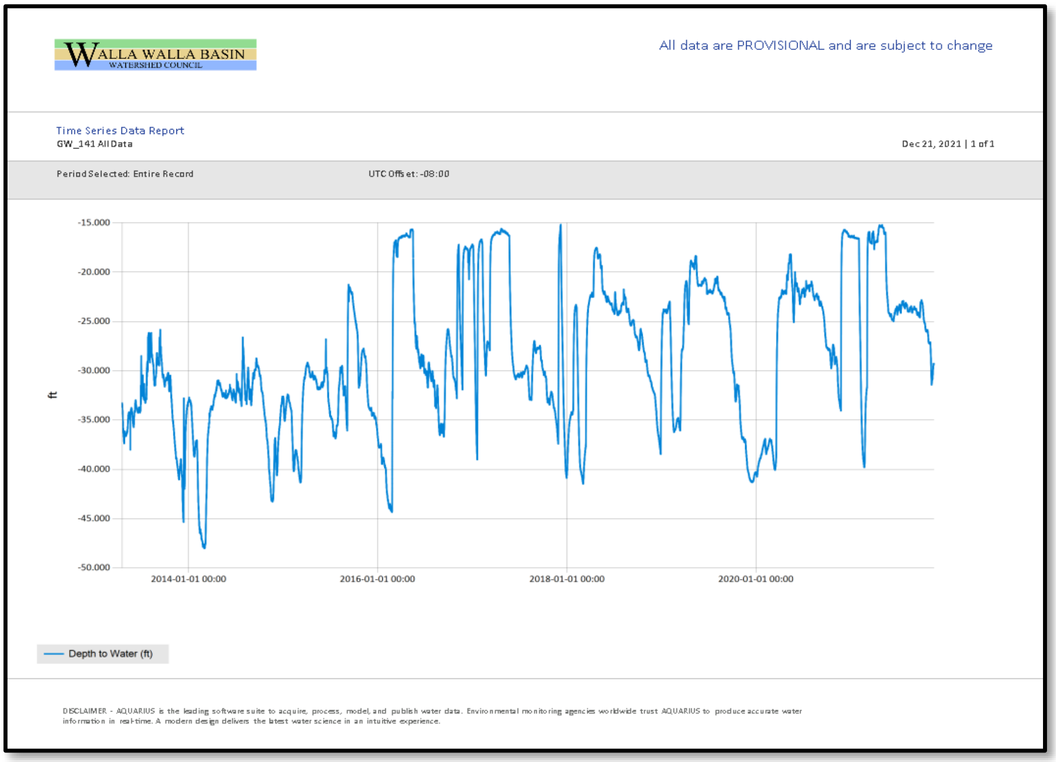
Figure 10. Groundwater monitoring wells (red dots) and aquifer recharge sites (green triangles).

ANSPACH RECHARGE SITE

The Anspach site operated for 142 days (11/23/20 - 2/1/21, 3/4/21 - 5/15/21), recharging 641.58 ac-ft of water at an average rate of 2.27 cfs. This site recharged more water this season than in any previous recharge season.

The site has two up-gradient wells, GW_135 and GW_141, and one cross-gradient well, GW_23 (Figure 11). The shallowest groundwater elevations at GW_141 rose by more than 10 feet during the early years of managed recharge (Figure 12). This year's groundwater trends look similar to the 2016 and 2017 seasons, both of which were high-volume recharge years at Anspach. While GW_135 and GW_141 are up-gradient of the recharge site, the timing of the seasonal patterns (Figure 13 and 14) suggests both wells are influenced by managed recharge operations, perhaps as a result of groundwater mounding under the Anspach site. At cross-gradient GW_23, quarterly readings preclude observing changes between each month; between years, groundwater levels may be stabilizing after declines in the three previous decades (Figure 15).

Figure 11. Anspach monitoring recharge locations.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GW_141 All Data

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Figure 12. GW_141 hydrograph from WY 2013 -2021.

Figure 13. GW_135 hydrograph from WY 2021.

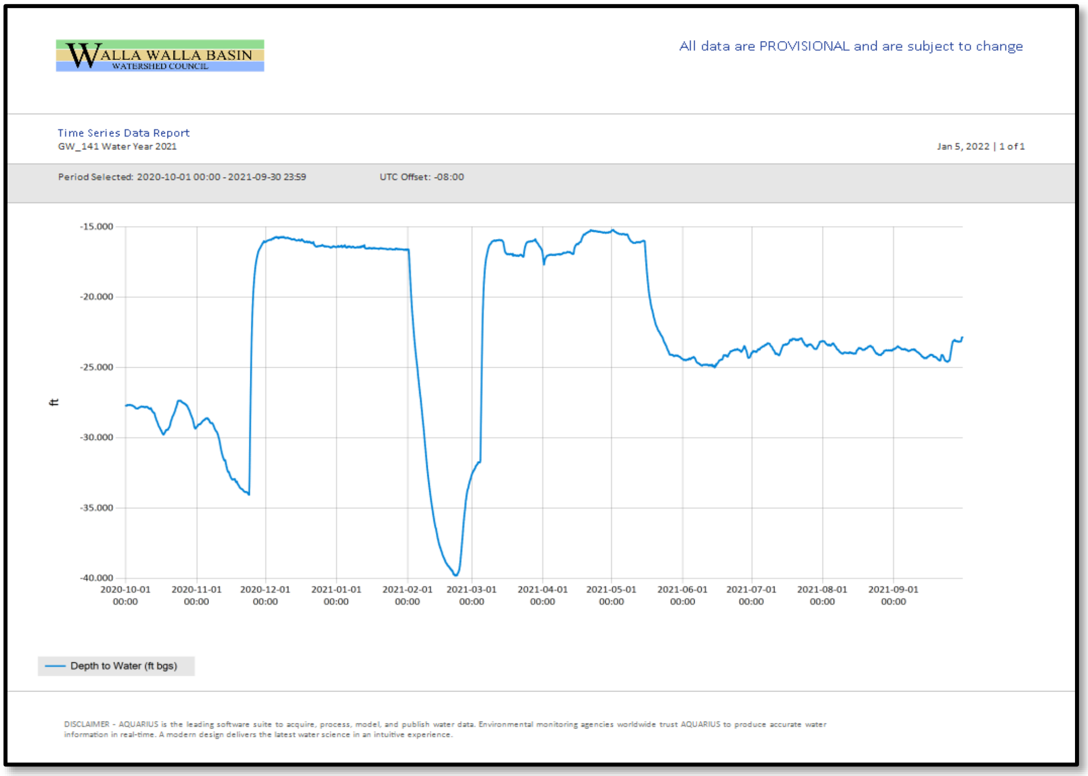
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Figure 14. GW_141 hydrograph from WY 2021.

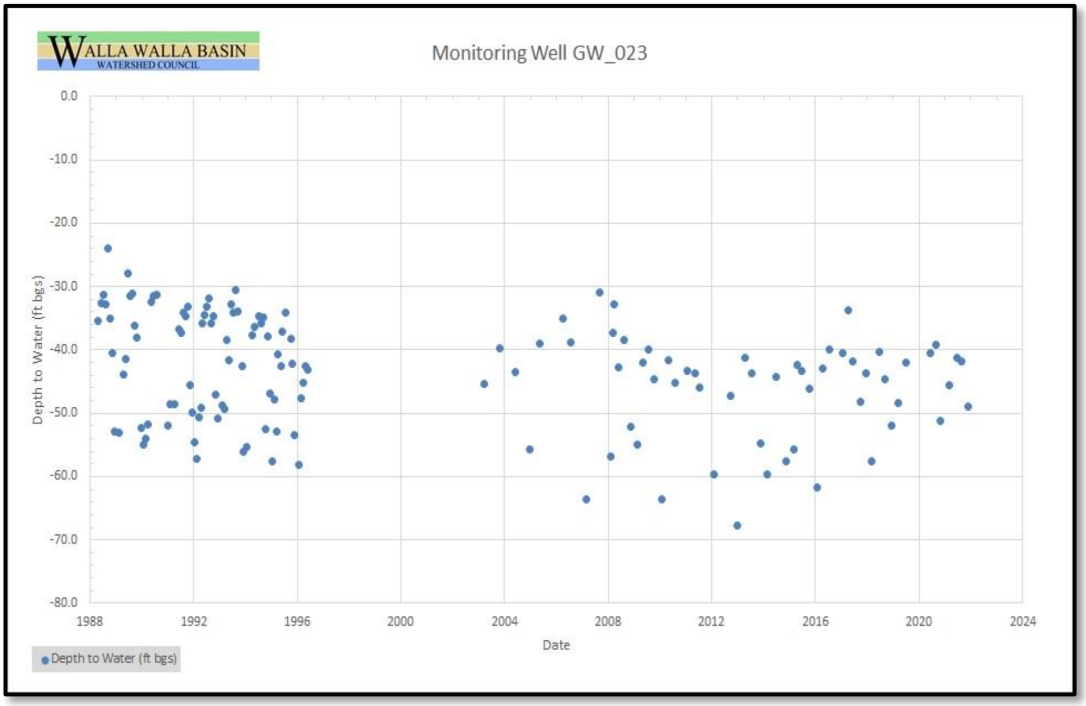

Figure 15. GW_23 hydrograph from WY 1988-2021.

BARRETT RECHARGE SITE

The Barrett site operated for 144 days (11/21/20 - 2/1/21, 3/4/21 - 5/15/21), recharging 222.98 ac-ft at an average rate of 0.78 cfs.

GW_62 is up-gradient and GW_150 is approximately 0.3 miles down-gradient of the site (Figure 16). Response to recharge operations at the Barrett site were observed at the up-gradient groundwater monitoring well, GW_62, and includes influences from the Chuckhole recharge site (see below). Groundwater levels in the monitoring well increased to peak levels during recharge operations and decreased when recharge operations stopped (Figure 17). The 2006-2021 hydrograph for GW_62 is included for longer term groundwater levels at the Barrett site, which began operation in WY 2014 (Figure 18). At down-gradient GW_150, a sustained peak during recharge season is apparent, but the timing of peaks and troughs likely also reflects the influence of flows in the nearby White Ditch on groundwater levels (Figure 19).

Figure 16. Barrett monitoring well locations.

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Figure 17. GW_62 hydrograph from WY 2021

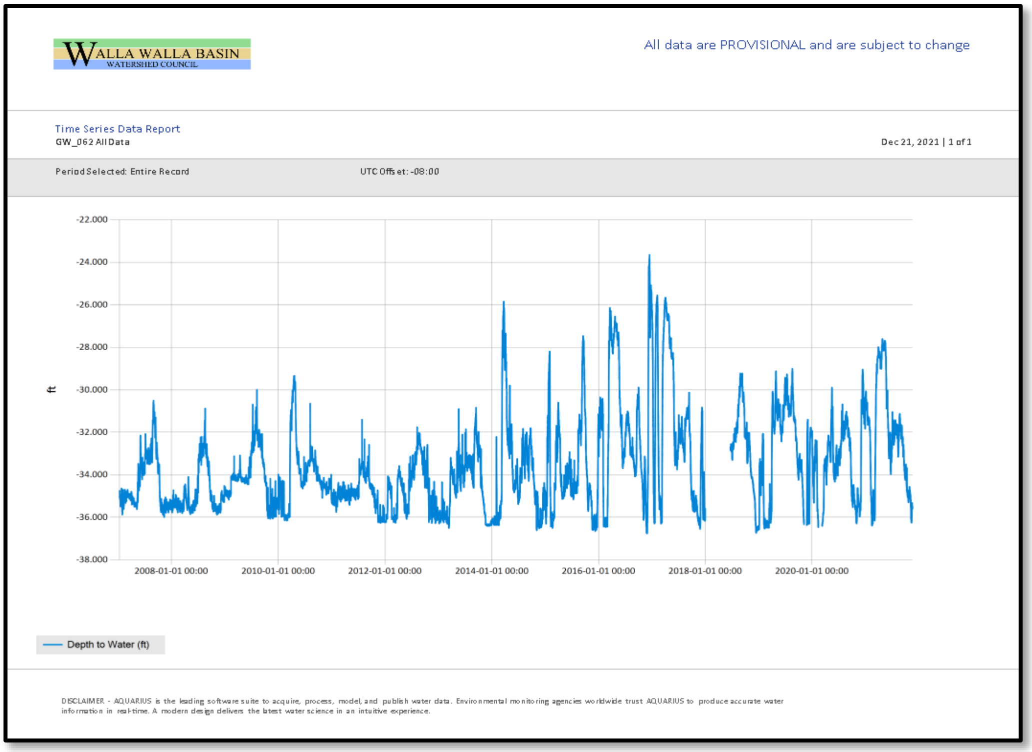

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Figure 18. GW_62 hydrograph from WY 2006-2021.

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Figure 19. GW_150 hydrograph from WY 2021. Periodically, the water level drops below the elevation of the sensor, producing the gaps seen on the hydrograph

CHUCKHOLE RECHARGE SITE

The Chuckhole site operated for 48 days (3/28/21 - 5/15/21), recharging 9.31 ac-ft at an average of 0.10 cfs.

Three monitoring wells are in the vicinity of the site: GW_169 up-gradient, GW_62 down-gradient, and GW_23 cross-gradient (Figure 20). As discussed above, GW_62 water levels show the influence of the Barrett recharge site and the influence of the Chuckhole site. GW_62 groundwater levels increase in November with the start of recharge at the Barrett site and further increase in March/April, coinciding with the start of recharge at the Chuckhole site. Groundwater level decrease in mid-May when recharge operations at both sites are concluded for the year. At GW_169 groundwater levels have increased during recharge season since the site began operating in 2016 (Figure 21). Each spring, the water level drops below the elevation of the sensor, producing the gaps seen on the hydrograph. At cross-gradient GW_23, the quarterly readings during WY 2021 did not occur within the brief 6-week recharge season (Figure 22).

Figure 20. Chuckhole monitoring well locations.

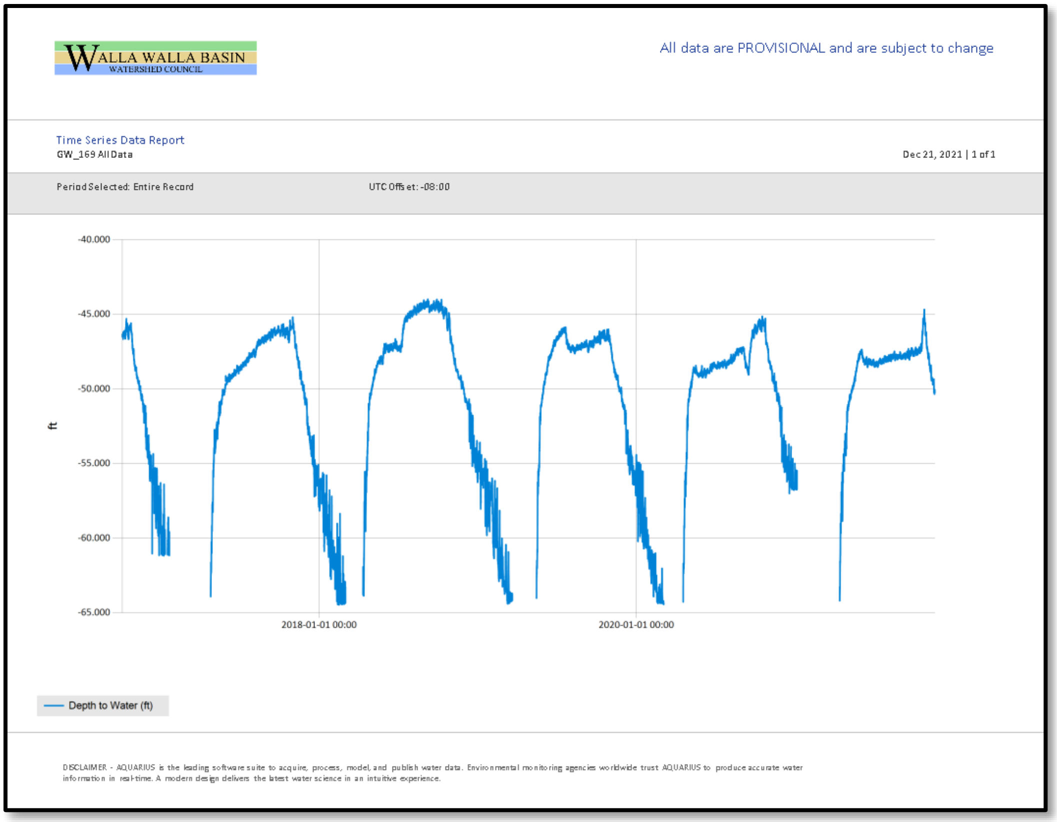

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Figure 21. GW_169 hydrograph from WY 2017-2021. Springtime data gaps represent times when the water level drops below the elevation of the sensor.

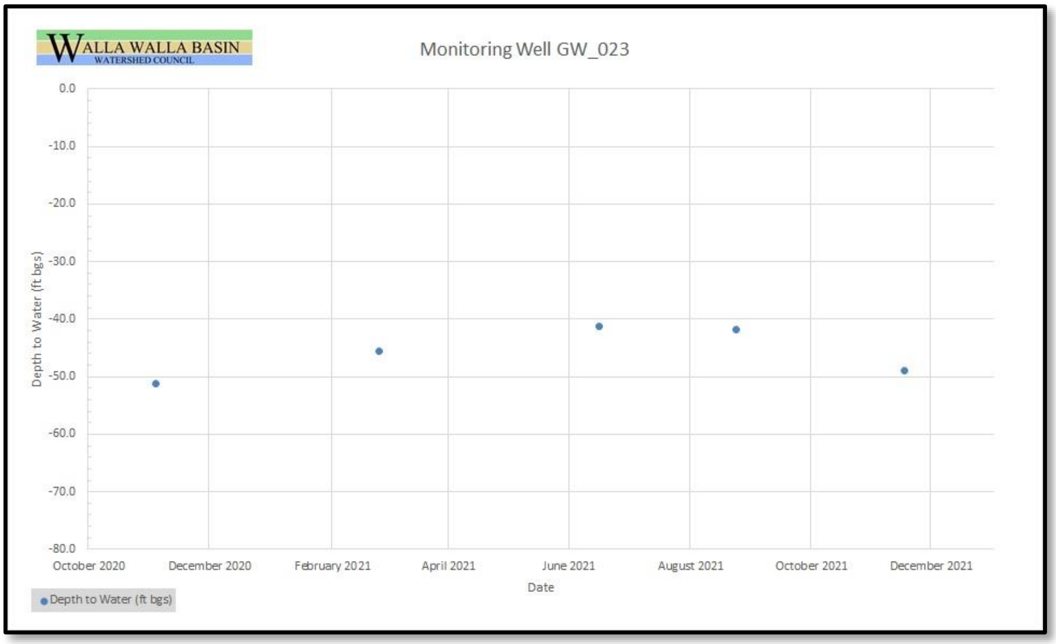


Figure 22. GW_23 hydrograph from WY 2021.

EAST TROLLEY RECHARGE SITE

The East Trolley site operated for 146 days (11/18/20 - 2/1/21, 3/4/21 – 4/1/21, 4/2/21 – 5/15/21), recharging 159.72 ac-ft at an average rate of 0.55 cfs. The landowner cleaned the intake screen daily to maximize recharge rates. The site recharged approximately three times the volume of water compared to previous years of operation.

GW_151 is at the distal end of the infiltration gallery (Figure 23). The magnitude and timing of the changes in groundwater levels suggest multiple influences on the seasonal water table (Figures 24-25). The springtime peak does appear to reflect the higher volume recharged this year, but not in proportion to the volume recharged compared to previous years.

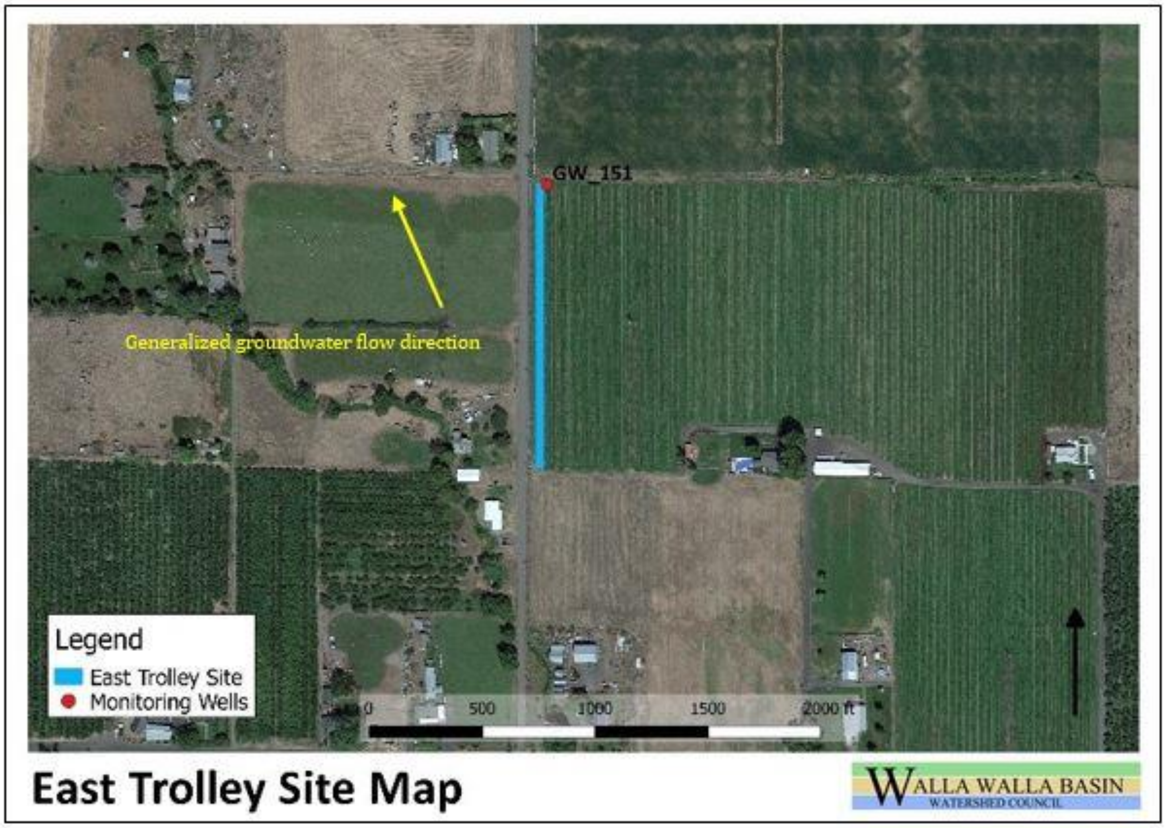
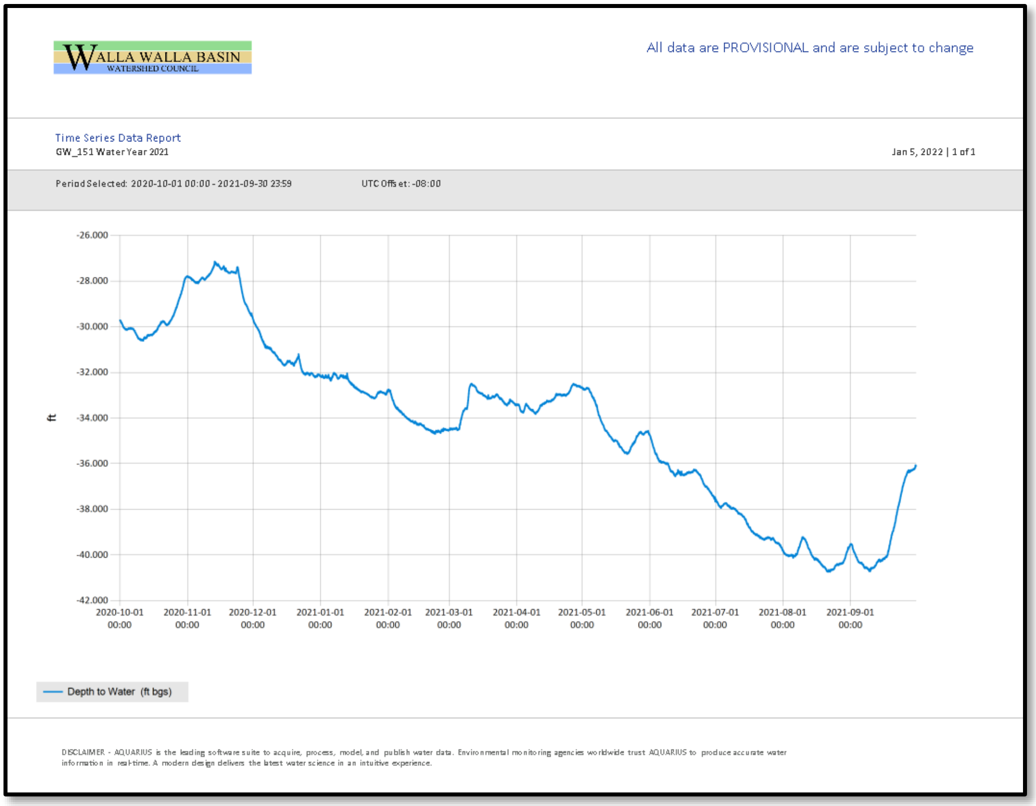


Figure 23. East Trolley monitoring well location.



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GW_151 Water Year 2021

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Figure 24. GW_151 hydrograph from WY 2021.

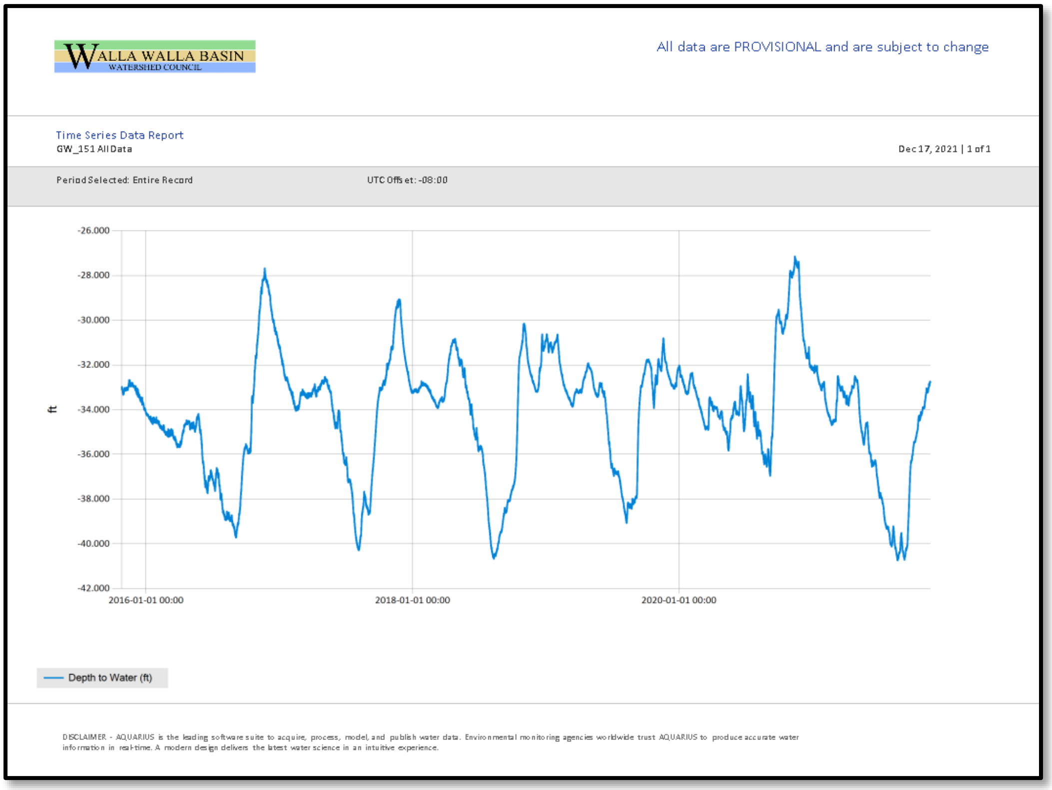

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Figure 25. GW_151 hydrograph from WY 2016-2021.

FRUITVALE RECHARGE SITE

The Fruitvale site operated for 96 days (11/18/20 – 2/1/21, 3/4/21 – 3/25/21), recharging 57.16 ac-ft at an average rate of 0.30 cfs.

This site is located between the inner and middle zone of springs described by Newcomb (1965). The landowner has described that springs used to surface near this site. Groundwater monitoring well GW_33 and GW_171 are down-gradient of the site (Figure 26). At both locations, peaks and troughs correlate with recharge season (Figures 27-28). At GW_33, seasonal peaks increased and seasonal lows stabilized for the first four years after Fruitvale recharge began in 2017. During WY2021, seasonal high groundwater elevations were similar to previous years, but the summertime low was influenced by other contributing factors, likely 2021 drought conditions and the resulting demand for groundwater (Figure 27). Increased spring yield at nearby monitoring sites has been observed by WWBWC (see WWBWC, 2019) and suggests increased groundwater storage in the vicinity.

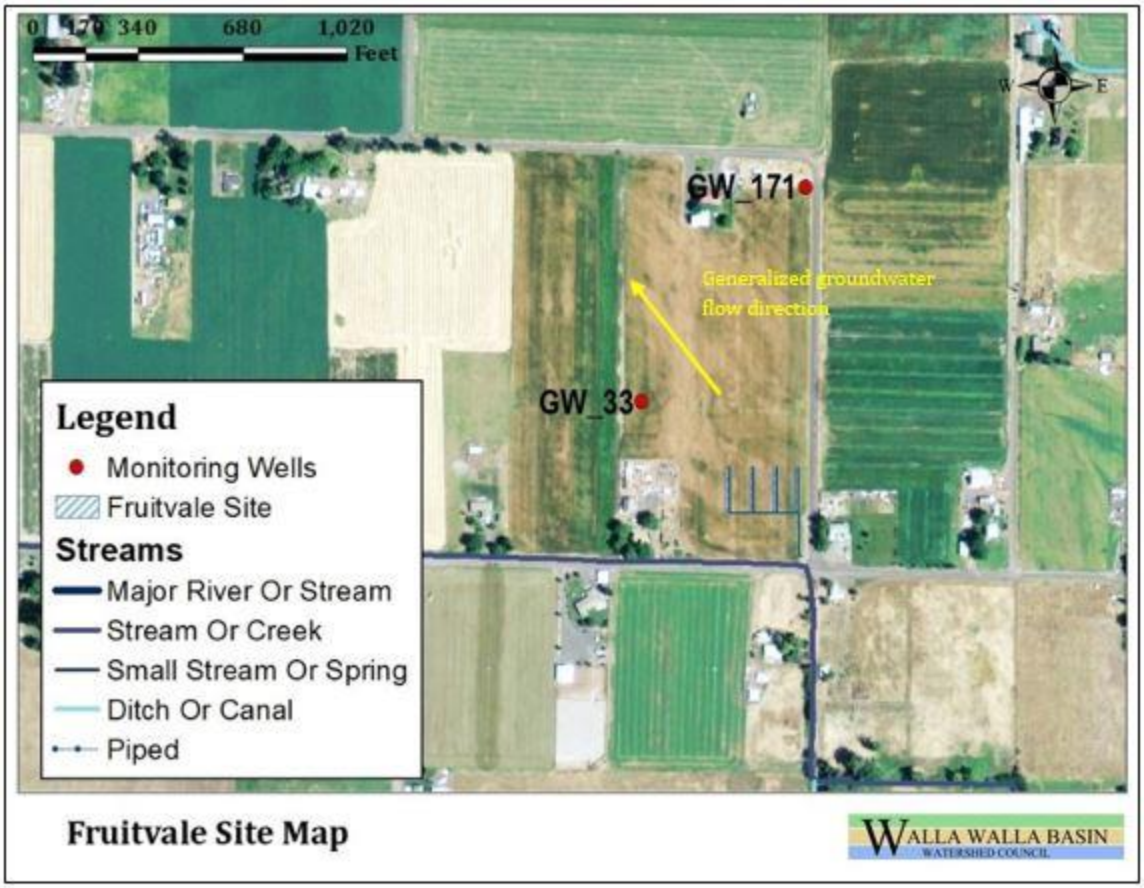

Figure 26. Fruitvale monitoring well locations.

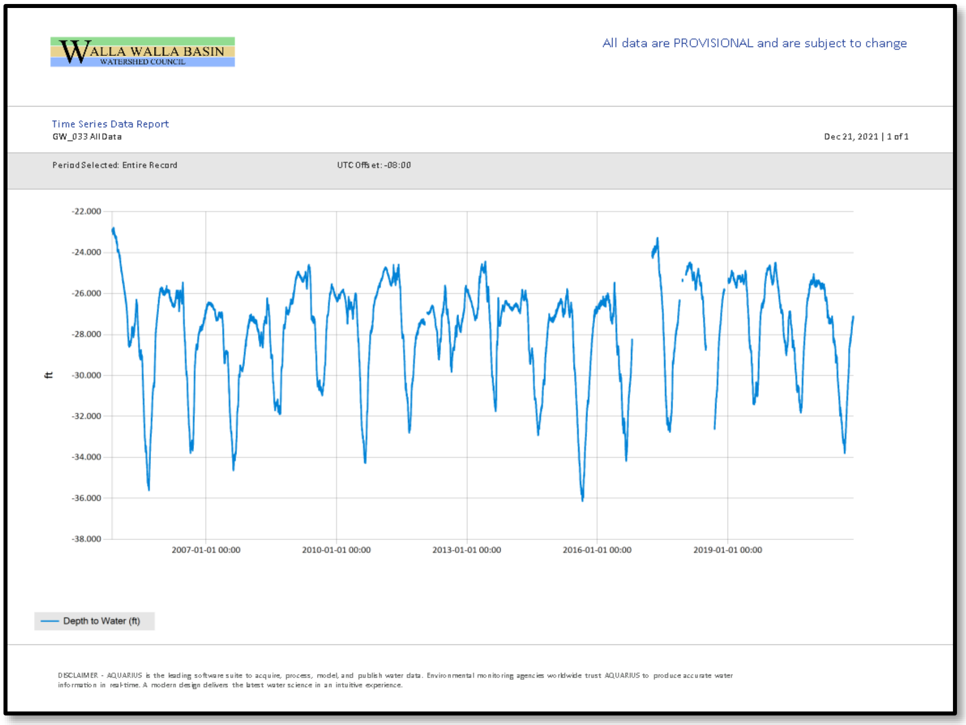

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Figure 27. GW_33 hydrograph from WY 2004-2021.

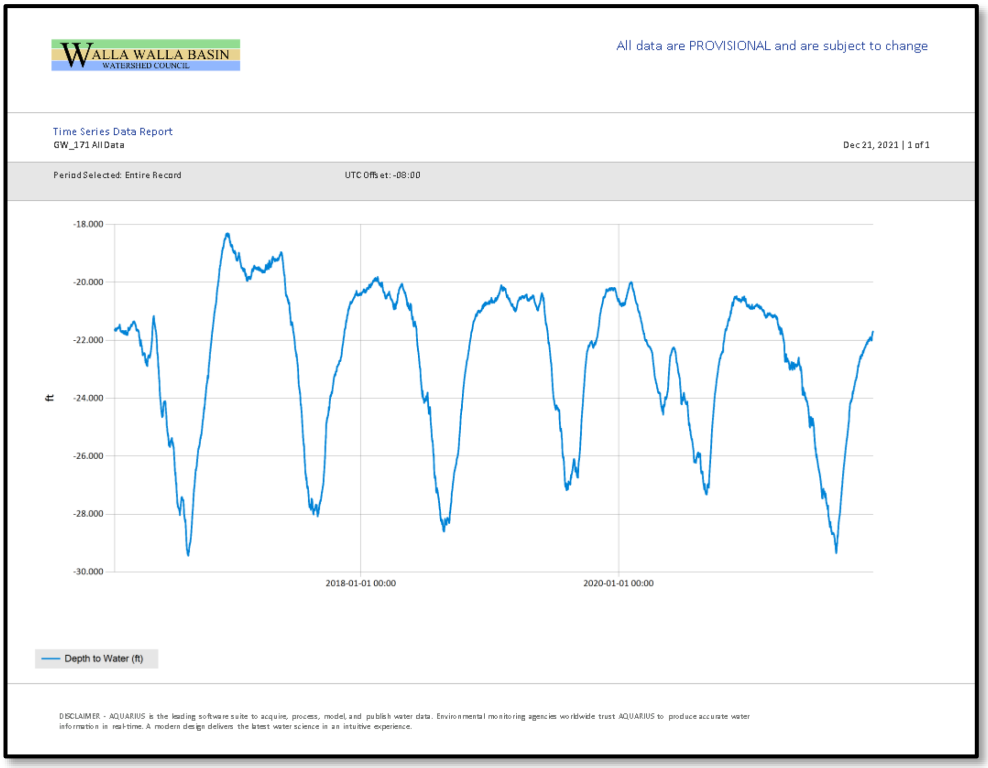

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Figure 28. GW_171 hydrograph from WY 2016-2021.

GALLAGHER RECHARGE SITE

The Gallagher site, which includes a recharge basin and infiltration galleries, operated for 134 days (11/18/20 – 2/1/21, 3/4/21 – 4/1/21, 4/14/21 – 5/15/21), recharging 86.45 ac-ft at an average rate of 0.41 cfs.

GW_36 is up-gradient of the site (Figure 29). None of the quarterly measurements occurred during the 134 days the Gallagher site operated. The hydrograph for GW_36 (Figure 30) doesn't show a direct influence from the recharge site, although, the well is only measured four times out of the year and continuous data are not available for this well. Water level data at downgradient wells GS_144 and GW_034 are shown in Figure 57-60 and are likely responding to multiple factors, including recharge at the Gallagher site.

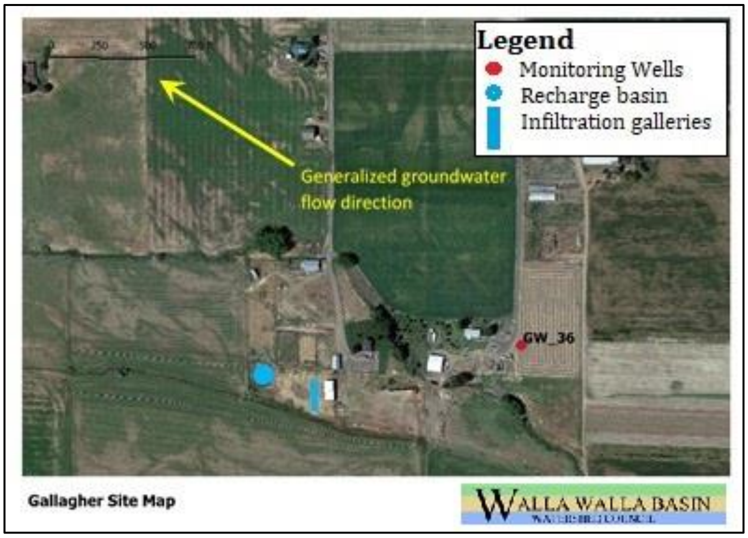

Figure 29. Gallagher monitoring well location.

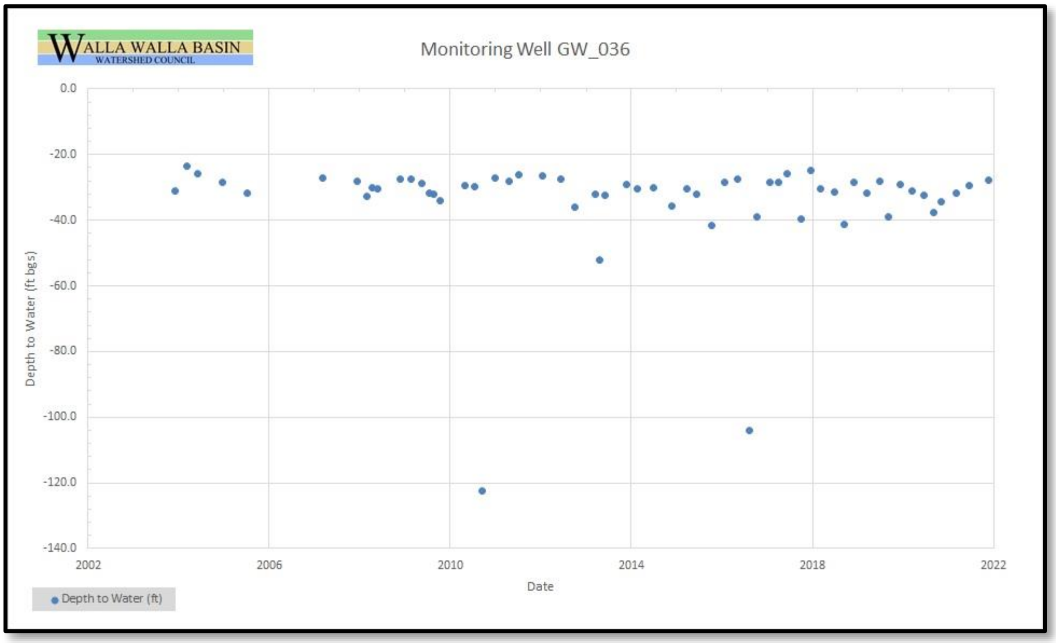

Figure 30. GW_36 hydrograph from WY 2004-2021.

JOHNSON RECHARGE SITE

The Johnson site operated for 141 days (11/25/20 – 2/1/21, 3/3/21 – 5/15/21), recharging 3221.52 ac-ft at an average rate of 11.97 cfs. The ten spreading basins received 2738.25 ac-ft and three active infiltration galleries received 483.27 ac-ft. Flow rates into the basins and galleries were similar to rates in WY2020.

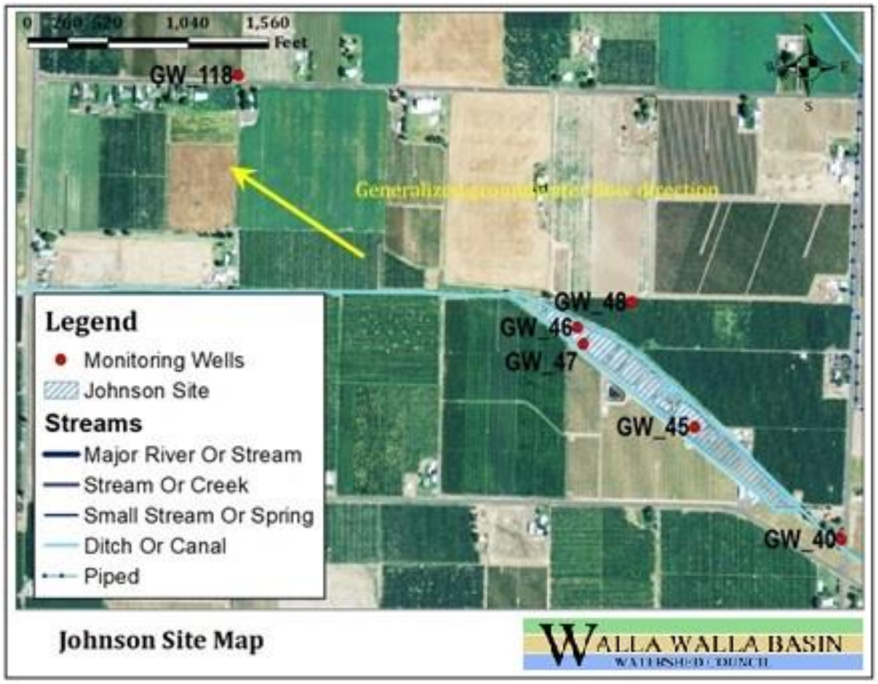

Figure 31. Johnson monitoring well locations.

Six monitoring wells are on or near the site (Figure 31). During recharge season, groundwater levels under the Johnson site (GW_45, GW_46, and GW_47) are roughly 15-20 ft closer to the ground surface than at the up-gradient well (GW_40). The shallowest groundwater levels in down-gradient GW_118 are similar to levels under the Johnson site during the recharge season.

Groundwater monitoring wells (Figures 32-38) near the Johnson site were all observed to have a distinct increase in water levels in November shortly after operations began at the site. Monitoring wells closer to the spreading basins and infiltration galleries (GW_45-48) responded more rapidly and with greater magnitude increases and decreases in water levels than GW_118, which is located farther down-gradient. Up-gradient monitoring well GW_40 also showed a strong response to recharge operations with water levels increasing rapidly during recharge operations and decreasing after recharge operations were suspended. GW_40 water levels also show a direct response to White Ditch flows during the fall.

Water levels in GW_45, GW_46 and GW_47 were observed to decrease approximately 30-40 feet between approximately February 1st and March 3rd, 2021, when recharge operations were interrupted, and again at the end of recharge season. However, water levels after the end of recharge season decreased slower than the rate of water level increase at the beginning of recharge operations, suggesting that groundwater mounding was occurring beneath the site, which is consistent with the observed hydraulic response in the alluvial monitoring well network. WY 2021 seasonal groundwater fluctuations at the site were typically 30 to 40 feet, with the lowest groundwater levels occurring in early March and in August. The influence of the adjacent irrigation ditch operation and irrigation activities are apparent in the small increases and decreases in groundwater levels at the Johnson site monitoring wells during non-recharge months.

Water levels in GW_118, located about one mile down-gradient, show improvements in the seasonal lows from WY 2010 through WY 2021 (Figure 38) indicating increased long-term water storage within the alluvial aquifer, potentially due to aquifer recharge activities. Water year 2015 was a drought year with decreased water availability for recharge and increased groundwater pumping to compensate for limited surface water. Water levels from WY 2016-2020 returned to the upward trend, showing increasing elevations of the annual lows in August. The August 2021 low was the lowest since 2016 and likely reflects drought conditions and the resulting demand on groundwater.

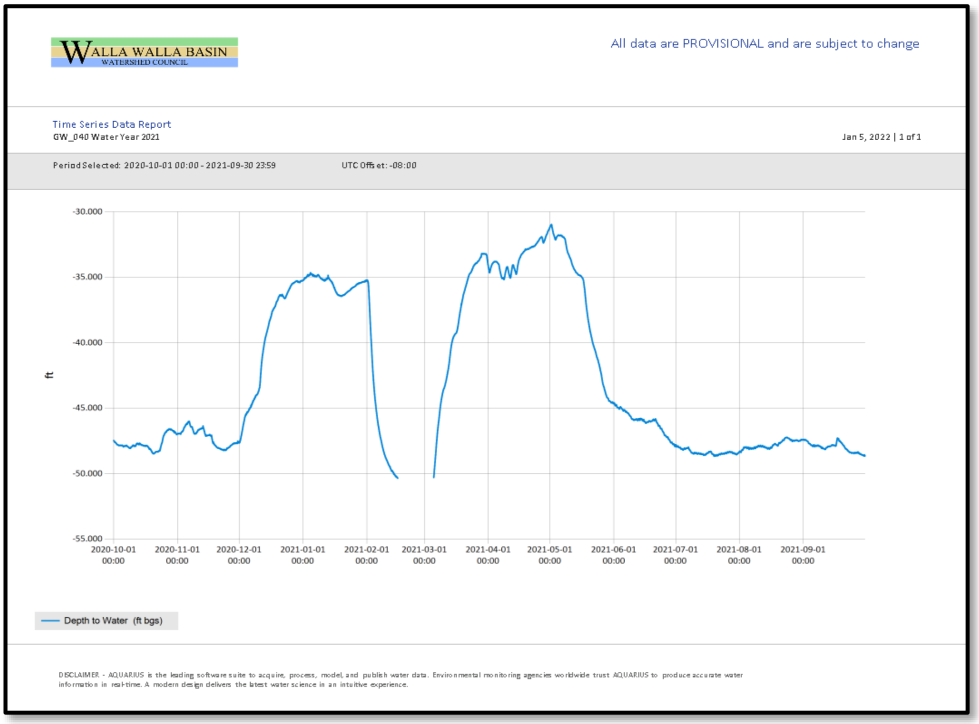

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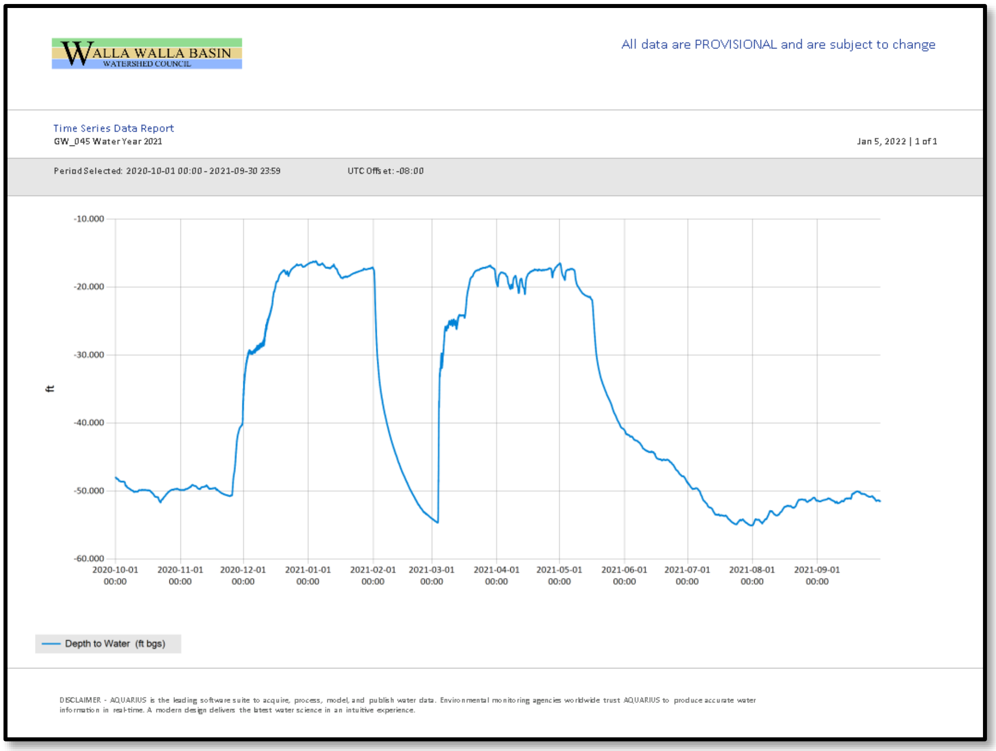
Figure 32. GW_40 hydrograph from WY 2021.



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GW_045 Water Year 2021

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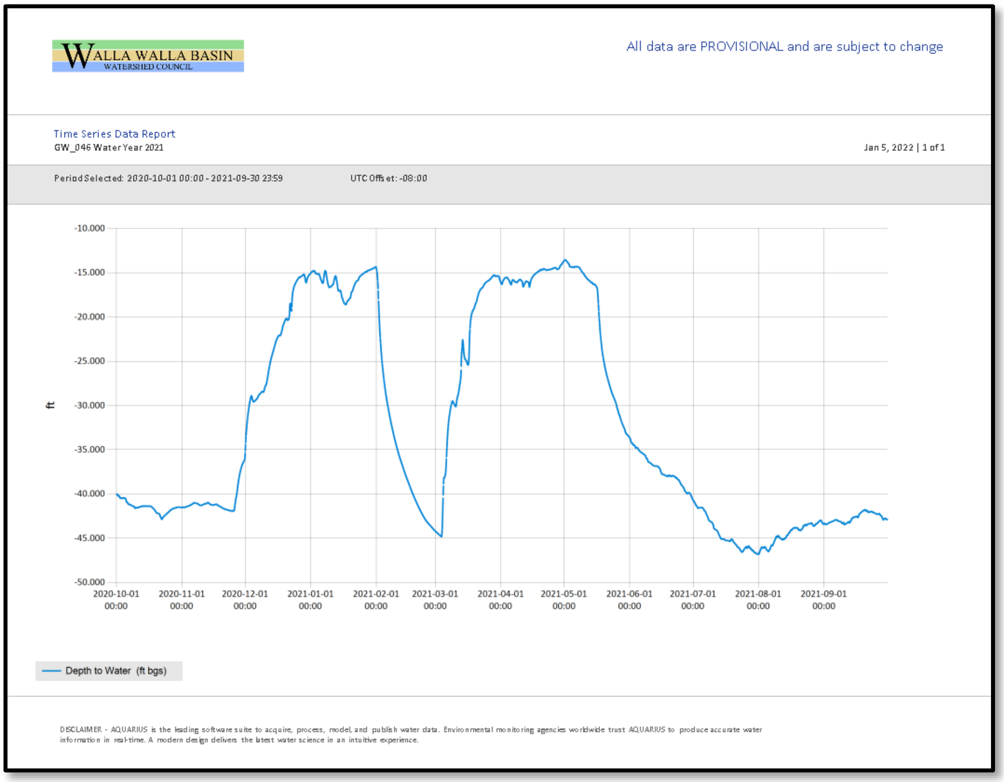
Figure 33. GW_45 hydrograph from WY 2021.



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Time Series Data Report
GW_046 Water Year 2021

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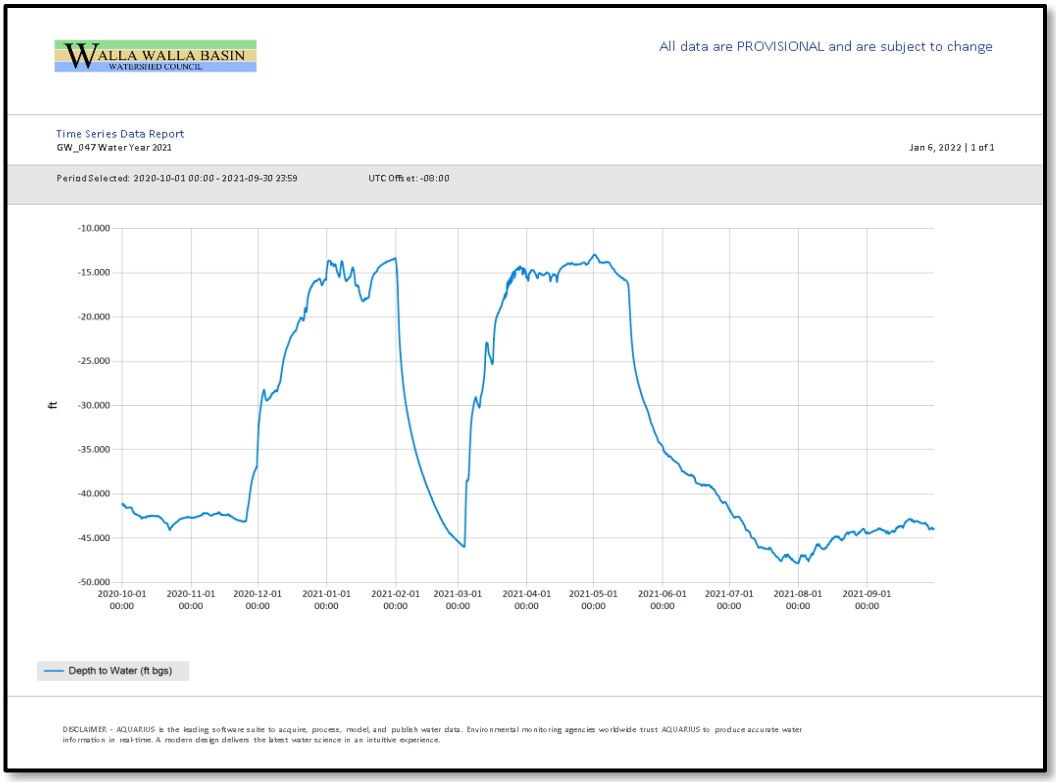
Figure 34. GW_46 hydrograph from WY 2021.



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Time Series Data Report
GW_047 Water Year 2021

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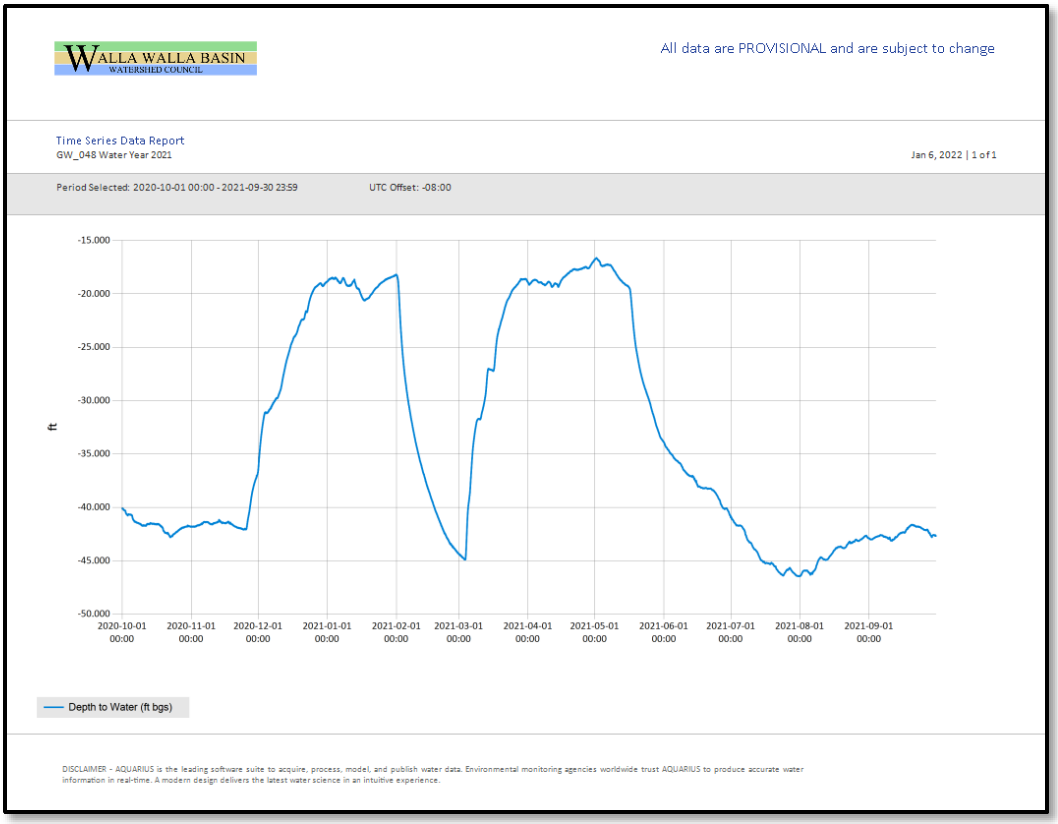
Figure 35. GW_47 hydrograph from WY 2021.



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Time Series Data Report
GW_048 Water Year 2021

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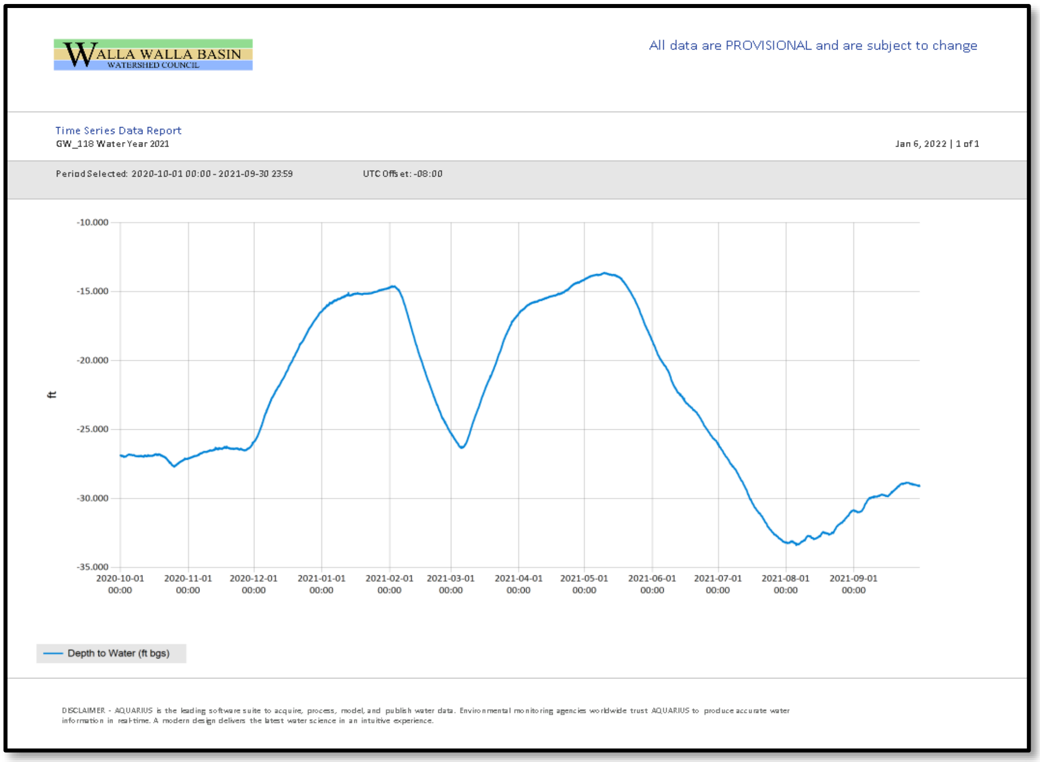
Figure 36. GW_48 hydrograph from WY 2021.



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Time Series Data Report

GW_118 Water Year 2021

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Figure 37. GW_118 hydrograph from WY 2021.

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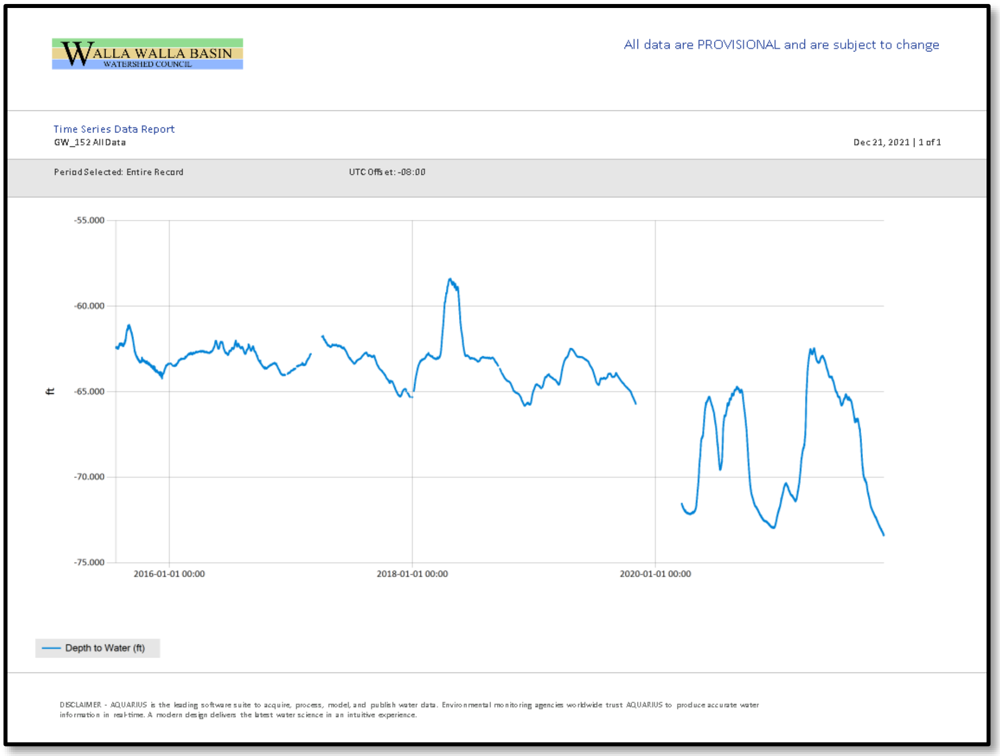
Figure 38. GW_118 hydrograph from WY 2010-2021.

LEFORE RECHARGE SITE

The LeFore Site did not operated during the 2021 water year because WWBWC was developing operational arrangements with the landowner.

Figure 39. LeFore monitoring well locations.

GW_152 is down-gradient and GW_160 is cross-gradient of the site (Figure 39). During WY 2020, one day of operations was not adequate to affect groundwater levels. However, the response to operations in WY 2018, when 78 ac-ft was recharged, is in sharp contrast to the years during which recharge did not occur (Figure 40). The reason for lower groundwater elevations measured during the 2020 and 2021 water years is unknown but will be evaluated if the trend continues. The groundwater response to 2018 recharge operations was less pronounced at GW_160, but the annual declines are apparent in seasonal lows, with water levels dropping about 10 feet since 2015 (Figure 41). The dramatic 2021 peak at GW_160 and, to a lesser extent, the GW_152 peak, reflect the first year of recharge operations at the Miller Road recharge site.



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Time Series Data Report

GW_152 All Data

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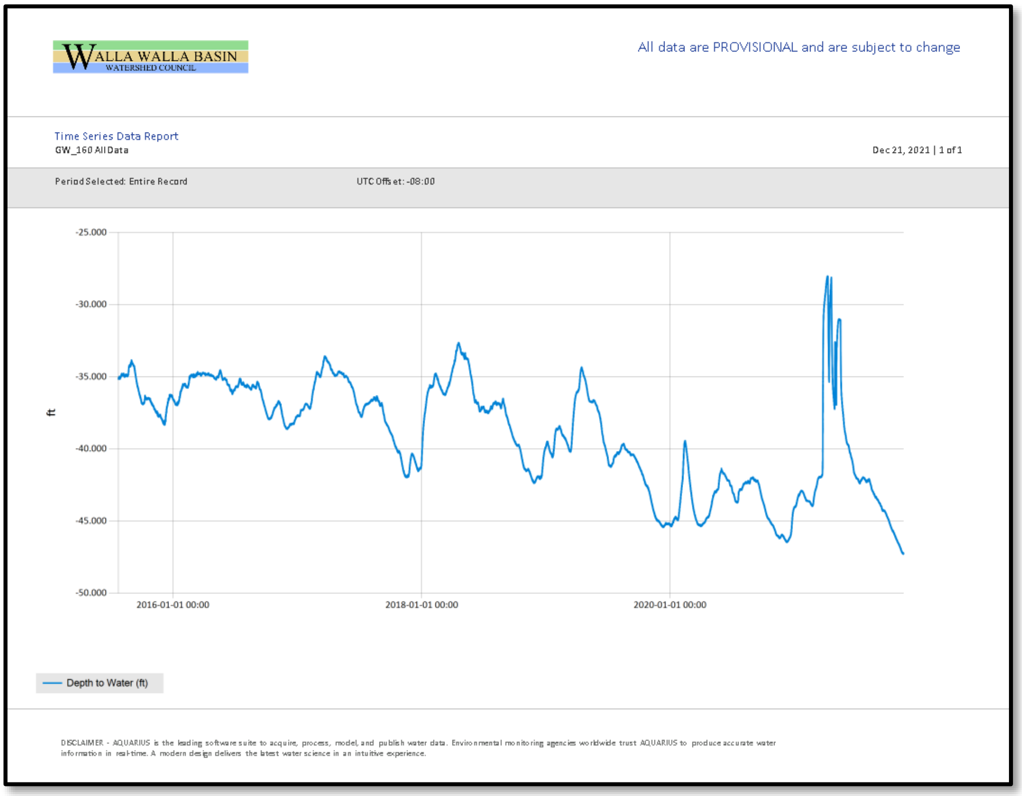
Figure 40. GW_152 hydrograph from WY 2015-2021. The notable increase during the spring of 2018 aligns with recharge operations at the LeFore site.



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GW_160 All Data

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Figure 41. GW_160 hydrograph from WY 2015-2021. The 2021 peak reflects Miller Road recharge operations.

LOCUST ROAD RECHARGE SITE

The Locust Road Site operated for 89 days (March 19-May 15, 2020), recharging 68 ac-ft at an average rate of 0.38 cfs, about half the average rate of WY2020.

GW_14 and GW_116 are approximately 0.4 miles up-gradient and 0.8 miles down-gradient of the site, respectively (Figure 42). Since recharge began in the spring of 2018, changes in groundwater levels solely due to recharge are not apparent in either well (Figures 43 and 44). Given the proximity of both GW_14 and GW_116 to the Little Walla Walla River irrigation canal, groundwater fluctuations at those sites appears to be more strongly influenced by seepage losses from the canal than by water recharged at the Locust Road Site.

Figure 42. Locust Road monitoring well locations.

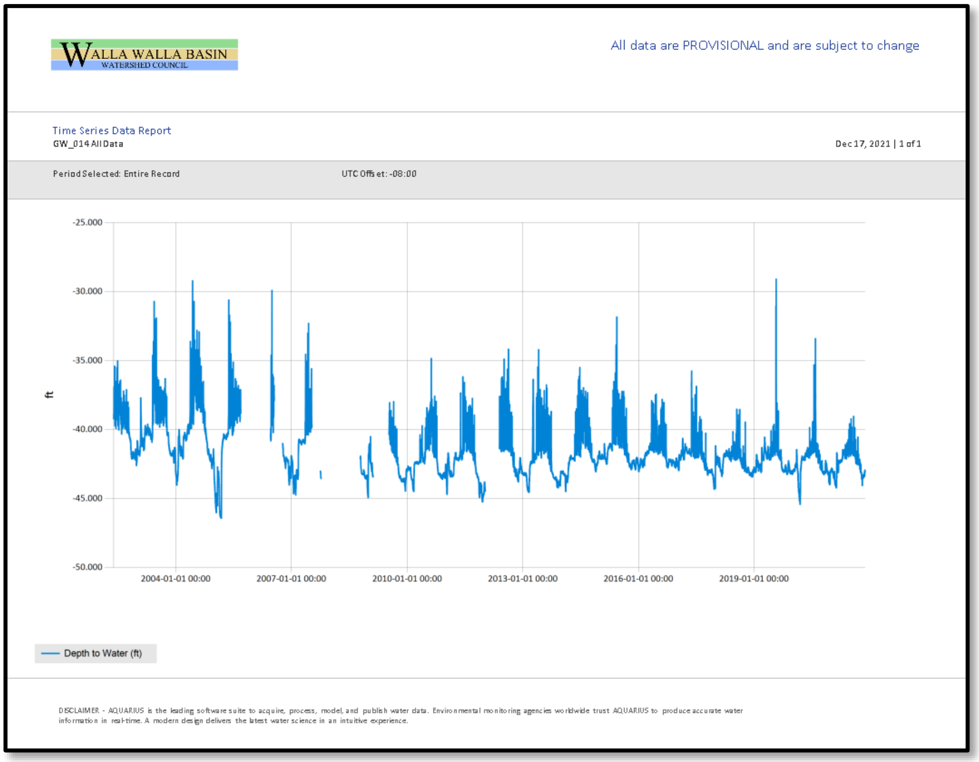

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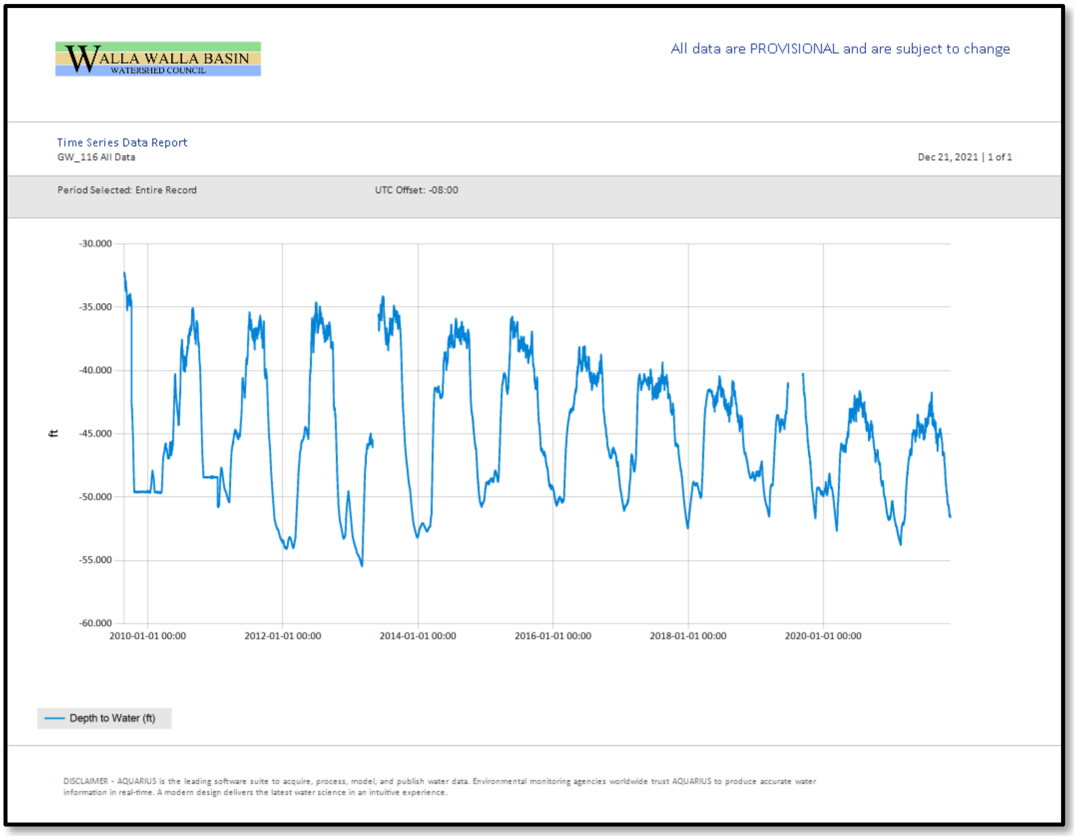
Figure 43. GW_14 hydrograph from WY 2002- 2021.



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Time Series Data Report
GW_116 All Data

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Figure 44. GW_116 hydrograph from WY 2009 to 2021.

MILLER ROAD RECHARGE SITE

The Miller Road site operated for 35 days (3/23/21 – 4/8/21, 4/12/21 – 4/18/21, 4/28/21 – 4/29/21, 5/3/21 – 5/15/21), recharging 152.14 ac-ft of water at an average rate of 2.19 cfs. Within the WWBWC recharge program, this recharge rate is second only to the Johnson site. Operations were limited to 35 days because this site is fed by the Eastside Pipeline, which only operates in the spring after freezing temperatures have passed.

GW_160 is located at the site of the infiltration galleries, while GW_162 is 0.2 miles away (Figure 45). WY 2021 is the first season of operation at this site. The hydrographs from GW_160 and GW_162 show a significant influence from the recharged water (Figures 46-47). Annual low groundwater elevations, however, continue to drop at an alarming rate. While the site was running, water emerged on the ground surface three separate times due presumably to ground saturation. In each case, the site was shut off temporarily to allow for water dispersal before turning back on. The Eastside Pipeline is pressurized, allowing for a high rate of water inflow. We learned this season that the intake valve should be partially closed in order to keep the water inflow rate within the design specifications for the site.

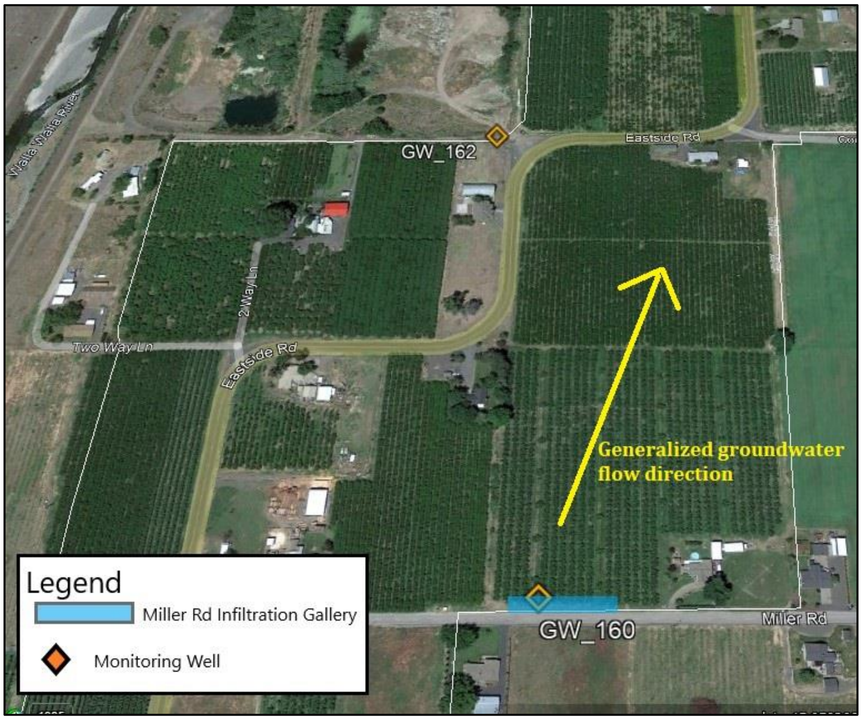
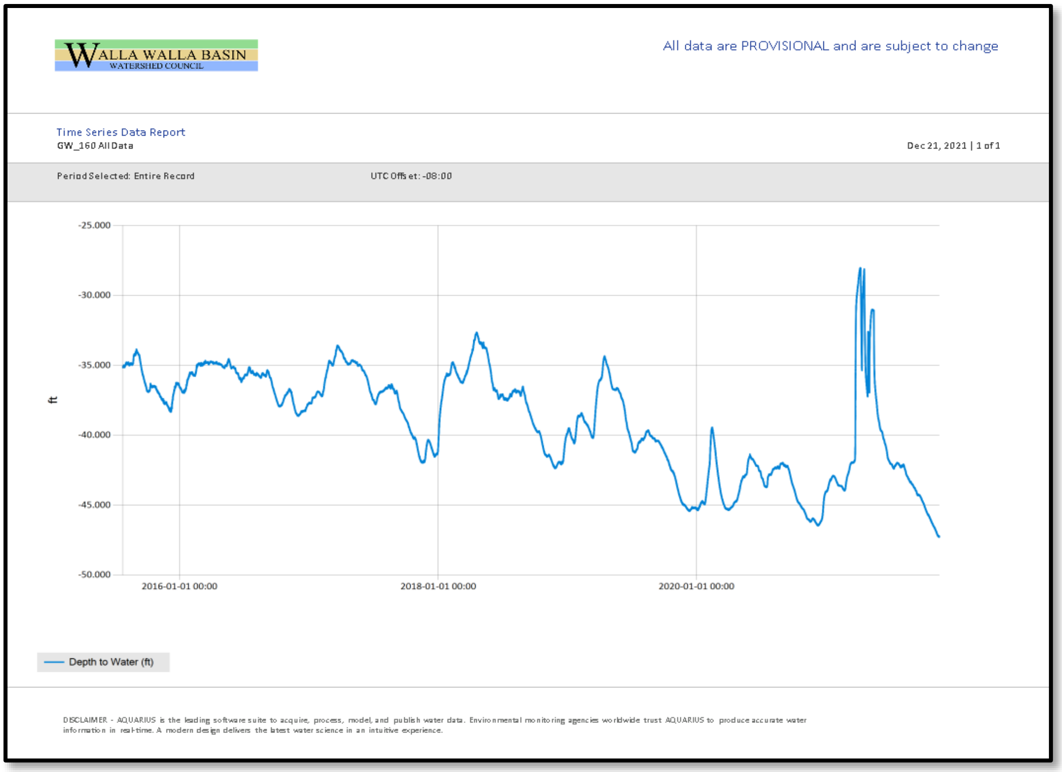


Figure 45. Miller Road monitoring well location



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GW_160 All Data

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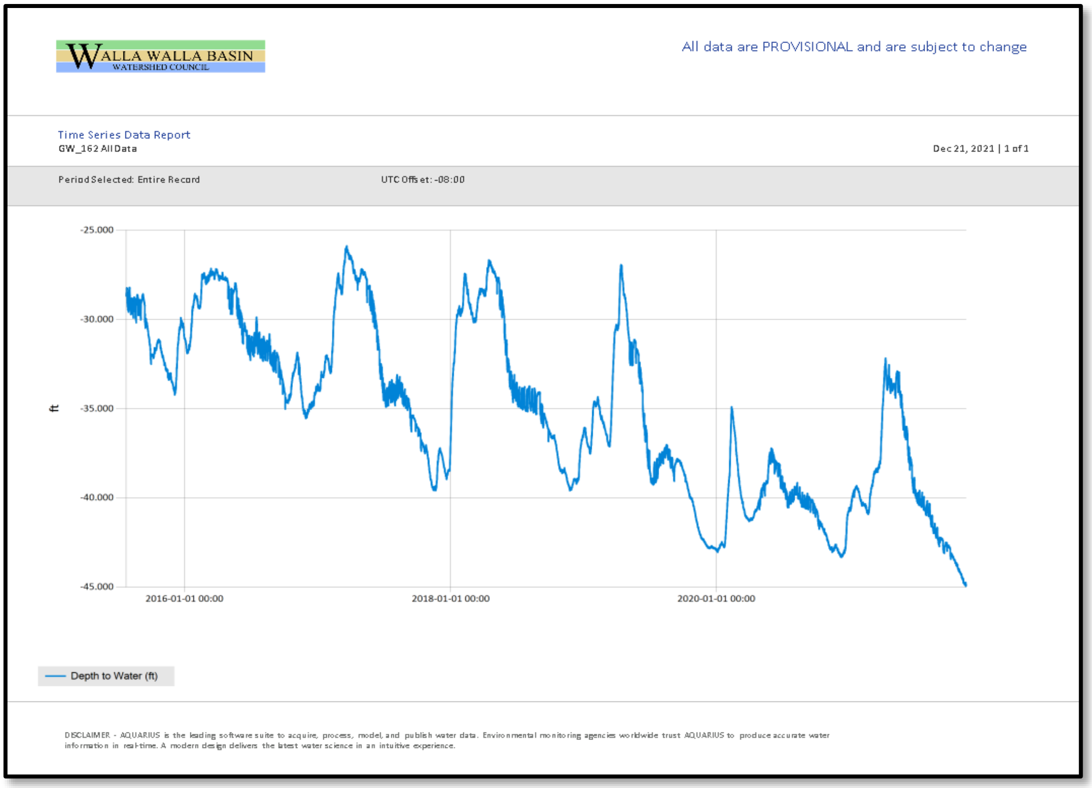
Figure 46. GW_160 hydrograph from WY 2015-2021.



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GW_162 All Data

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Figure 47. GW_162 hydrograph from 2015-2020.

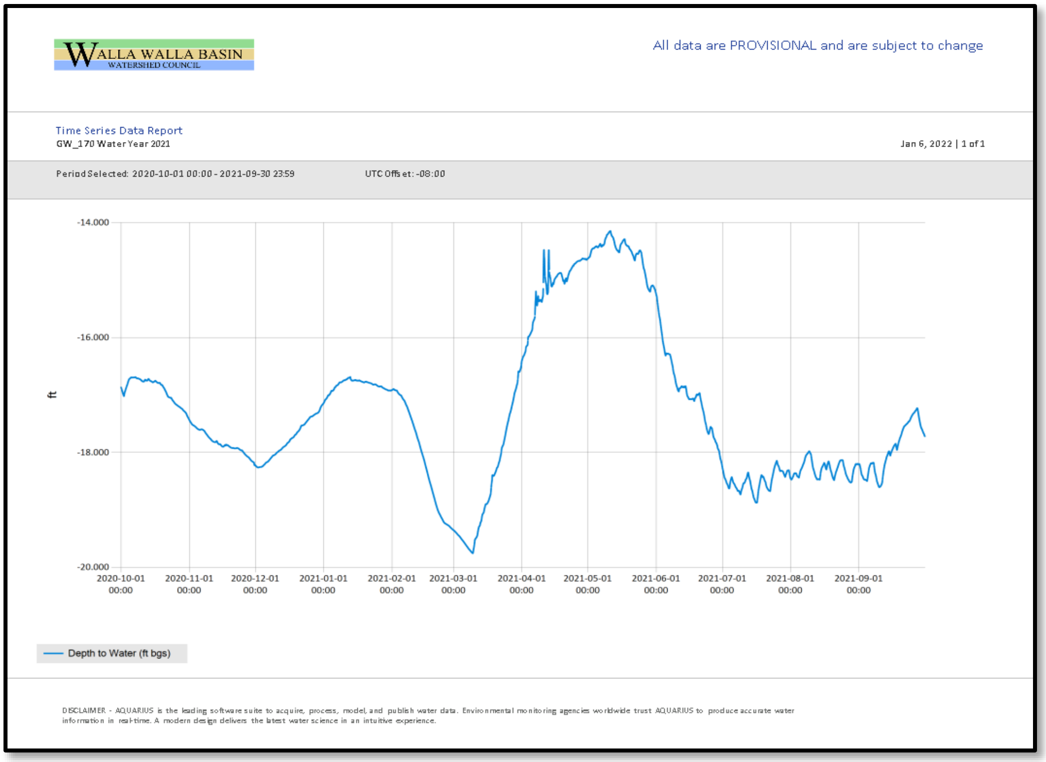
MUD CREEK RECHARGE SITE

The Mud Creek site operated for 96 days (11/18/20 – 12/8/20, 12/29/20 – 1/7/21, 3/9/21 – 5/15/21) recharging 237.5 ac-ft at an average rate of 1.25 cfs, a notably higher infiltration rate than in previous years.

Monitoring wells GW_170 and GW_117 are located up-gradient approximately 0.1 and 0.9 miles from the site, respectively (Figure 48). The roughly 40-foot difference in groundwater levels between the two wells illustrate the highly variable conditions in the alluvial aquifer (Figures 49-50). At nearby GW_170, groundwater levels increased during the recharge season, particularly from March-May. However, the springtime elevation increase was present prior to when Mud Creek recharge operations began in WY 2017, suggesting groundwater levels are responding to other factors as well, possibly recharge at the down-gradient recharge sites (Figure 51).

GW_117 water levels rose during recharge season, peaked in May and leveled off at a higher summertime elevation compared to the fall (Figure 50). The 2009-2021 dataset from GW_117 also shows multiple influences but documents an overall decrease in the annual lows, even during the hot summer of 2021 (Figure 52).

Figure 48. Mud Creek monitoring well locations.



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GW_170 Water Year 2021

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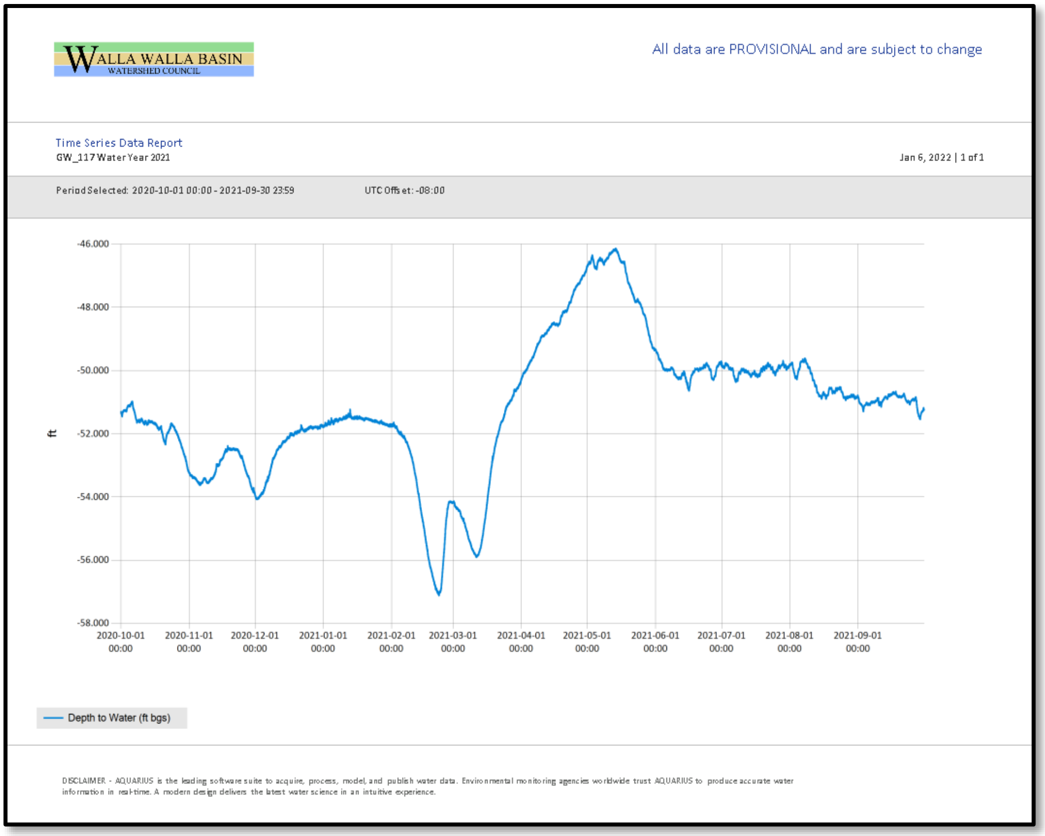
Figure 49. GW_170 hydrograph from WY 2021.



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GW_117 Water Year 2021

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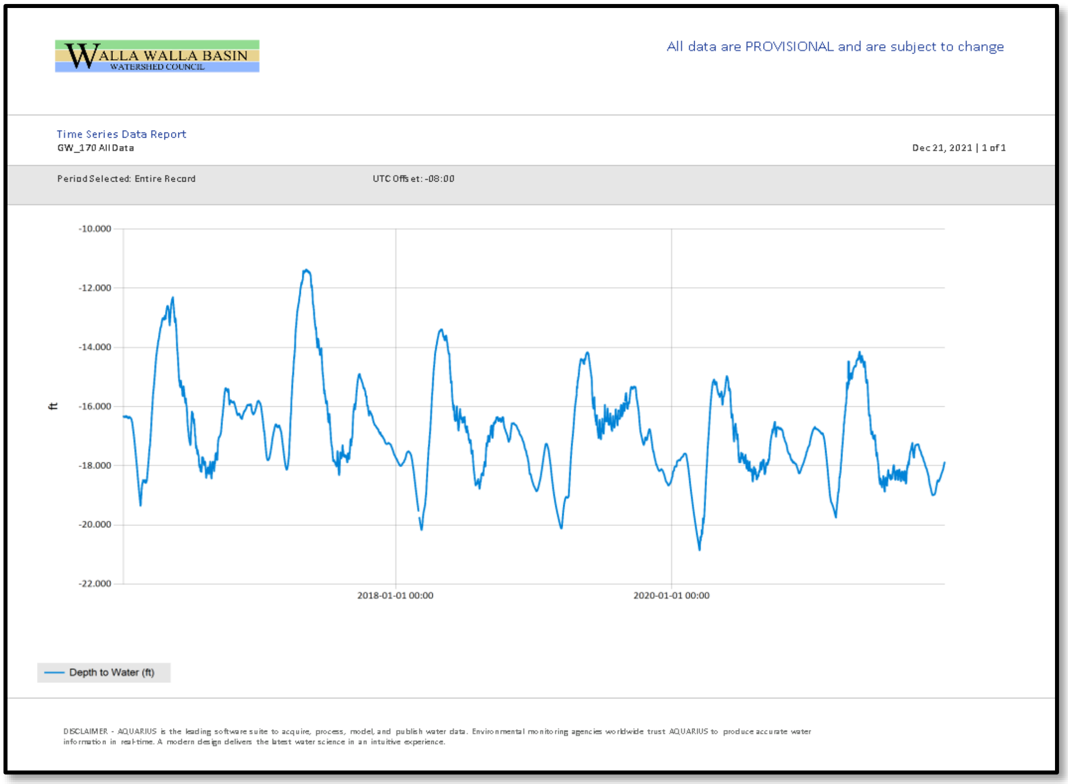
Figure 50. GW_117 hydrograph from WY 2021.



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GW_170 All Data

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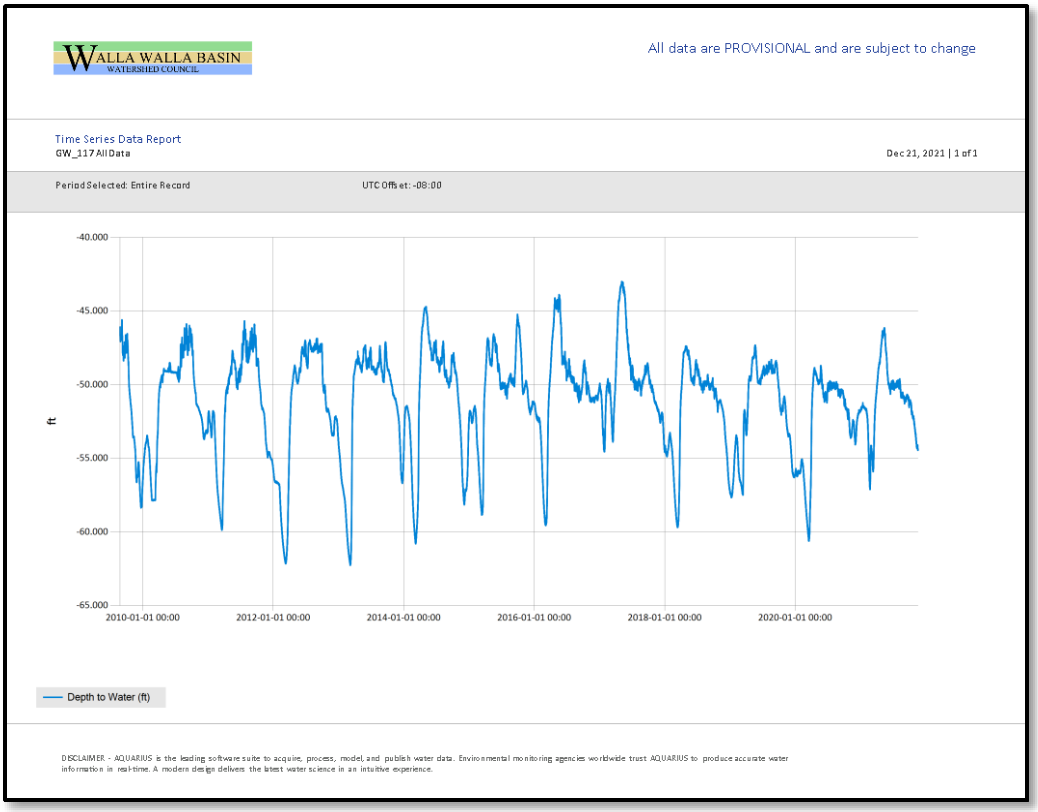
Figure 51. GW_170 hydrograph from WY 2016-2021.



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GW_117 All Data

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Figure 52. GW_117 hydrograph from WY 2009-2021.

NORTH SUNQUIST RECHARGE SITE

The North Sunquist Site was not operated during the 2021 water year because the WWBWC was developing operational arrangements with the landowner.

GW_33 and GW_171 are up-gradient of the site (Figure 62), both discussed in the Fruitvale site. This recharge site is about 0.5 miles west of the Fruitvale Recharge Site.

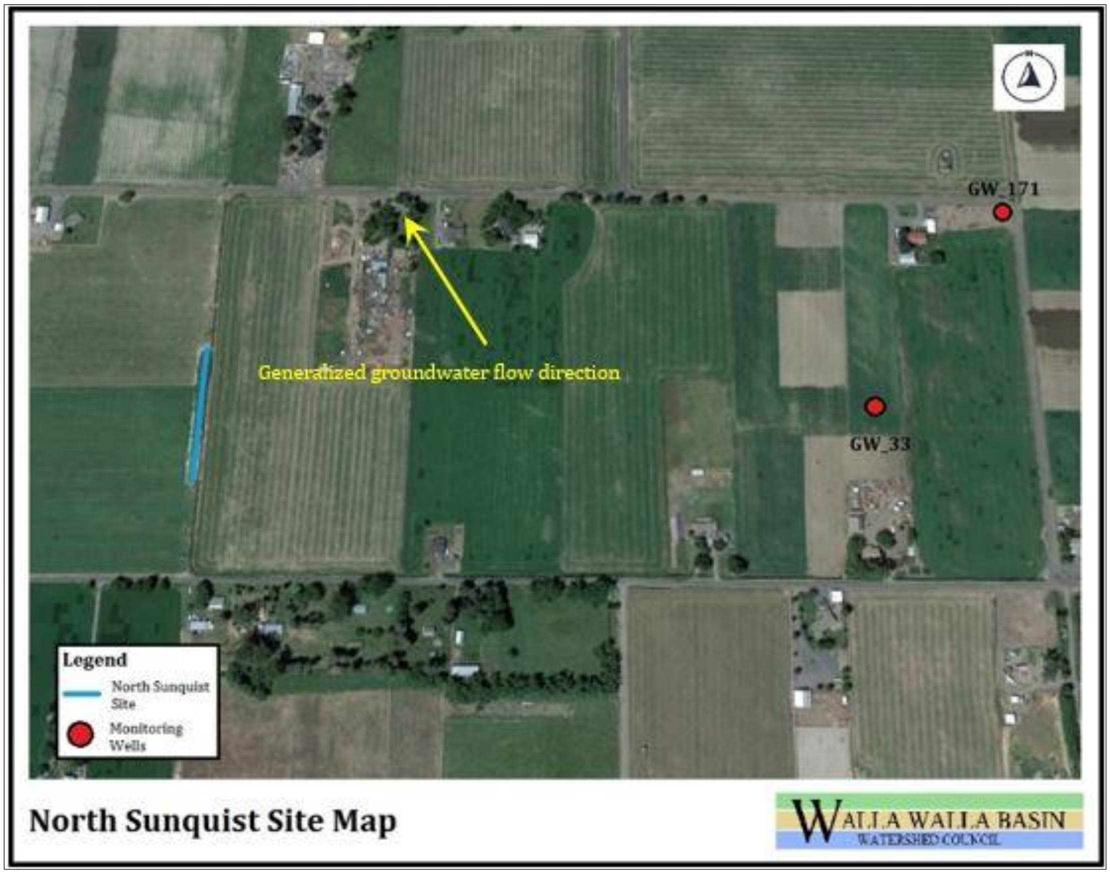
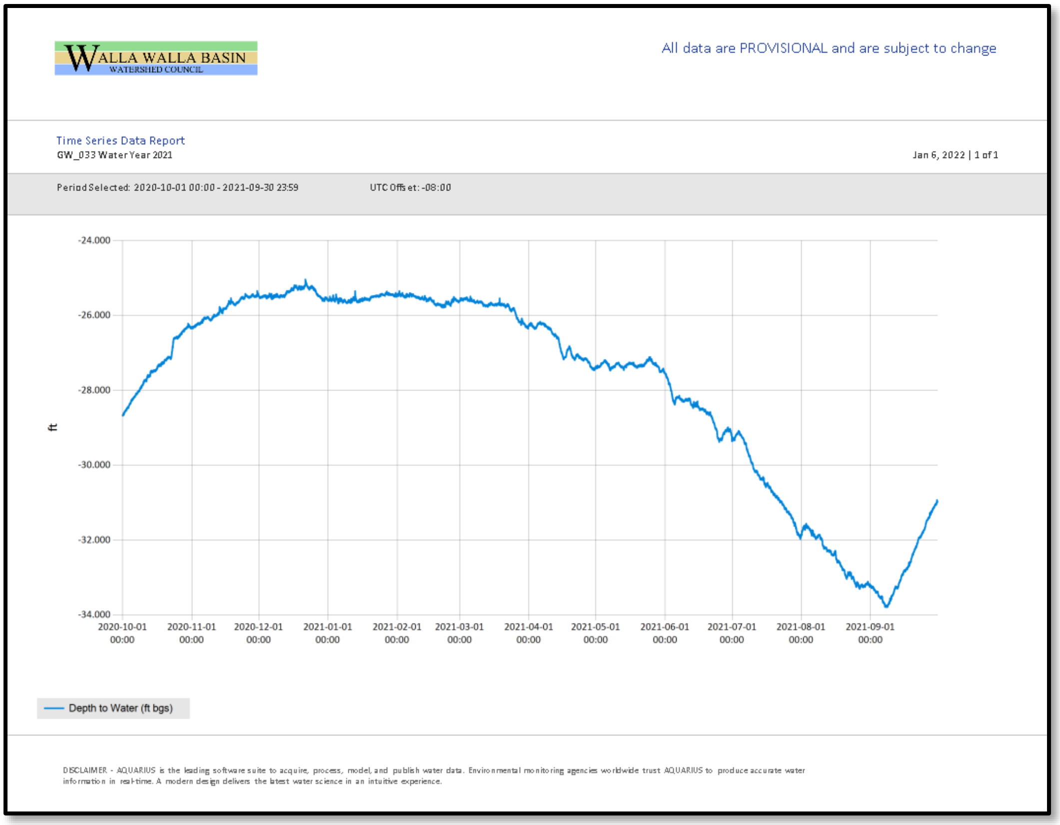


Figure 53. North Sunquist monitoring well location



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Time Series Data Report
GW_033 Water Year 2021

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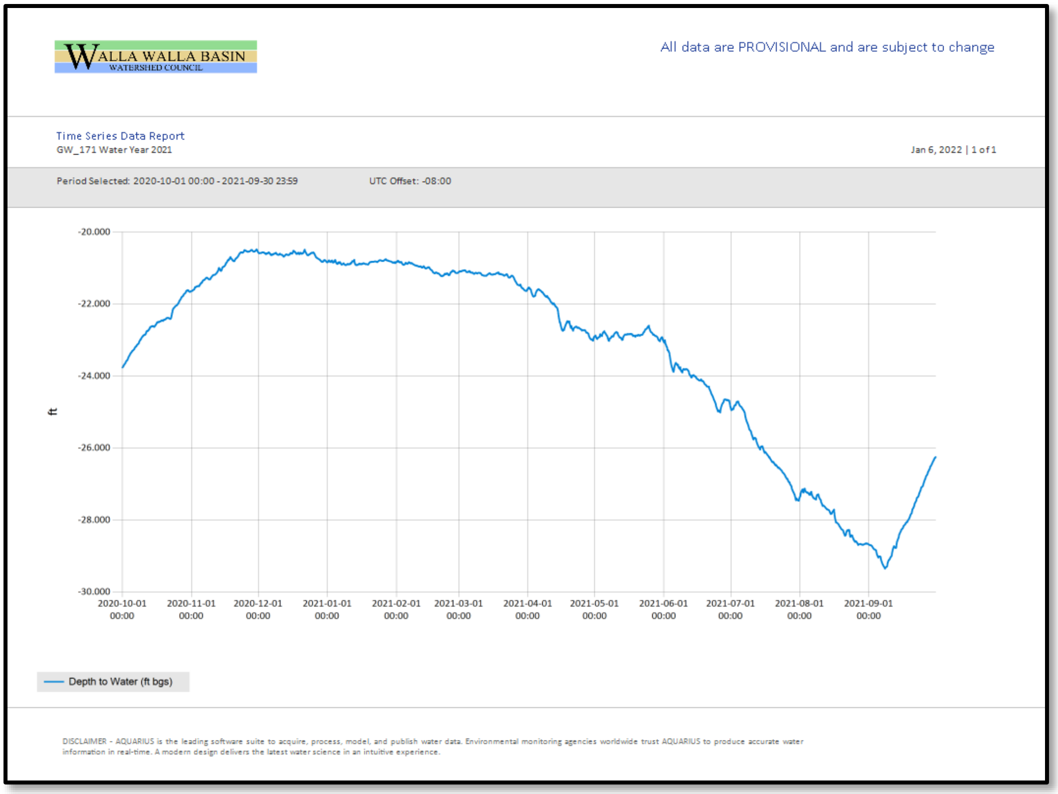
Figure 54. GW_33 hydrograph from WY 2021.



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Time Series Data Report
GW_171 Water Year 2021

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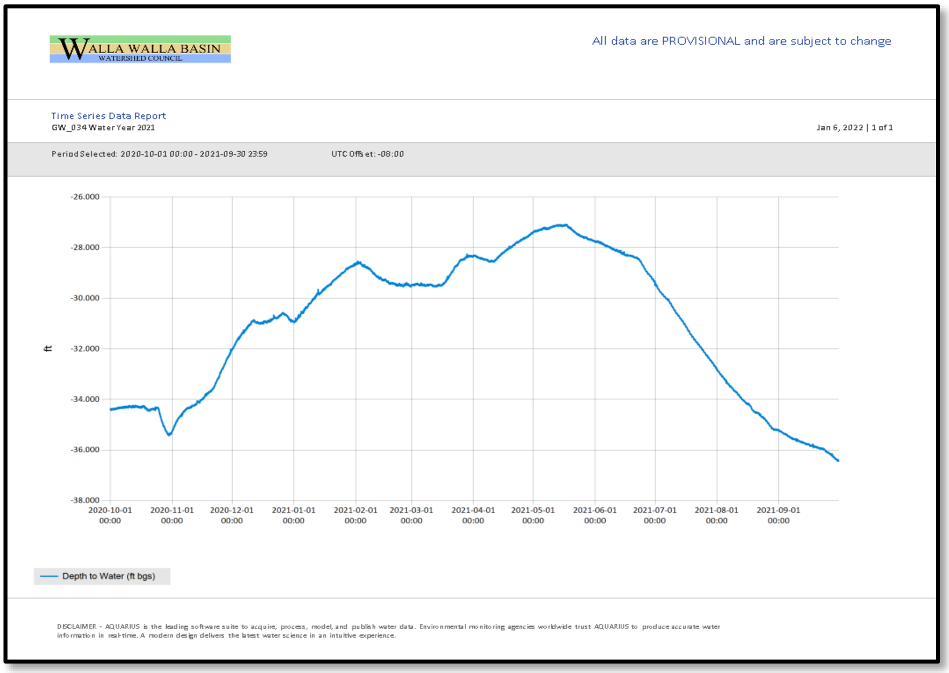
Figure 55. GW_171 hydrograph from WY 2021.

NW UMAPINE SITE

Figure 56. NW Umapine monitoring well locations

The NW Umapine site operated for 129 days (11/19/20 – 12/26/20, 12/29/20 – 2/1/21, 3/12/21 – 3/28/21, 4/3/21 – 5/15/21), recharging 416.62 ac-ft at an average rate of 1.63 cfs.

Five monitoring wells are in the area of the site (Figure 56). GW_66 is discussed under the West Ringer Road site and GW_036 is reported under the Gallagher site. The annual groundwater cycle in the down-gradient wells GW_34 and GW_144 correlates with the recharge season (Figures 54-55), but that cycle was present prior to WY 2014, when the NW Umapine site began operation (Figure 59). The long-term datasets also show the yearly minimum and maximum groundwater levels at GW_34, GW_144, and GW_119 appearing to be relatively stable (Figures 56-57). Groundwater levels at up-gradient GW_119 appear similar in the years before and after NW Umapine recharge began in WY 2014 (Figure 58).



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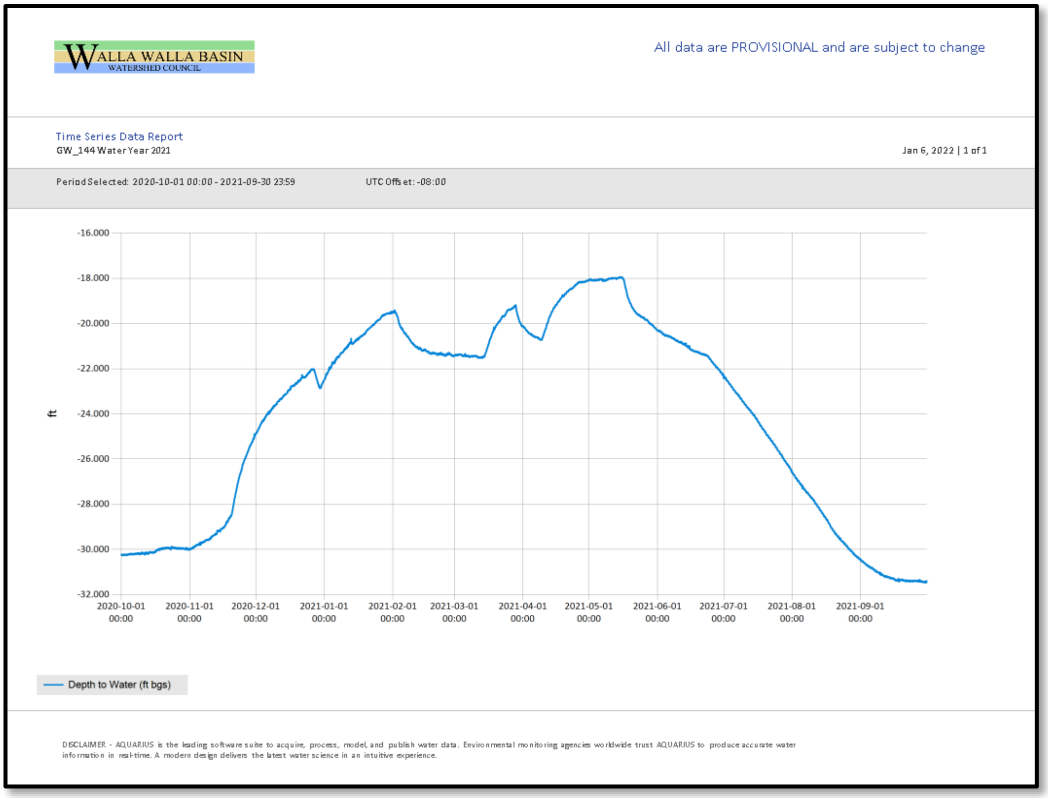
Time Series Data Report
GW_034 Water Year 2021

Jan 6, 2022 | 1 of 1

Period Selected: 2020-10-01 00:00 - 2021-09-30 23:59 UTC Offset: -08:00

Figure 57. GW_34 hydrograph from WY 2021.



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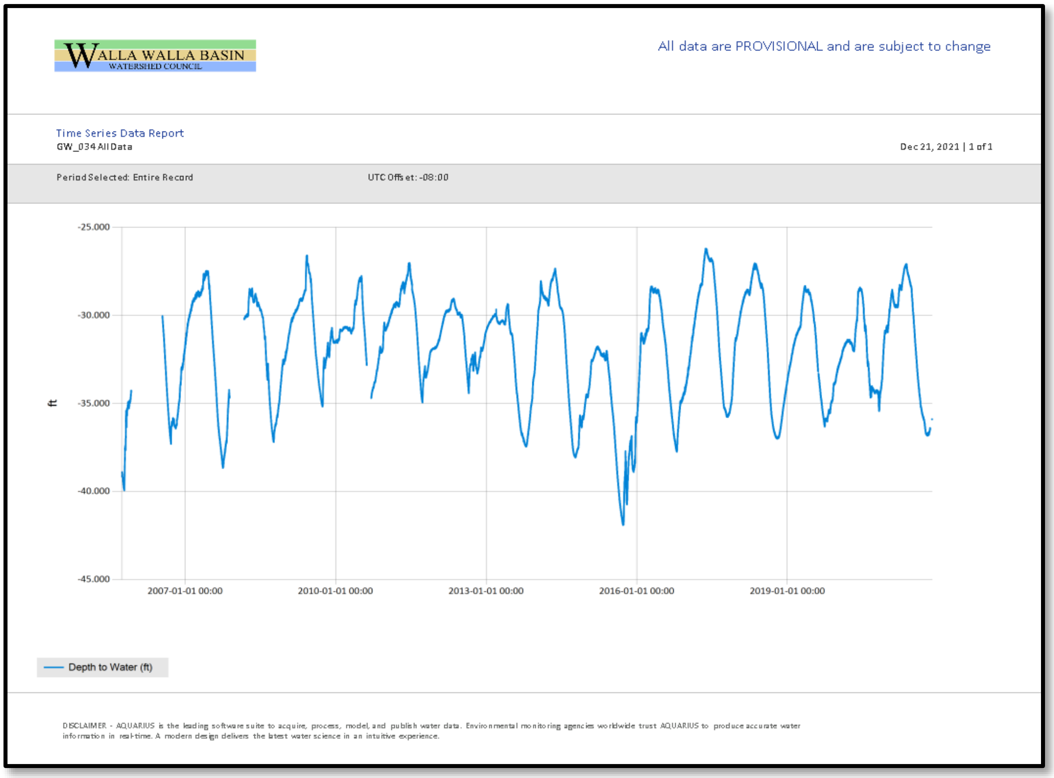
Time Series Data Report
GW_144 Water Year 2021

Jan 6, 2022 | 1 of 1

Period Selected: 2020-10-01 00:00 - 2021-09-30 23:59 UTC Offset: -08:00

Figure 58. GW_144 hydrograph from WY 2021 water year.



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Time Series Data Report
GW_034 All Data

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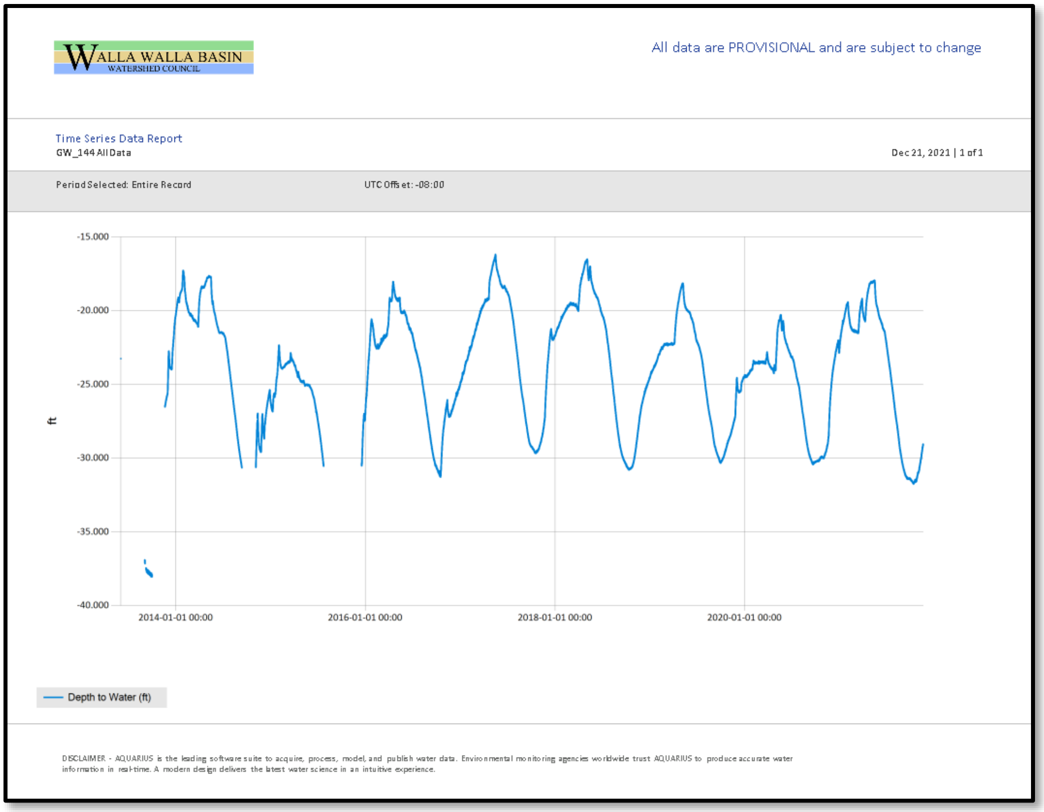
Figure 59. GW_34 hydrograph from WY 2006-2021.



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GW_144 All Data

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Figure 60. GW_144 hydrograph from WY 2013-2021.

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Time Series Data Report
GW_119 All Data

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Figure 61. GW_119 hydrograph from WY 2009-2021.

RUBY LANE RECHARGE SITE

The Ruby Lane site operated for 32 days (4/1/21 – 5/15/21), recharging 1.38 ac-ft of water at an average rate of 0.02 cfs.

GW_116 is 0.3 miles up-gradient of the site and GW_19 is 0.2 miles down-gradient of the site (Figure 59). WY 2021 was the first year of Ruby Lane recharge operation, and we encountered difficulty getting enough water into the recharge site intake pipeline. There was inadequate water available in the irrigation ditch to back up and enter the infiltration gallery intake. Based on the timing of annual peaks and troughs, groundwater levels in both the up and down-gradient wells appear to be more influenced by high summertime flow rates and conveyance losses in the Little Walla Walla River than by the limited recharge operations at Ruby Lane (Figures 60-61). In future years, the WWBWC will coordinate with the irrigation district to increase water availability for recharge when possible.

Figure 62. Ruby Lane monitoring well locations

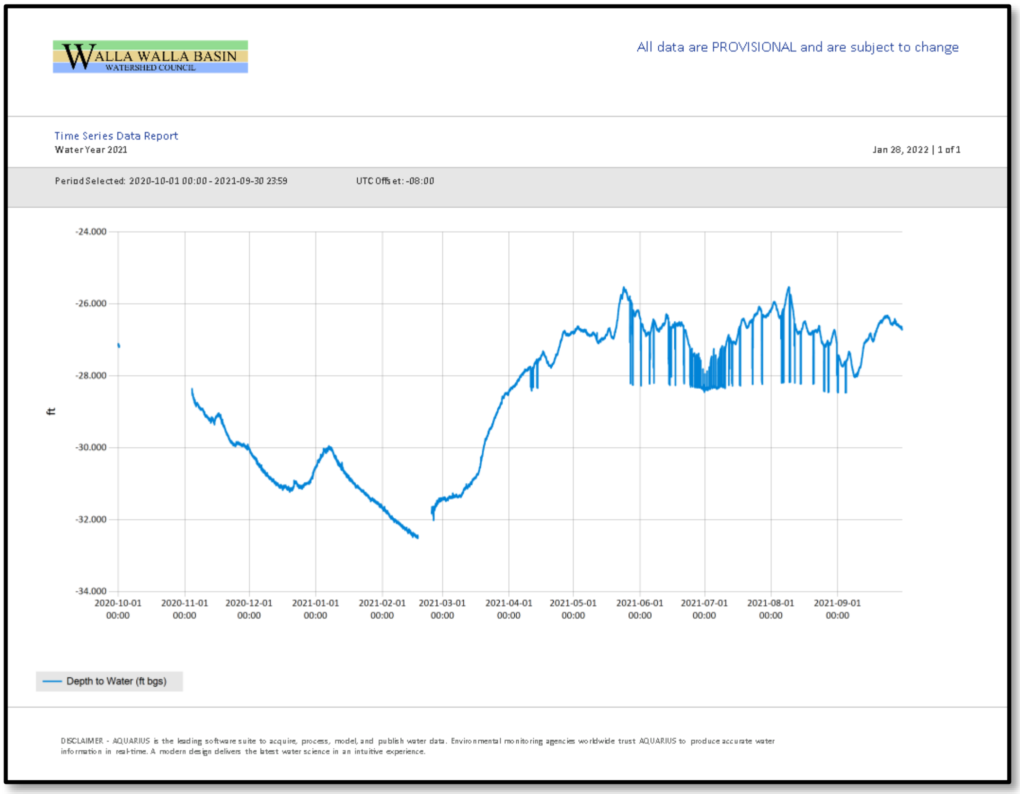

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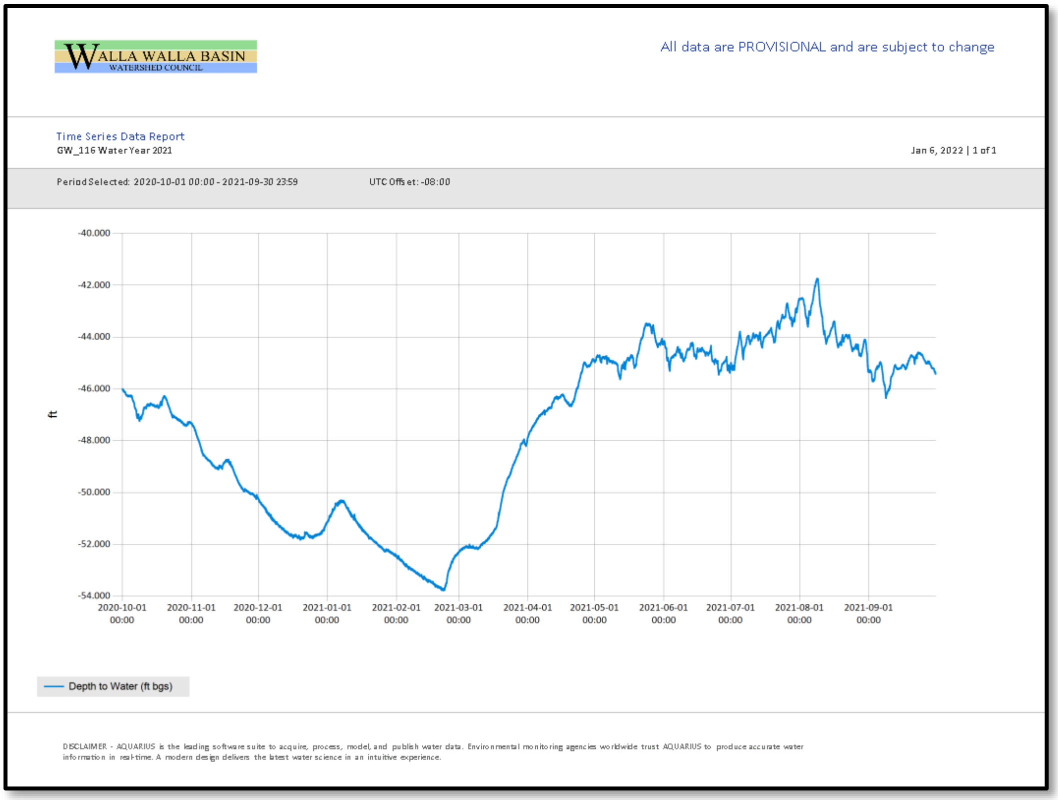
Figure 63. GW_19 hydrograph from WY 2021.



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Time Series Data Report
GW_116 Water Year 2021

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Figure 64. GW_116 hydrograph from WY 2021.

TRIANGLE ROAD RECHARGE SITE

The Triangle Road site operated for 96 days (11/18/20 – 12/8/20, 12/29/20 – 1/7/21, 3/9/21 – 5/15/21), recharging 104.81 ac-ft of water at an average rate of 0.55 cfs.

Four monitoring wells are in the vicinity of the site: up-gradient GW_117, cross-gradient GW_143, and down-gradient wells GW_170 and GW_171 (Figure 65[3]). As shown in Figures 50 and 52, GW_117 elevations correlate with recharge season but are likely influenced by other factors as well. Figure 66 shows elevations in GW_143 that correlate with recharge season during the 2021 water year. Annual patterns of groundwater elevations in GW_143, however, are similar to the years before Triangle Road recharge operations began in 2017 (Figure 67). It's likely that GW_143 water levels are influenced more by Johnson and maybe Trumbull Rd operations than by Triangle Road recharge.

At GW_170, groundwater levels increased during the recharge season, particularly from March-May, which may be due to recharge at both Mud Creek and Triangle Road recharge sites (Figures 49 and 51). However, the annual springtime elevation increase was present prior to the start of Mud Creek and Triangle Road recharge operations in WY 2017, suggesting groundwater levels are also responding to other sites/factors.

Figure 65. Triangle Road monitoring well locations (GW_171 not shown).

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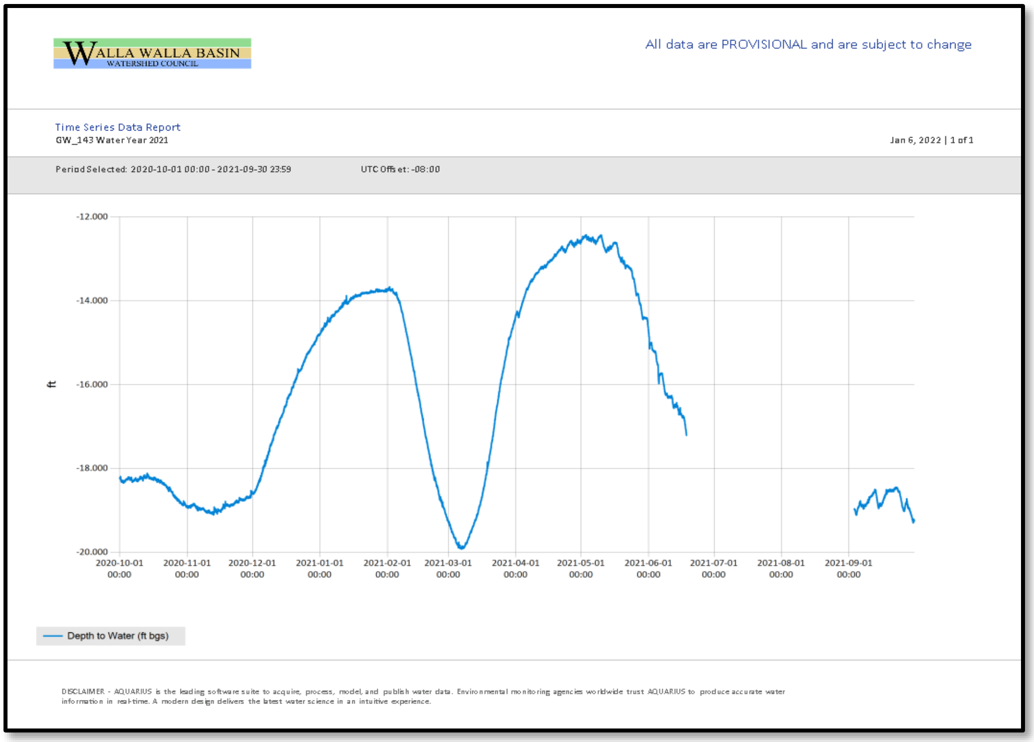
[3] GW_171, one of the four monitoring wells associated with the Triangle Road site, is not shown in Figure 65 because it is 1.6 miles northwest of the site; the location of GW_171 can be seen in Figure 26.



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Time Series Data Report
GW_143 Water Year 2021

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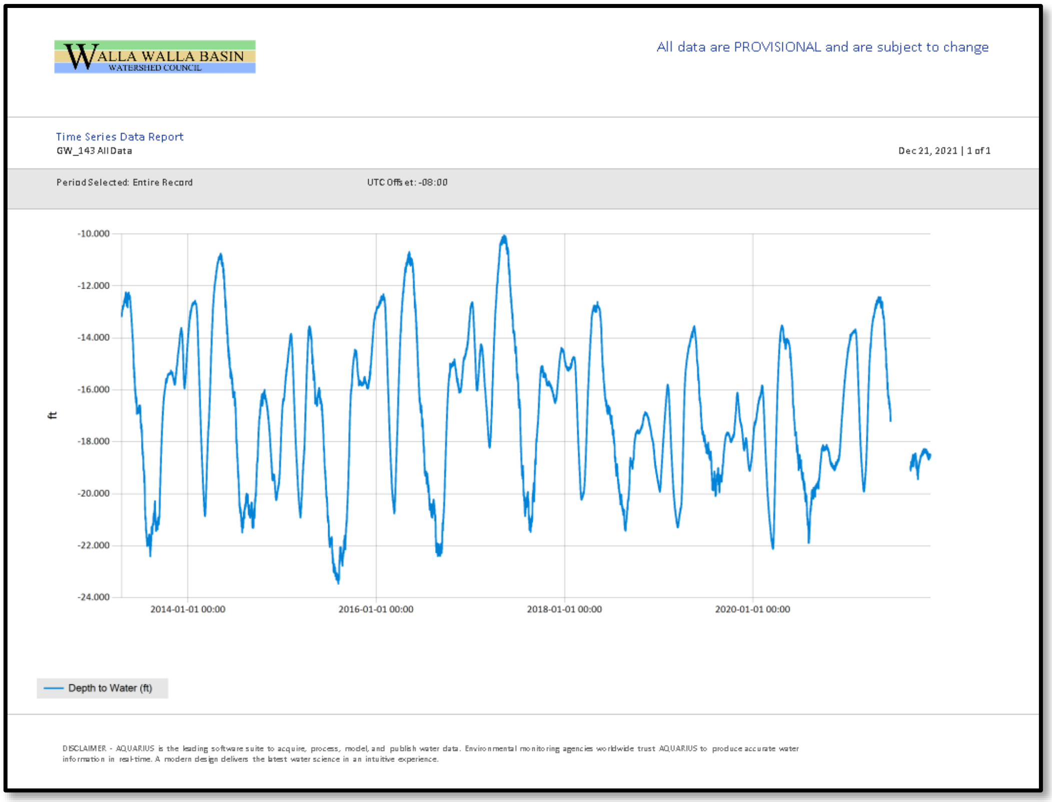
Figure 66. GW_143 hydrograph from WY 2021.



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Time Series Data Report
GW_143 All Data

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Figure 67. GW_143 hydrograph from WY 2013-2021.

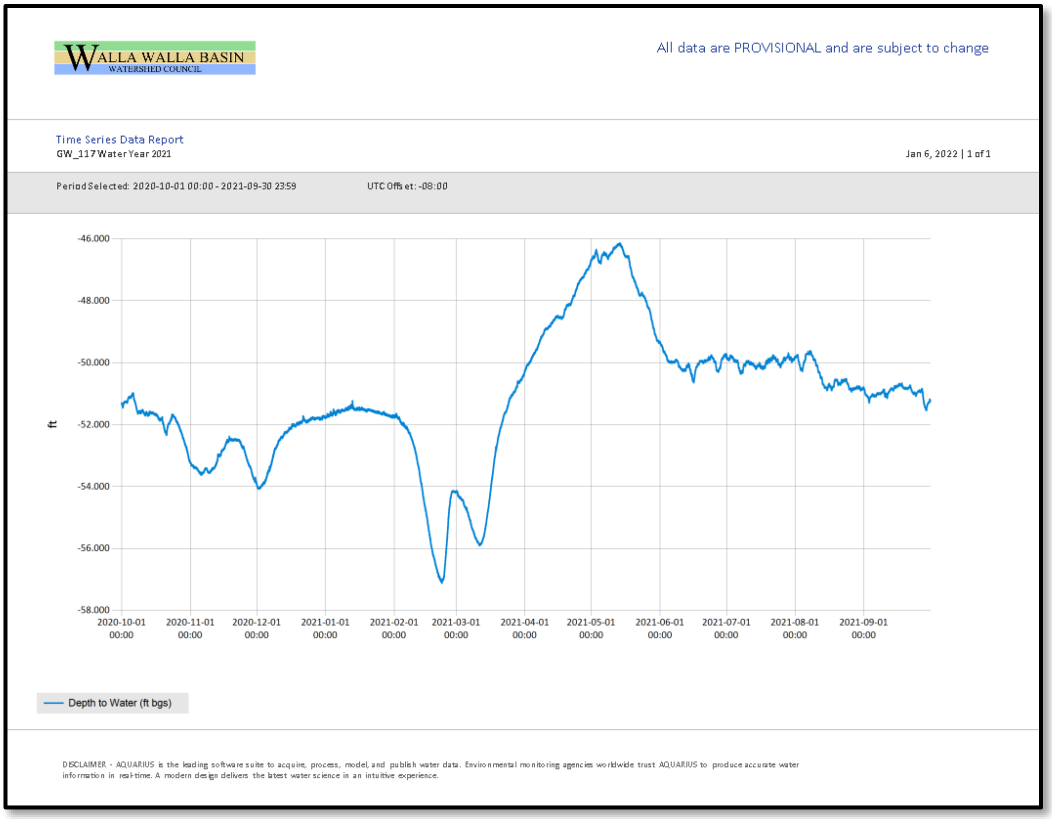
TRUMBULL AQUIFER RECHARGE SITE

The Trumbull site operated for 138 days (11/25/20 – 2/1/21, 3/6/21 -5/15/21), recharging 297.31 ac-ft at an average rate of 1.09 cfs.

GW_117 is cross gradient and GW_142 is down-gradient of the site (Figure 68). The two wells are approximately 0.6 miles apart. Water levels in GW_117 and GW_142 showed the influence of recharge operations, rising in early December, dropping during the February ditch turn off for diversion maintenance, and rising again during March and April (Figures 69-70).

Operation of the Trumbull site, which began in WY 2013, coincides with a rise in the lowest annual elevations at GW_117 (Figure 71). At GW_142, annual lows have remained stable while the peaks of the hydrograph have declined during the monitoring period (Figure 72). The peak of 2021, however, showed a slight rise compared to recent years.

Figure 68. Trumbull monitoring well locations.



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GW_117 Water Year 2021

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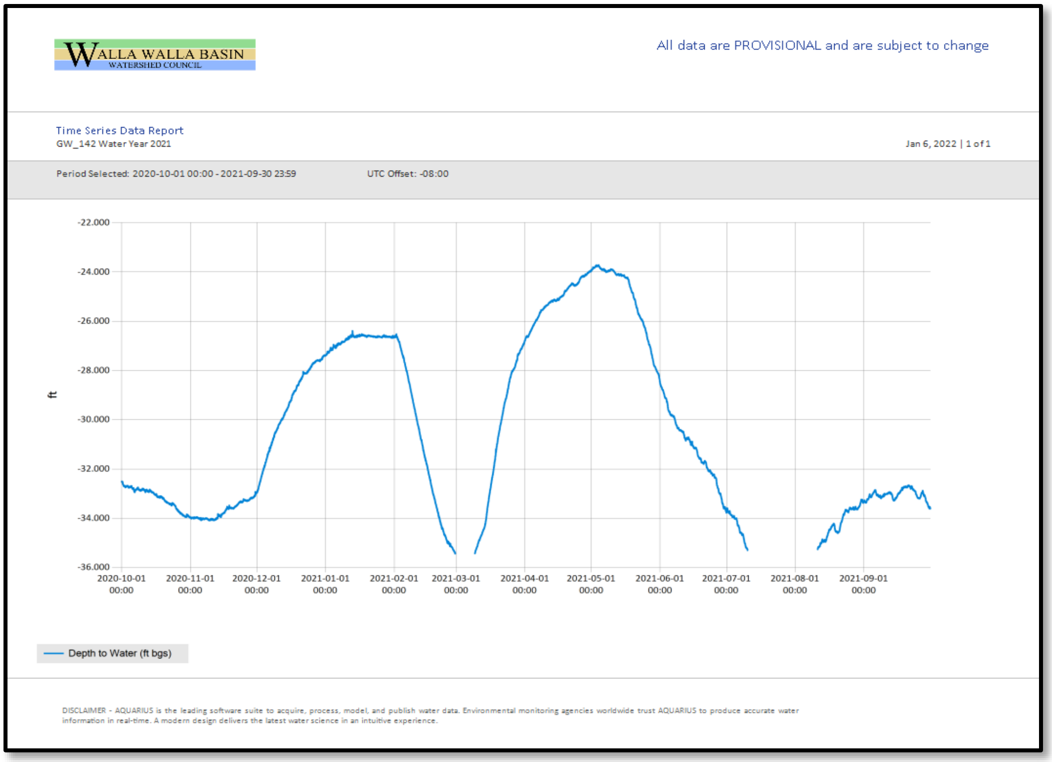
Figure 69. GW_117 hydrograph from WY 2021.



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Time Series Data Report
GW_142 Water Year 2021

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Period Selected: 2020-10-01 00:00 - 2021-09-30 23:59

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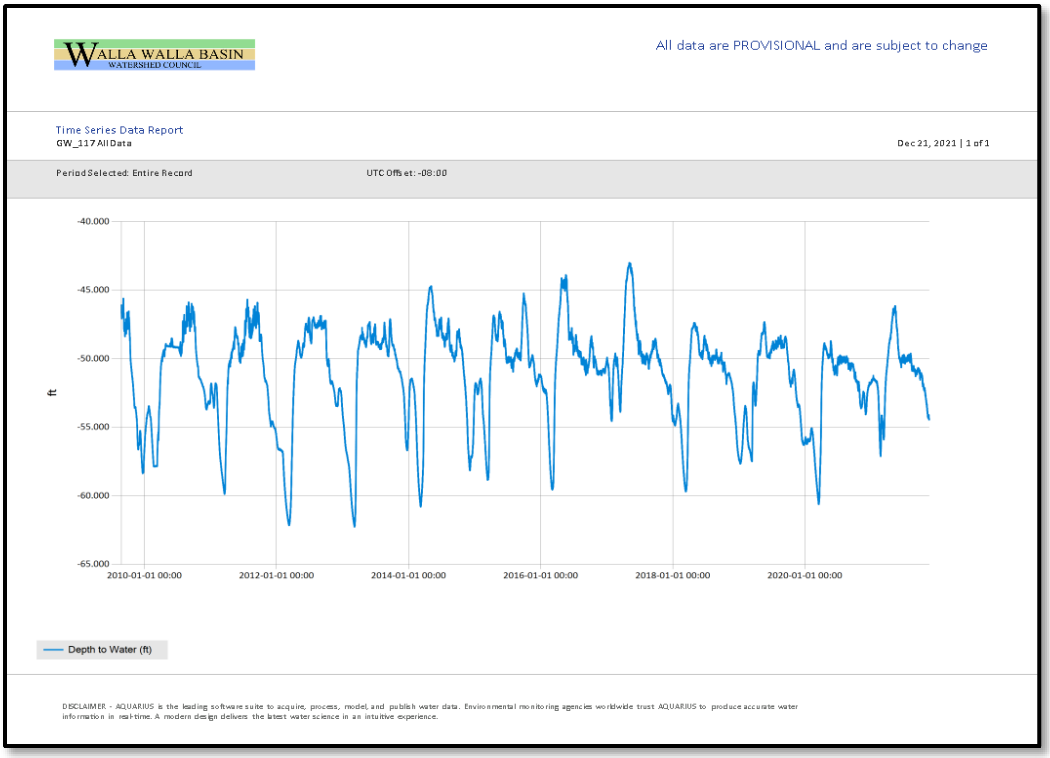
Figure 70. GW_142 hydrograph from WY 2021.



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GW_117 All Data

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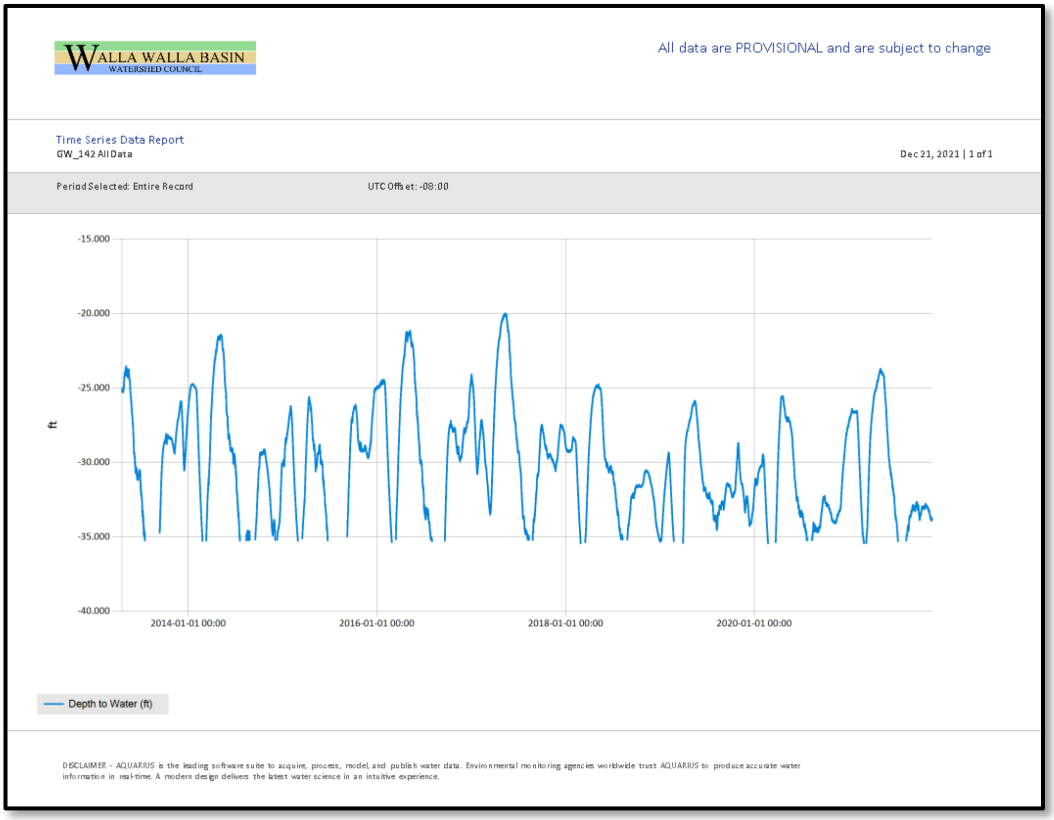
Figure 71. GW_117 hydrograph from 2009-2021.



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GW_142 All Data

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Figure 72. GW_142 hydrograph from WY 2013-2021. Data gaps represent times when the water level dropped below the elevation of the sensor.

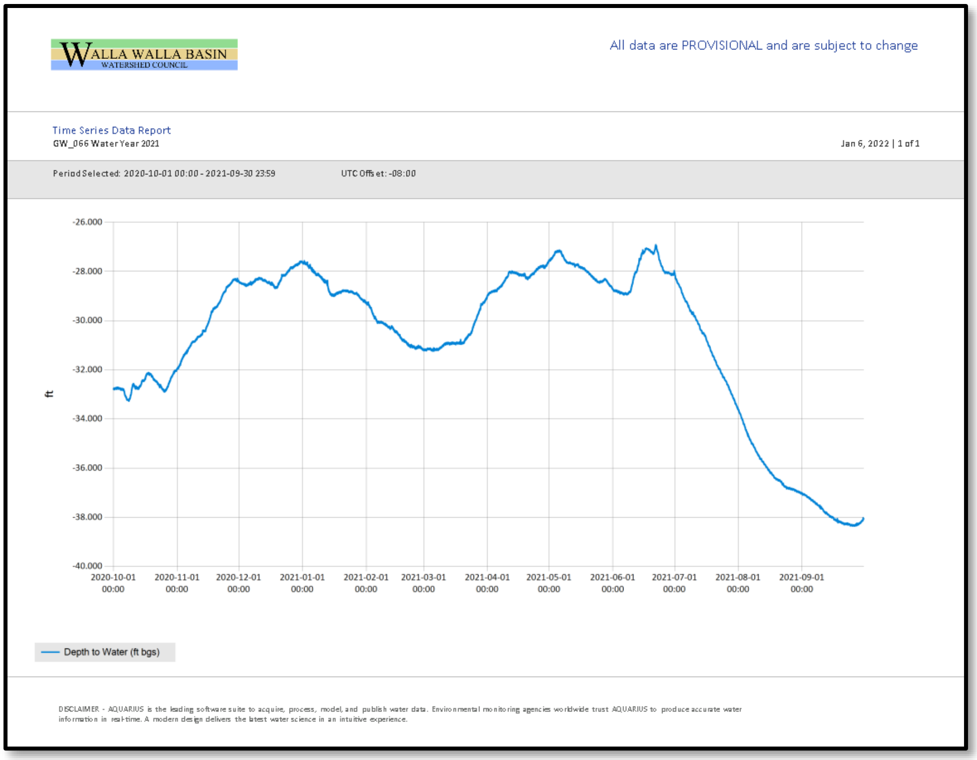
RINGER ROAD RECHARGE SITE

The Ringer Road site operated for 147 days (11/18/20 – 2/1/21, 3/4/21 -5/15/21), recharging 252.68 ac-ft of water at an average rate of 1.05 cfs.

WY 2021 was the first year of operation at the western of the two Ringer Road facilities, which allowed this site to recharge over twice the volume of water and at twice the infiltration rate compared to the other two years of Ringer Road operation.

GW_66 is up-gradient of the site (Figure 73). The WY 2021 elevation increases and decreases correlate with recharge operations. Additional years of data are needed to assess the influence of the Ringer Road site relative to other down-gradient recharge operations. However, annual groundwater elevation lows were higher during the first two years after Ringer operations began in WY 2019, potentially suggesting increased groundwater storage (Figures 74-75). The low in 2021 was lower but, as it was observed in other wells across the valley, that response could have been strongly influenced by an exceptionally hot summer and increased demand for groundwater use.

Figure 73. Ringer Road monitoring well location



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GW_066 Water Year 2021

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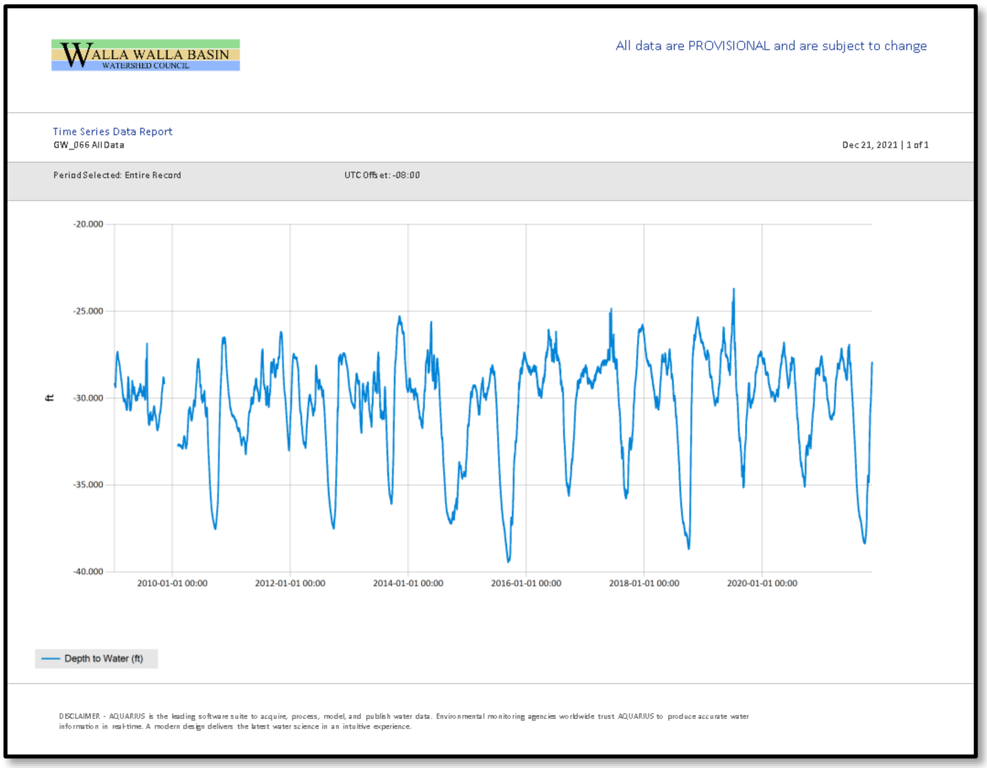
Figure 74. GW_66 hydrograph from WY 2021.



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GW_066 All Data

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Figure 75. GW_66 hydrograph from WY 2008-2021.

SPRING PRODUCTION

The new limited license LL-1848 includes monitoring spring yields to characterize large-scale changes in groundwater storage. Continuous 15-minute water level data were collected at five spring-fed creeks during the 2021 water year (Figure 76). AQUARIUS Time Series software was used to produce rating curves for each site and calculate continuous discharge values. Hydrographs for each site are shown below (Figures 77-81). These sites were chosen due to the availability of historic data, however they are not located directly at the spring sources. Water management factors like irrigation withdrawals and tailwater inputs make it difficult to directly correlate the measured stream flows with recharge activities. Nonetheless, these flow data can indicate trends in spring production and help to evaluate aquifer storage.

In Little Mud Creek (S-405), flow has increased dramatically since 2016, which coincides with an expansion of the Anspach Recharge site down-gradient (Figure 77). The Little Mud Creek hydrograph also shows annual peaks and valleys that appear to correlate with canal management and recharge operations.

Flow in Big Spring near the state line (S-233) appears to be relatively stable, although decreased flows were measured in 2021 (Figure 78). Annual fluctuations in discharge at this site do not appear to correlate with the timing of recharge operations. Monitoring at this location began in 2015, and more data are needed to assess trends.

Flow in Walsh/Lewis Creek (S-221B) shows a marked increase starting in 2015 and 2016 (Figure 79), one year prior to the start of the nearest recharge site, East Trolley. Annual peaks in the hydrograph for this site occur in April, and although aquifer recharge is occurring at that time, the data do not suggest a direct correlation. Similar to Big Spring, this location is not directly downgradient from a recharge site and likely will not show a marked response without more recharge on an annual basis, resulting in an increase in groundwater storage.

Mud Creek springs emerge near the locations of the Triangle Road, Mud Creek Pond, and Fruitvale Recharge sites. Downstream, at the monitoring location (S-303), flows appear relatively stable (Figure 80). Flow peaks occur in April and May at this site.

The hydrograph for Swartz Creek flow (S-411) shows a notable annual flow increase beginning in 2012-2013, which is when recharge operations began up-gradient at the Anspach, Barrett, and Trumble sites (Figure 81). It is important to note that this flow monitoring location is downstream of multiple irrigation tailwater inputs, so spring production is not the only factor affecting annual flow volumes. However, the WWBWC is not aware of increases in tailwater inputs upstream of the monitoring location that persist from 2012 to 2021.

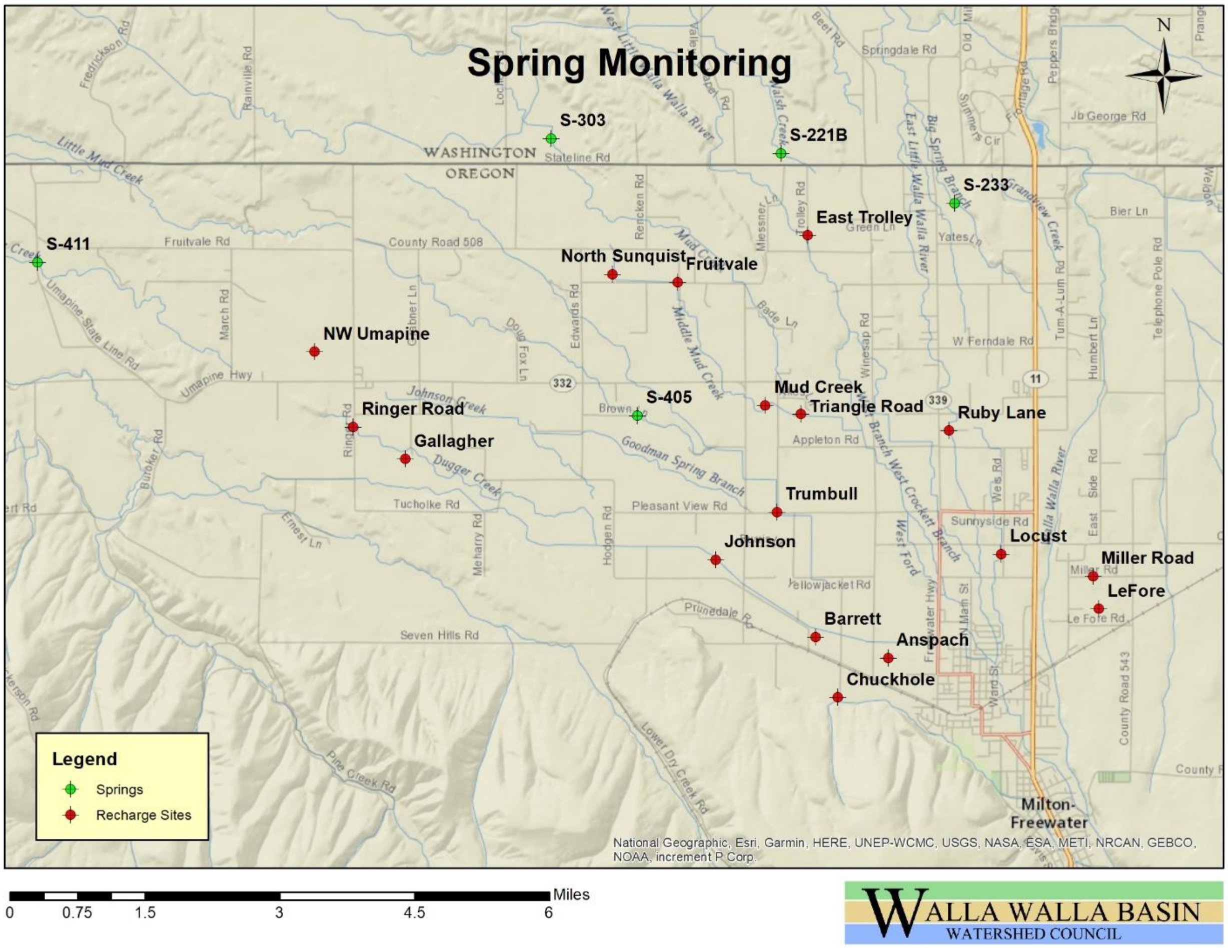

Figure 76. Location of 5 spring monitoring locations in relation to recharge sites.

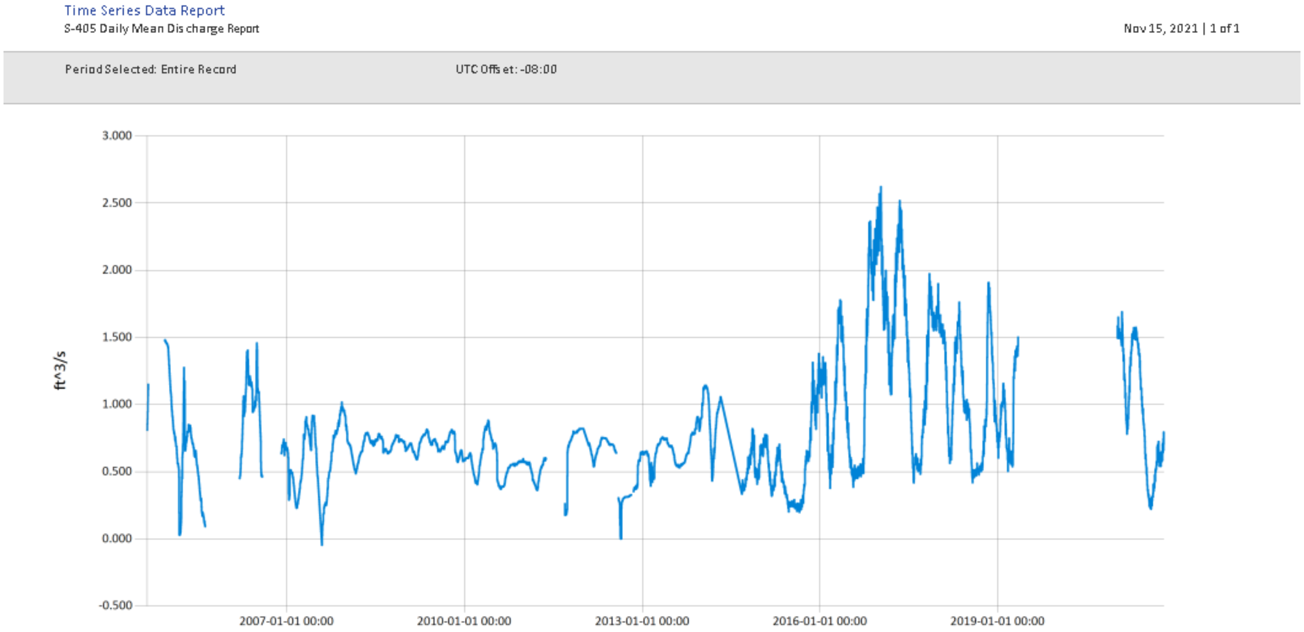
Time Series Data Report
S-405 Daily Mean Discharge Report
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Figure 77. Hydrograph showing stream flow at S405 Little Mud Creek, 2005-2021.

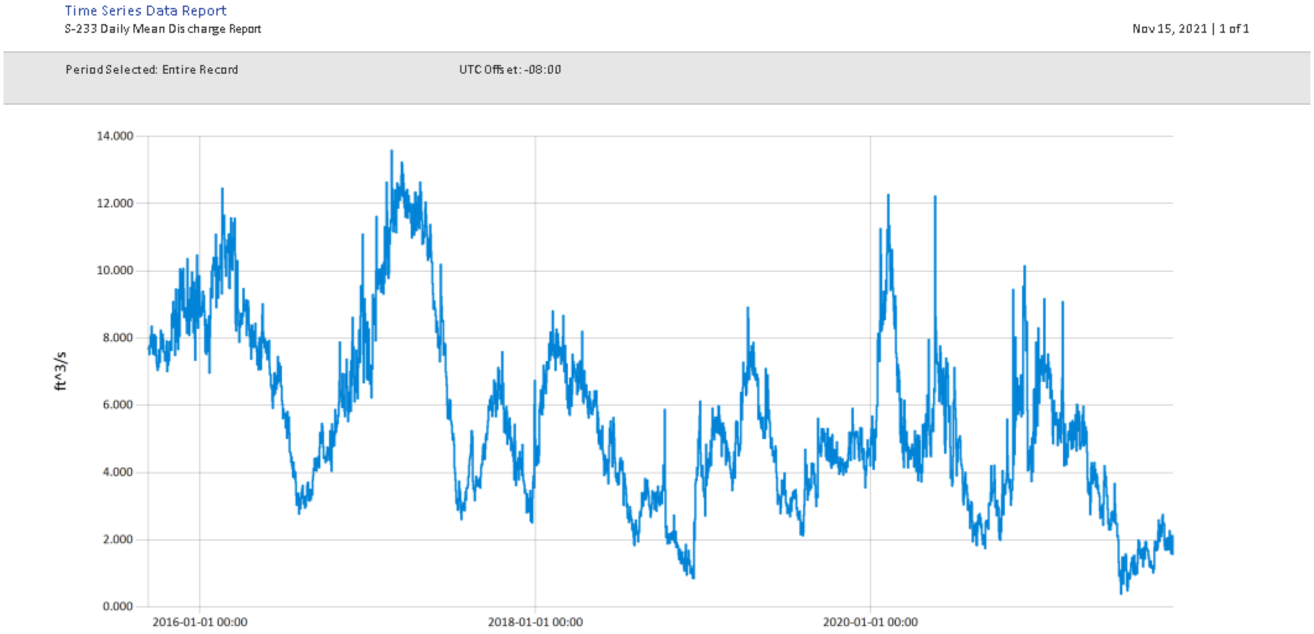
Time Series Data Report
S-233 Daily Mean Discharge Report
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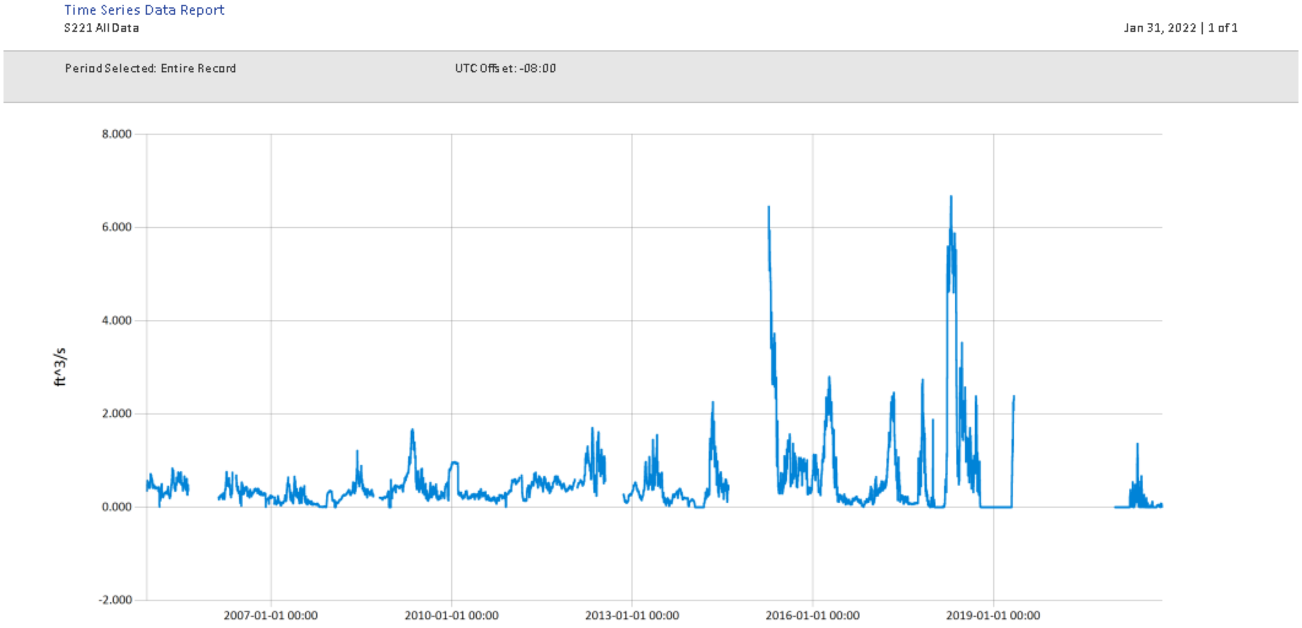
Figure 78. Hydrograph showing stream flow at S233 Big Spring near Stateline Rd, 2015-2021.



Time Series Data Report
S221 All Data
Jan 31, 2022 | 1 of 1

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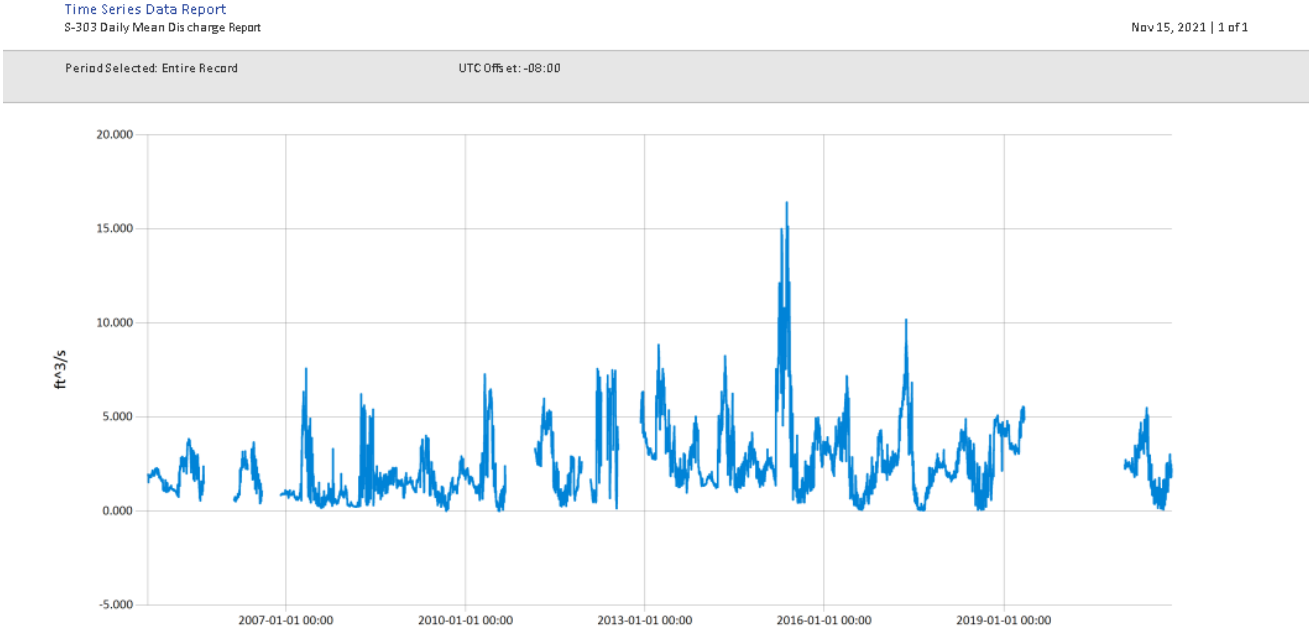
Figure 79. Hydrograph showing stream flow at S221 Walsh/Lewis Creek, 2005-2021.



Time Series Data Report
S-303 Daily Mean Discharge Report
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Figure 80. Hydrograph showing stream flow at S303 Mud Creek near Stateline Rd, 2004-2021.

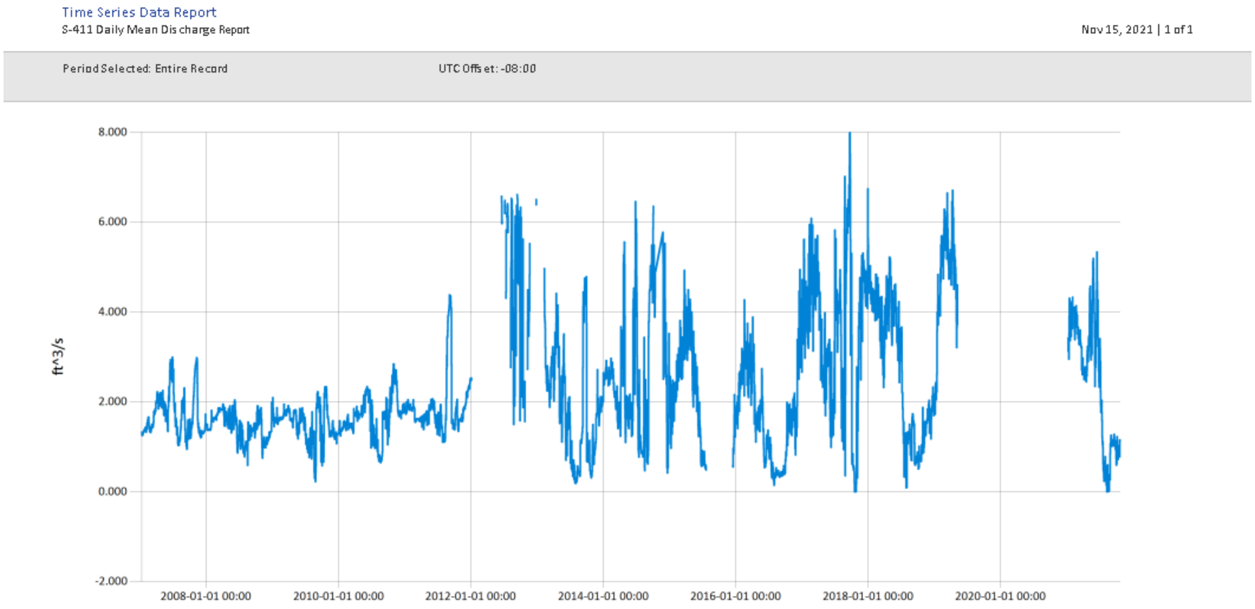

Figure 81. Hydrograph showing stream flow at S411 Swartz Creek near Umapine Highway.

Water Quality Monitoring

Methods

In accordance with limited license LL-1848, samples were collected once before and once after the recharge season. Grab samples of source water at five locations and groundwater at 8 locations were collected on November 16-17, 2020 and June 18 and 20, 2021 (Figure 82). The five source water locations were as follows: Source Water #1 (Zerba Weir), Source Water #2 (Duff Weir, S-418), Source Water #3 (Huffman-Richartz Split), Source Water #4 (Fruitvale, S-318), and Source Water #5 (Eastside). The eight groundwater wells were as follows: GW_046, GW_141, GW_144, GW_151, GW_152, GW_160, GW_170, and GW_171.

Table 5 shows the inorganic analytes and synthetic organic constituents evaluated as well as the analytical methods and detection limits for each. The Eco-Tracker analytical method is a cost-effective passive sampling tool that utilizes a resin capsule placed in the sample water for 24 hours to trap and exchange analytes of interest. At the lab, the chemical constituents are extracted with 50 mL 2M HCl. To evaluate concentrations of nitrate, water samples were analyzed by Anatek Labs, Inc. using conventional methods (Table 5).

Table 4. Analyte list, analytical methods, and method reporting limits for WY 2021.

Inorganic Analyte	Analytical Method	Detection Limit (mg/L)
Calcium (mg/L)	Eco-Tracker (Unibest)	0.31
Iron (mg/L)	Eco-Tracker (Unibest)	0.05
Magnesium (mg/L)	Eco-Tracker (Unibest)	0.27
Nitrate-N(mg/L)	EPA 300.0	0.1
Phosphorus (mg/L)	Eco-Tracker (Unibest)	0.02
Potassium (mg/L)	Eco-Tracker (Unibest)	0.18
Sodium (mg/L)	Eco-Tracker (Unibest)	0.17
Sulfur (mg/L)	Eco-Tracker (Unibest)	0.02
Synthetic Organic Constituents		
Azinphos-methyl	8321B	0.12
Chlorpyrifos	8270D	0.06
Diuron	8321B	0.06
Malathion	8270D	0.06

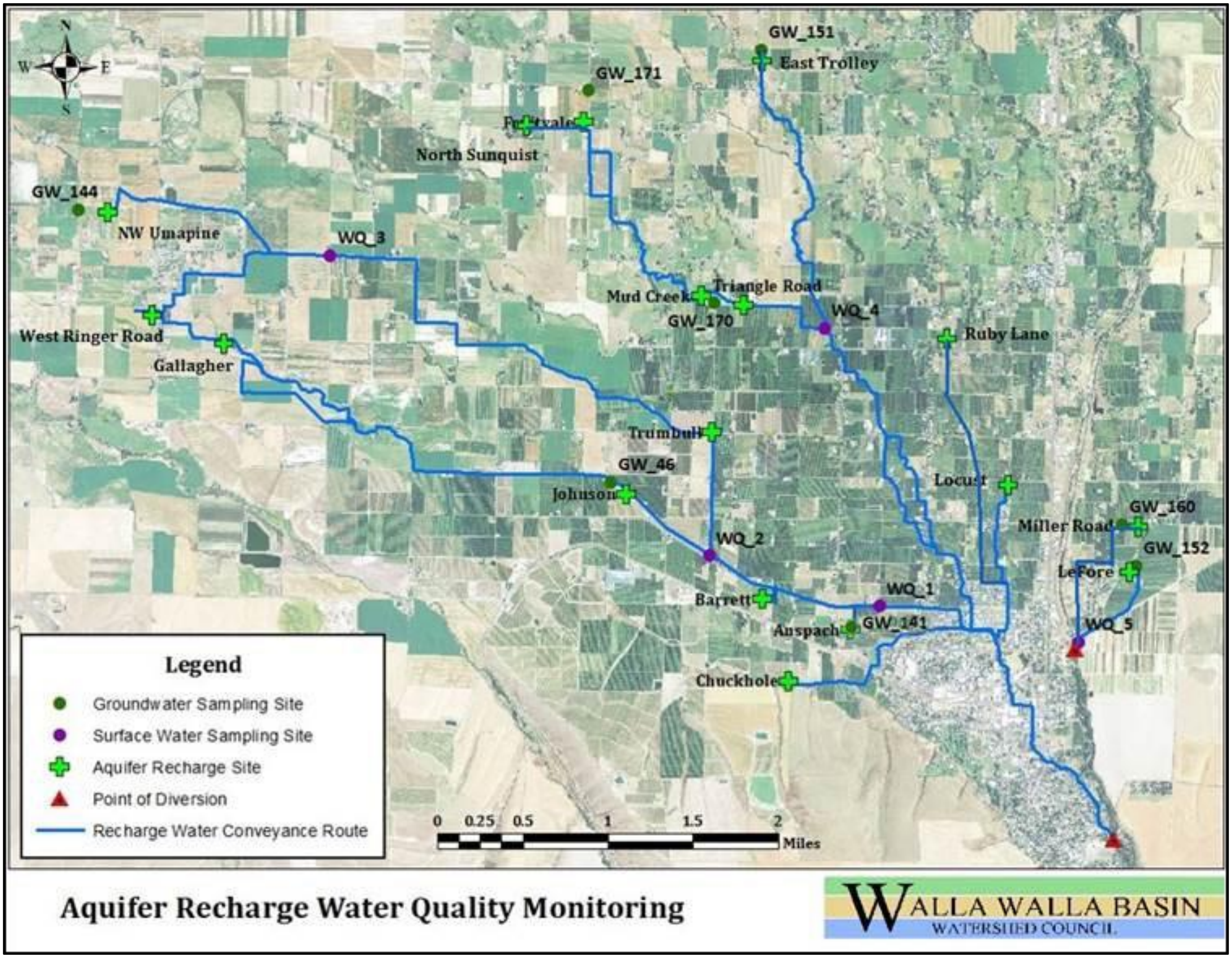

Figure 82. Water quality sampling locations for the managed aquifer recharge program in WY 2021.

To evaluate the impacts of managed aquifer recharge, analyte concentrations in groundwater were compared to source water concentrations before and after the recharge season. Table 6 lists the source water sites relevant for each groundwater sampling site.

Table 5. Relevant source water site for each groundwater site.

GW site	Relevant source water sampling site
GW_141	WQ_1
GW_046	WQ_2
GW_144	WQ_3
GW_170	WQ_4
GW_171	WQ_4
GW_151	WQ_4
GW_152	WQ_5
GW_160	WQ_5

RESULTS

Tables 7-8 show groundwater quality results alongside the relevant source water results from the Unibest Eco-Tracker analysis. Figures 83-84 display the data in bar graphs for visual comparison of pre- and post-recharge samples and source water samples. The results of conventional lab analyses are shown in Tables 9 and 10. See Appendix C for all laboratory reports.

Field parameters were measured with a multi-parameter Thermo-Scientific Orion meter. Sensors were quality checked and calibrated as needed before each sampling event.

Table 6. Water quality data, Unibest methodology, GW_046, GW_141, GW_144, and GW_151. Relevant source water locations are identified in Table 6.

		Groundwater (mg/L)		**Source water (mg/L)**	
Site	**Constituent**	**Pre-recharge**	**Post-recharge**	**Pre-recharge**	**Post-recharge**
GW_046	Ca	9.53	4.51	5.25	3.20
GW_046	K	3.21	3.25	2.33	2.28
GW_046	Mg	2.58	1.59	2.00	1.13
GW_046	Na	3.61	2.59	3.56	1.59
GW_046	S	12.97	14.65	12.71	13.75
GW_046	Fe	0.12	0.17	0.09	0.12
GW_046	P	0.09	0.17	0.09	0.11
GW_141	Ca	10.93	7.27	4.96	3.08
GW_141	K	4.96	4.43	2.86	2.38
GW_141	Mg	4.22	2.61	1.9	1.09
GW_141	Na	6.81	4.25	3.7	1.52
GW_141	S	13.46	15.32	12.53	15.10
GW_141	Fe	0.09	0.13	0.09	0.14
GW_141	P	0.08	0.08	0.1	0.06
GW_144	Ca	32.63	20.11	5.58	4.42
GW_144	K	9.96	7.01	2.45	2.61
GW_144	Mg	13.03	7.49	2.11	1.53
GW_144	Na	21.19	16.93	3.52	1.94
GW_144	S	17.52	17.90	12.92	14.66
GW_144	Fe	0.08	0.12	0.09	0.16
GW_144	P	0.12	0.15	0.05	0.06
GW_151	Ca	10.56	12.37	5.16	5.73
GW_151	K	3.66	4.10	2.19	2.72
GW_151	Mg	4.00	3.69	1.98	1.68
GW_151	Na	5.04	4.23	3.16	2.20
GW_151	S	14.41	15.48	12.29	14.57
GW_151	Fe	0.08	0.22	0.11	0.17
GW_151	P	0.09	0.13	0.05	0.10

Table 7. Water quality data, Unibest methodology, GW_152, GW_160, GW_170, GW_171. Relevant source water locations are identified in Table 6.

Site	Constituent	Groundwater (mg/L)		Source water (mg/L)	
		Pre-recharge	Post-recharge	Pre-recharge	Post-recharge
GW_152	Ca	24.91	15.19	4.93	3.22
GW_152	K	4.43	4.12	2.24	2.21
GW_152	Mg	7.67	5.46	1.88	1.11
GW_152	Na	10.22	7.82	3.03	1.32
GW_152	S	14.77	16.60	12.48	14.09
GW_152	Fe	0.55	0.15	0.10	0.13
GW_152	P	0.20	0.10	0.05	0.07
GW_160	Ca	6.72	7.86	4.93	3.22
GW_160	K	2.72	3.57	2.24	2.21
GW_160	Mg	2.54	2.69	1.88	1.11
GW_160	Na	3.41	2.77	3.03	1.32
GW_160	S	12.98	15.39	12.48	14.09
GW_160	Fe	0.08	0.55	0.10	0.13
GW_160	P	0.07	0.09	0.05	0.07
GW_170	Ca	17.07	20.37	5.16	5.73
GW_170	K	4.97	6.06	2.19	2.72
GW_170	Mg	6.56	7.28	1.98	1.68
GW_170	Na	7.05	8.28	3.16	2.20
GW_170	S	18.09	23.72	12.29	14.57
GW_170	Fe	0.09	0.12	0.11	0.17
GW_170	P	0.08	0.09	0.05	0.10
GW_171	Ca	24.82	23.09	5.16	5.73
GW_171	K	6.66	6.46	2.19	2.72
GW_171	Mg	9.95	8.62	1.98	1.68
GW_171	Na	9.51	7.81	3.16	2.20
GW_171	S	16.12	19.57	12.29	14.57
GW_171	Fe	0.09	0.13	0.11	0.17
GW_171	P	0.15	0.13	0.05	0.10

Figure 83. Water quality data, Unibest method, GW_046, GW_141, GW_144, and GW_151.

Figure 84. Water quality data, Unibest method, GW_152, GW_144, GW_151, and GW_152.

Table 8. Surface water quality nitrate data, conventional methods.

Monitoring Site	NO3-N (mg/L)	
	Pre	Post
WQ_1	0.213	ND
WQ_2	0.196	ND
WQ_3	0.142	ND
WQ_4	0.113	ND
WQ_5	0.228	ND

ND = not detected

Table 9. Groundwater nitrate constituent concentrations, conventional methods.

Well	NO3-N (mg/L)	
	Pre	Post
GW_046	0.109	ND
GW_046_DUP	-	ND
GW_141	1.50	0.391
GW_144	6.84	3.85
GW_151	2.00	1.70
GW_151_DUP	1.89	-
GW_152	2.57	2.36
GW_160	0.719	2.00
GW_170	1.69	2.39
GW_171	4.20	4.48

Table 10. Field parameter results

	Temperature (^{0}C)		Specific conductance (uS/cm)		Dissolved oxygen (mg/L)		pH (std units)	
Site	Pre	Post	Pre	Post	Pre	Post	Pre	Post
WQ_1	7.4	9.4	84.1	50.4	11.89	11.12	7.40	7.10
WQ_2	7.6	9.5	83.8	50.3	11.63	11.19	8.56	7.53
WQ_3	6.9	9.2	84.2	66.3	11.60	12.30	8.80	8.18
WQ_4	7.5	11.6	82.1	48.6	11.87	12.73	8.20	8.43
WQ_5	7.1	7.4	84.7	53.9	11.77	11.65	7.74	7.12
GW_046	13.3	13.1	88.3	58.1	7.85	9.04	7.22	6.92
GW_141	13.7	13.4	151.9	92.0	7.22	8.86	6.52	6.82
GW_144	11.9	11.9	391.2	277.7	6.51	7.95	6.92	6.88
GW_151	12.5	11.5	152.2	139.6	8.58	9.01	6.78	6.59
GW_152	11.5	12.0	232.3	404.4	8.34	7.50	6.98	6.79
GW_160	10.6	9.8	101.6	115.0	5.97	9.85	6.15	6.63
GW_170	14.5	14.2	207.8	244.3	7.21	7.60	6.60	6.44
GW_171	13.1	12.7	288.9	288.7	7.72	7.72	6.88	6.79

DISCUSSION

The data suggest it is unlikely that groundwater quality degradation is occurring due to operation of the recharge sites. Often, the groundwater constituent concentrations are lower after recharge ends than before recharge begins. Out of 56 groundwater constituent concentrations measured with the Unibest method prior to and after recharge season, concentrations were lower (improved) after the recharge season in 46% of the values. Constituent concentrations in the source water were lower (better) than in the receiving groundwater in 89% of the pre-recharge and 91% of the post-recharge values. In 11 cases, source water contained a higher concentration than the receiving groundwater for a given constituent. In nine cases, this occurred with iron and, in two cases, for phosphorus (Tables 7-8 & Figures 83-84). The difference in iron concentrations in source water compared to groundwater ranged from 0.1 to 0.5 mg/L (note: the detection limit for the Unibest method is 0.05 mg/L). The difference in phosphorus concentrations in source water compared to groundwater was 0.1-0.2 mg/L (detection limit for Unibest method is 0.02 mg/L).

Iron was detected using the Unibest method in the pre- and post-recharge samples at all groundwater and source water locations (Tables 7-8). Concentrations were substantially below Oregon Department of Environmental Quality's (ODEQ) guidance level of 0.3 mg/L for iron except in GW_152 and GW_160. In GW_152, iron was detected at 0.55 mg/L in the pre-recharge sample and at 0.15 mg/L in the post-recharge sample. GW_160 had a notable increase in iron concentration from 0.08 mg/L before recharge to 0.55 mg/L after recharge (Table 8). Based on the low iron concentrations detected in any source water samples, which ranged from 0.09-0.17 mg/L, it is unlikely that recharge water contributed to the observed increase in iron concentration in GW_160.

Results from conventional lab analysis show that nitrate concentrations increased at three sample locations (GW_160, GW_170, and GW_171) over the course of the recharge season (Table 10). The drinking water standard for nitrate (10 mg/L) was not exceeded in any samples. Nitrate concentrations were very low in pre-season source water samples (0.113-0.228 mg/L), and no nitrate was detected in any post-recharge source water samples, so the recharge water infiltrating into groundwater was likely not the source of the nitrates found in the groundwater (Tables 9-10).

The groundwater samples collected at wells GW_144 and GW_171 on June 20, 2021 were also analyzed for the approved targeted list of herbicides and pesticides (azinphos-methyl, chlorpyrifos, diuron, and malathion) using analytical methods EPA 8270D and EPA 8321B. There were no detections of the four constituents in either sample. Analytical laboratory reports are included in Appendix C.

QUALITY CONTROL

For the synthetic organic compounds, the lab did not identify any quality control issues associated with analysis of the samples.

For the samples analyzed using conventional methods at Anatek, samples were received within the holding time. The temperature of the samples upon receipt by the lab was 2.8 °C for the 11/16/2020 shipment and 3.4 °C for the 11/17/2020 shipment. In the post-recharge sampling event, the temperature of the samples was 5.6 °C for the 05/18/2021 shipment and 5.6 °C for the shipment on 05/20/2021. The 05/18/2021 and the 05/18/2021 shipments exceeded the 4 °C preservation threshold for nitrate. The lab manager did not believe the temperature would affect results, and concentrations are similar to those reported in previous years. Because preservation protocols were not followed however, concentrations of nitrate in these samples may not represent actual conditions.

One field replicate was obtained at GW_151 during the pre-recharge sampling event and at GW_046 during the post-recharge event to quantify precision of the Nitrate-N data (Table 12). The results indicate the data have sufficiently high reproducibility for their intended end use.

Table 11. Relative percent difference of replicate samples.

Analyte	**GW_151**			**GW_046**		
	Sample mg/L	**Replicate mg/L**	**Relative percent difference**	**Sample**	**Replicate**	**Relative percent difference**
Nitrate-N	2.00	1.89	5.7%	ND	ND	0%

SUMMARY

During the WY 2021 recharge season, 8,121 ac-ft (2.7 billion gallons) of water was recharged to the alluvial aquifer near Milton-Freewater through recharge basins, infiltration galleries, and seepage from canals and ditches delivering the water to the engineered structures. Groundwater levels in wells closest to the sites typically showed the strongest response. Seasonal patterns in groundwater levels at most of the monitoring sites reflect multiple factors influencing their change over time such as seepage from stream channels and the irrigation delivery network, deep percolation past the rooting zone, spring discharge, and upwelling into stream channels. Flow data from Little Mud Creek and Swartz Creek, both spring-fed creeks down-gradient of multiple recharge sites, show an increase in flows since the recharge program expanded in 2012-2013.

As in previous recharge seasons, groundwater and surface water quality data collected during aquifer recharge activities do not indicate that aquifer recharge activities are degrading groundwater quality. The quality of source water delivered to the aquifer recharge sites continues to be of better quality than the receiving groundwater. No exceedances of surface water quality criteria were measured.

The Walla Walla Basin's aquifer recharge program continues to use nature-based infrastructure to simulate the floodplain function of recharge to the aquifer that was lost due to channelization of the distributary system. With continued aquifer recharge activities, WWBWC aims to increase alluvial aquifer water levels and spring production.

PROPOSED AR PROGRAM IN WY 2022

Operation of the current 17 alluvial aquifer recharge sites will continue in WY 2022 under Limited License 1848.

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APPENDIX A – LIMITED LICENSE LL-1621

Oregon Water Resources Department

Final Order
Limited License Application LL-1621
Walla Walla Basin Watershed Council and
Hudson Bay District Improvement
Company

Appeal Rights

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Requested Water Use

On June 13, 2016, the Water Resources Department received completed limited license request 1621 from Walla Walla Basin Watershed Council and Hudson Bay District Improvement Company for the use of up to 70 cubic feet per second from the Walla Walla River. The points of diversion are located in the NE ^{1}/4 NW ^{1}/4, Section l, Township 5 North, Range 35 East W.M. and in the SW ^{1}/4, NE ^{1}/4, Section 12, Township 5 North, Range 35 East, W.M., for the purpose of artificial groundwater recharge testing, for the period of March l, 2015 through December 3 1, 2020.

Authorities

The Department may approve a limited license pursuant to its authority under ORS 537.143, 537.144 and OAR 690-340-0030.

ORS 537.143(2) authorizes the Director to revoke the right to use water under a limited license if it causes injury to any other water right or a minimum perennial streamflow.

A limited license will not be issued for more than five consecutive years for the same use, as directed by ORS 537.143(8).

Findings of Fact

1. The forms, fees and map have been submitted, as required by OAR 690-340-0030(1).
2. The Department provided public notice of the application, on December 22, 2015 as required by OAR 690-340-0030(2).
3. This limited license request is limited to an area within a single drainage basin as required by OAR 690-340-0030(3).
4. The Department has determined that there is water available for the requested use.

5. The Department has determined that the proposed source has not been withdrawn from further appropriation.

6. Because this use is from surface water and has the potential to impact fish, the Department finds that fish screening is required to protect the public interest.

7. Because the use requested is longer than 120 days and because the use is in an area that has sensitive, threatened or endangered fish species, the use is subject to the Department's rules under OAR 690-33. These rules aid the Department in determining whether a proposed use will impair or be detrimental to the public interest with regard to sensitive, threatened, or endangered fish species.

8. The Department has determined that the use is not subject to its rules under OAR 690-350. However, artificial groundwater recharge testing must be done in a manner that provides a test with results and supplemental information for the user's artificial groundwater recharge permit application. Consistent with this intent, the Department has added conditions pertaining to testing, monitoring, reporting and coordination with Oregon Department of Environmental Quality (ODEQ), Oregon Department of Fish and Wildlife (ODFW) and this Department.

9. The Department has received comments related to the possible issuance of the limited license from ODEQ requesting changes to the proposed monitoring plan. The water quality monitoring plan was revised and approved by ODEQ on February 25, 2016. The Department has received comments from ODFW in support of this issuance and recommending conditions related to instream water rights and bypass flows. The Department's Groundwater Section determined the testing and water quantity monitoring plan submitted as an addendum to the application on June 13, 2016 is sufficient for artificial groundwater recharge testing. The authorization of Limited License 1621 is conditioned to satisfactorily address issues raised in those comments.

10. Pursuant to OAR 690-340-0030(4)(5), conditions have been added with regard to notice and water-use measurement.

Conclusions of Law

The proposed water use will not impair or be detrimental to the public interest pursuant to OAR 690-340-0030(2), as limited in the order below.

Order

Therefore, pursuant to ORS 537.143, ORS 537.144, and OAR 690-340-0030, application for Limited License 1621 is approved as conditioned below.

1. The period and rate of use for Limited License 1621 shall be from October 17, 2016 through December 3 1, 2020 for the use of 70 cubic feet per second from the Walla Walla River, for the purpose of artificial groundwater recharge testing. The season of use is limited to November 1 through May 15.

2. The licensee shall give notice to the Watermaster in the district where use is to occur not less than 15 days or more than 60 days in advance of using the water under this limited license. The notice

shall include the location of the diversion, and the volume of water to be diverted and the intended use and place of use.

3. When water is diverted under this limited license, the use is limited to times when the following minimum streamflows are met in the Tum A Lum reach of the Walla Walla River, between the Little Walla Walla River diversion and Nursery Bridge Dam and flowing past Nursery Bridge Dam: November — 64 cfs, December and January 95 cfs, February to May 15 — 150 cfs. Nursery Bridge Dam is located just downstream of Nursery Bridge and is downstream of the Little Walla Wall diversion. The District 5 Watermaster, based on gage and/or flow measurements, shall make the determination that the above described streamflows are flowing past Nursery Bridge Dam. Diversion under this limited license shall cease when said streamflows are unmet.

4. The Licensee shall follow the operation, water quality and water level monitoring plans described in the document entitled "Surface water and Groundwater Monitoring and Reporting Plan for Limited License Application LL1621" and dated May 3 1, 2016. This plan may be modified after review and approval of changes by the Department.

5. The licensee shall comply with all ODEQ water quality requirements. If monitoring data or other information result in identification of potential water quality concerns, ODEQ may seek modifications to the monitoring and test plan and/or require a permit of its own to address the water quality concerns prior to resumption of artificial groundwater recharge testing.

6. Before water use may begin under this license, the licensee shall install a totalizing flow meter at each point of diversion and at the entry point to each recharge test site. The totalizing flow meters must be installed and maintained in good working order. In addition the licensee shall maintain a record of all water use, including the total number of hours of diversion, the total volume diverted, and the categories of beneficial use to which the water is applied. During the period of the limited license, the record of use shall be available for review by the Department upon request, and shall be submitted to the Department annually and to Watermaster upon request. This record shall include the amount of water diverted from the Walla Walla River, and the amount delivered to each recharge area.

7. The Director may revoke the right to use water for any reason described in ORS 537.143 (2), and OAR 690-340-0030(6). Such revocation may be prompted by field regulatory activities or by any other reason.

8. Use of water under a limited license shall not have priority over any water right exercised according to a permit or certificate, and shall be subordinate to all other authorized uses that rely upon the same source.

9. The licensee shall install, maintain and operate fish screening and by-pass devices as required by the Oregon Department of Fish and Wildlife to prevent fish from entering the proposed diversion. See copy of enclosed fish screening criteria for information.

10. In supporting this license, ODFW retains the prerogative to pursue a future instream water right for the Walla Walla River. A permanent water right for the requested location may fall under the

requirements of Division 33 rules, which limit water usage during the period from April 15-September 30.

11. The licensee is required to provide a written annual report by February 15th of each year. This report will detail recharge testing and any subsequent recovery under a secondary limited license from the preceding water year. Reporting shall include, but is not limited to, the results of testing efforts that relate to water quality, water quantity, and operations. Water level data shall be submitted in a Department-specified digital format. The licensee shall consult with ODEQ and OWRD to identify additional specific reporting elements. The first report is due in February 2014. The annual report shall be sealed and signed by a professional(s) registered or allowed, under Oregon law, to practice geology.

12. Failure to meet the conditions of the license to the satisfaction of the Department will lead to a cancellation of the limited license, in which case it would no longer be in force.

13. The licensee shall conduct recharge testing as proposed in the application and later amended by the licensee, and as otherwise conditioned herein.

NOTE: This water-use authorization is temporary. Applicants are advised that issuance of this final order does not guarantee that any permit for the authorized use will be issued in the future; any investments should be made with that in mind.

Issued October *18*, 2016

E. Timothy Wall

E. Timothy Wallin, Water Rights Program Manager, for
Thomas M. Byler, Director
Water Resources Department

Enclosures - limited license

cc: Greg Silbernagel, District 5 Watermaster
Bill Duke, ODFW
Phil Richerson, ODEQ
File

If you need further assistance, please contact the Water Rights Section at the address, phone number, or fax number below. When contacting the Department, be sure to reference your limited license number for better service.

Remember, the use of water under the terms of this limited license is not a secure source of water. Water use can be revoked at any time. Such revocation may be prompted by field regulatory activities or many other reasons.

Water Rights Section
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem OR 97301-1271
Phone: (503) 986-081 7 Fax: (503) 986-0901

FISH SCREENING CRITERIA FOR WATER DIVERSIONS

This summary describes ODFW fish screening criteria for all fish species.

Screen material openings for ditch (gravity) and pump screens must provide a minimum of 27% open area:

Perforated plate: Openings shall not exceed 3/32 or 0.0938 inches (2.38 mm).

Mesh/Woven wire screen: Square openings shall not exceed 3/32 or 0.0938 inches (2.38 mm) in the narrow direction, e.g., 3/32 inch x 3/32 inch open mesh.

Profile bar screen/Wedge wire: Openings shall not exceed 0.0689 inches (1.75 mm) in the narrow direction.

Screen area must be large enough to prevent fish impact. Wetted screen area depends on the water now rate and the approach velocity.

Approach velocity: The water velocity perpendicular to and approximately three inches in front of the screen face.
Sweeping velocity: The water velocity parallel to the screen face.
Bypass system: Any pipe, flume, open channel or other means of conveyance that transports fish back to the body of water from which the fish were diverted.
Active pump screen: Self cleaning screen that has a proven cleaning system.
Passive pump screen: Screen that has no cleaning system other than periodic manual cleaning.

Screen approach velocity for ditch and active pump screens shall not exceed 0.4 fps (feet per second) or 0.12 mps (meters per second). The wetted screen area in square feet is calculated by dividing the maximum water flow rate in cubic feet per second (1 cfs— 449 gpm) by 0.4 fps.

Screen sweeping velocity for ditch screens shall exceed the approach velocity. Screens greater than 4 feet in length must be angled at 45 degrees or less to flow. An adequate bypass system must be provided for ditch screens to safely and rapidly collect and transport fish back to the stream.

Screen approach velocity for passive pump screens shall not exceed 0.2 fps or 0.06 mps. The wetted screen area in square feet is calculated by dividing the maximum water flow rate by 0.2 fps. pump rate should be less than 1 cfs.

For further information please contact:

Bernie Kepshire
Oregon Department of Fish and Wildlife
71 1 8 NE Vandenberg Avenue
Corvallis, OR 97330-9446
(541)757-4186 055
bernard.m.kepshire@state.or.us

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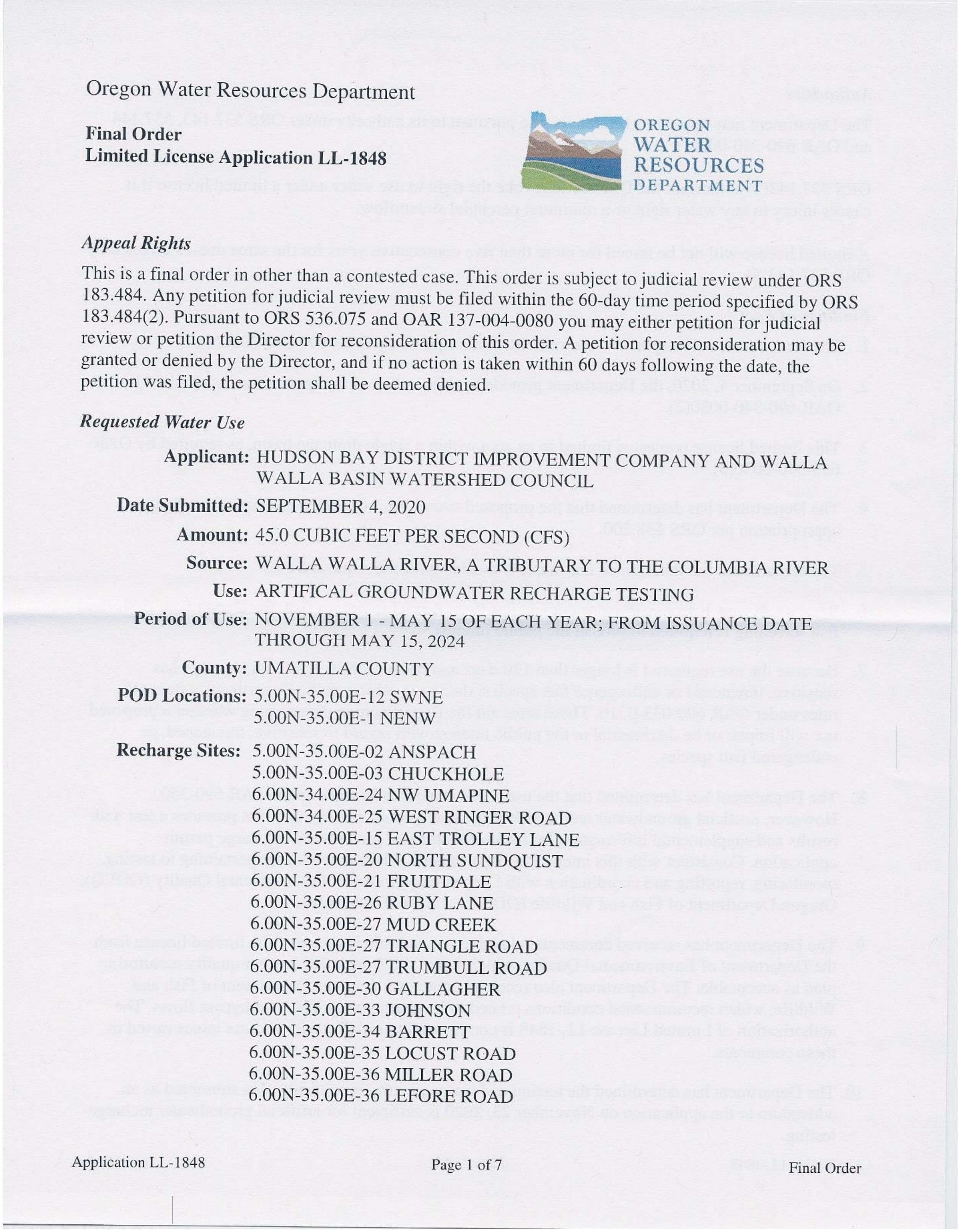
APPENDIX B – LIMITED LICENSE LL-1848



Oregon Water Resources Department

Final Order
Limited License Application LL-1848

OREGON
WATER
RESOURCES
DEPARTMENT

Appeal Rights

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date, the petition was filed, the petition shall be deemed denied.

Requested Water Use

Applicant: HUDSON BAY DISTRICT IMPROVEMENT COMPANY AND WALLA WALLA BASIN WATERSHED COUNCIL

Date Submitted: SEPTEMBER 4, 2020

Amount: 45.0 CUBIC FEET PER SECOND (CFS)

Source: WALLA WALLA RIVER, A TRIBUTARY TO THE COLUMBIA RIVER

Use: ARTIFICAL GROUNDWATER RECHARGE TESTING

Period of Use: NOVEMBER 1 - MAY 15 OF EACH YEAR; FROM ISSUANCE DATE THROUGH MAY 15, 2024

County: UMATILLA COUNTY

POD Locations: 5.00N-35.00E-12 SWNE
5.00N-35.00E-1 NENW

Recharge Sites: 5.00N-35.00E-02 ANSPACH
5.00N-35.00E-03 CHUCKHOLE
6.00N-34.00E-24 NW UMAPINE
6.00N-34.00E-25 WEST RINGER ROAD
6.00N-35.00E-15 EAST TROLLEY LANE
6.00N-35.00E-20 NORTH SUNDQUIST
6.00N-35.00E-21 FRUITDALE
6.00N-35.00E-26 RUBY LANE
6.00N-35.00E-27 MUD CREEK
6.00N-35.00E-27 TRIANGLE ROAD
6.00N-35.00E-27 TRUMBULL ROAD
6.00N-35.00E-30 GALLAGHER
6.00N-35.00E-33 JOHNSON
6.00N-35.00E-34 BARRETT
6.00N-35.00E-35 LOCUST ROAD
6.00N-35.00E-36 MILLER ROAD
6.00N-35.00E-36 LEFORE ROAD

Authorities

The Department may approve a limited license pursuant to its authority under ORS 537.143, 537.144 and OAR 690-340-0030.

ORS 537.143(2) authorizes the Director to revoke the right to use water under a limited license if it causes injury to any water right or a minimum perennial streamflow.

A limited license will not be issued for more than five consecutive years for the same use, as directed by ORS 537.143(8).

Findings of Fact

1. The forms, fees, and map have been submitted, as required by OAR 690-340-0030(1).
2. On September 4, 2020, the Department provided public notice of the application, as required by OAR 690-340-0030(2).
3. This limited license request is limited to an area within a single drainage basin, as required by OAR 690-340-0030(3).
4. The Department has determined that the proposed source has not been withdrawn from further appropriation per ORS 538.200.
5. The Department has determined that water is available for the requested use.
6. Because this use is from surface water and has the potential to impact fish, the Department finds that fish screening is required to protect the public interest.
7. Because the use requested is longer than 120 days and because the use is in an area that has sensitive, threatened or endangered fish species, the use is subject to the Department's statewide rules under OAR 690-033-0310. These rules aid the Department in determining whether a proposed use will impair or be detrimental to the public interest with regard to sensitive, threatened, or endangered fish species.
8. The Department has determined that the use is not subject to its rules under OAR 690-350. However, artificial groundwater recharge testing must be done in a manner that provides a test with results and supplemental information for the user's artificial groundwater recharge permit application. Consistent with this intent, the Department has added conditions pertaining to testing, monitoring, reporting and coordination with Oregon Department of Environmental Quality (ODEQ), Oregon Department of Fish and Wildlife (ODFW) and this Department.
9. The Department has received comments related to the possible issuance of the limited license from the Department of Environmental Quality, which found the August 2020 water quality monitoring plan as acceptable. The Department also received comments from the Department of Fish and Wildlife, which recommended conditions related to instream water rights and bypass flows. The authorization of Limited License LL-1848 is conditioned to satisfactorily address issues raised in these comments.
10. The Department has determined the testing and water quantity monitoring plan submitted as an addendum to the application on November 23, 2020 is sufficient for artificial groundwater recharge testing.

11. Pursuant to OAR 690-340-0030(4)(5), conditions have been added with regard to notice and water-use measurement.

12. Umatilla County has indicated that the proposed use is compatible with the applicable acknowledged comprehensive land-use plan. A copy of the land use compatibility statement is in the file.

Conclusions of Law

The proposed water use will not impair or be detrimental to the public interest pursuant to OAR 690-340-0030(2), as limited in the order below.

Order

Therefore, pursuant to ORS 537.143, ORS 537.144, and OAR 690-340-0030, Application LL-1848 is approved as conditioned below.

1. The authorized use of water under this limited licenses is as follows:

Amount: 45.0 CFS
Source: WALLA WALLA RIVER, A TRIBUTARY TO THE COLUMBIA RIVER
Use: ARTIFICAL GROUNDWATER RECHARGE TESTING
Duration: NOVEMBER 1 - MAY 15 OF EACH YEAR; FROM ISSUANCE DATE THROUGH MAY 15, 2024

2. The licensee shall give notice to the Watermaster in the district where use is to occur not less than 15 days or more than 60 days in advance of using the water under the limited license. The notice shall include the location of the diversion, the quantity of water to be diverted, and the intended use and place of use. In the case of this application, this order serves as the notice described above.

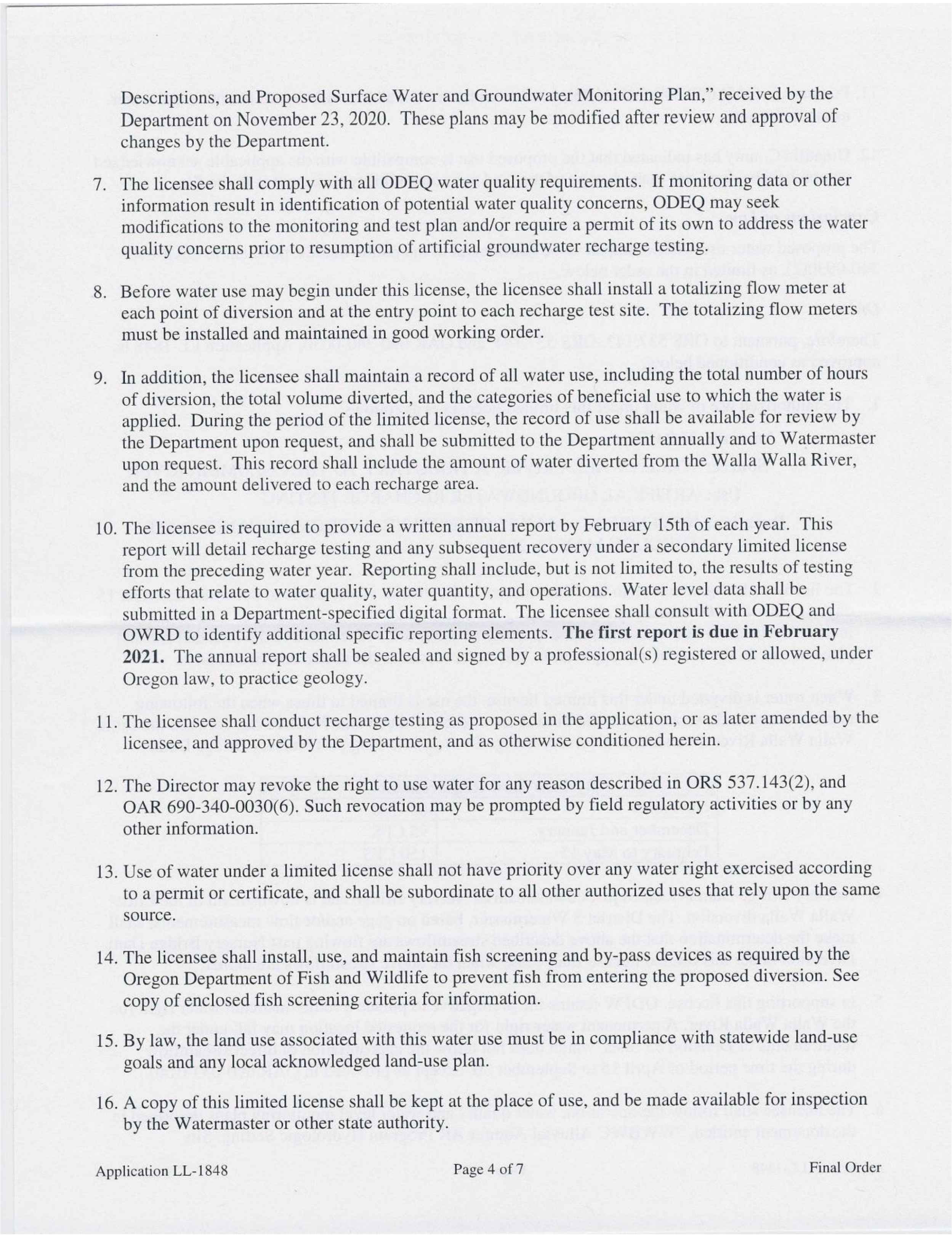
3. When water is diverted under this limited license, the use is limited to times when the following minimum streamflows are met in the Tum A Lum reach of the Walla Walla River, between the Little Walla Walla River diversion and Nursery Bridge Dam and flowing past Nursery Bridge Dam:

By-Pass Flow Requirement	
November	64 CFS
December and January	95 CFS
February to May 15	150 CFS

4. Nursery Bridge Dam is located just downstream of Nursery Bridge and is downstream of the Little Walla Walla diversion. The District 5 Watermaster, based on gage and/or flow measurements, shall make the determination that the above described streamflows are flowing past Nursery Bridge Dam. Diversion under this limited license shall cease when the above streamflows are unmet.

5. In supporting this license, ODFW retains the prerogative to pursue a future instream water right for the Walla Walla River. A permanent water right for the requested location may fall under the requirements of Division 33 rules, which does not allow the appropriation of direct streamflow during the time period of April 15 to September 30, except as provided in OAR 690-033-0140.

6. The licensee shall follow the operation, water quality and water level monitoring plans described in the document entitled, "WWBWC Alluvial Aquifer AR Program Hydrologic Setting, Site



Descriptions, and Proposed Surface Water and Groundwater Monitoring Plan," received by the Department on November 23, 2020. These plans may be modified after review and approval of changes by the Department.

7. The licensee shall comply with all ODEQ water quality requirements. If monitoring data or other information result in identification of potential water quality concerns, ODEQ may seek modifications to the monitoring and test plan and/or require a permit of its own to address the water quality concerns prior to resumption of artificial groundwater recharge testing.

8. Before water use may begin under this license, the licensee shall install a totalizing flow meter at each point of diversion and at the entry point to each recharge test site. The totalizing flow meters must be installed and maintained in good working order.

9. In addition, the licensee shall maintain a record of all water use, including the total number of hours of diversion, the total volume diverted, and the categories of beneficial use to which the water is applied. During the period of the limited license, the record of use shall be available for review by the Department upon request, and shall be submitted to the Department annually and to Watermaster upon request. This record shall include the amount of water diverted from the Walla Walla River, and the amount delivered to each recharge area.

10. The licensee is required to provide a written annual report by February 15th of each year. This report will detail recharge testing and any subsequent recovery under a secondary limited license from the preceding water year. Reporting shall include, but is not limited to, the results of testing efforts that relate to water quality, water quantity, and operations. Water level data shall be submitted in a Department-specified digital format. The licensee shall consult with ODEQ and OWRD to identify additional specific reporting elements. **The first report is due in February 2021.** The annual report shall be sealed and signed by a professional(s) registered or allowed, under Oregon law, to practice geology.

11. The licensee shall conduct recharge testing as proposed in the application, or as later amended by the licensee, and approved by the Department, and as otherwise conditioned herein.

12. The Director may revoke the right to use water for any reason described in ORS 537.143(2), and OAR 690-340-0030(6). Such revocation may be prompted by field regulatory activities or by any other information.

13. Use of water under a limited license shall not have priority over any water right exercised according to a permit or certificate, and shall be subordinate to all other authorized uses that rely upon the same source.

14. The licensee shall install, use, and maintain fish screening and by-pass devices as required by the Oregon Department of Fish and Wildlife to prevent fish from entering the proposed diversion. See copy of enclosed fish screening criteria for information.

15. By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

16. A copy of this limited license shall be kept at the place of use, and be made available for inspection by the Watermaster or other state authority.

NOTE: This water-use authorization is temporary. Applicants are advised that issuance of this final order does not guarantee that any permit for the authorized use will be issued in the future; any investments should be made with that in mind.

Issued JAN 0 4 2021

Dwight French, Water Right
Services Division Administrator, *for*
Thomas M. Byler, Director
Oregon Water Resources Department

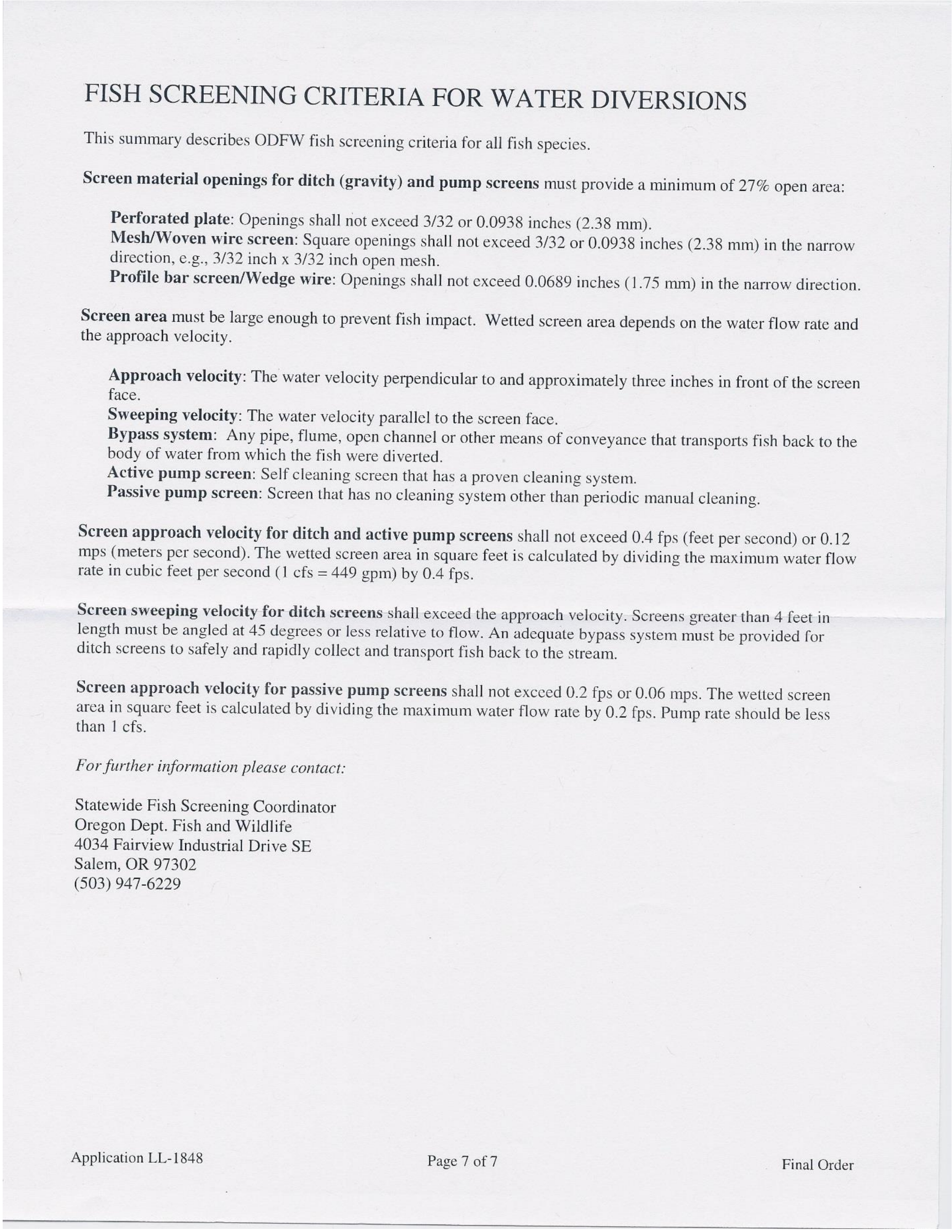
Enclosures - fish screen criteria

cc: Gregory M. Silbernagel, District 5 Watermaster
Danette Faucera, ODFW
Don Butcher, DEQ
Karen Whisler, DEQ
Phil Richerson, ODEQ
Kevin Lindsey, GeoEngineers, Inc.
Surface Water Section
File

If you need further assistance, please contact the Water Rights Section at the address, phone number, or fax number below. When contacting the Department, be sure to reference your limited license number for fastest service.

Remember, this limited license does not provide a secure source of water. Water use can be revoked at any time. Such revocation may be prompted by field regulatory activities or many other reasons.

Water Rights Section
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem OR 97301-1271
Phone: (503) 986-0817 Fax: (503) 986-0901



FISH SCREENING CRITERIA FOR WATER DIVERSIONS

This summary describes ODFW fish screening criteria for all fish species.

Screen material openings for ditch (gravity) and pump screens must provide a minimum of 27% open area:

> **Perforated plate**: Openings shall not exceed 3/32 or 0.0938 inches (2.38 mm).
> **Mesh/Woven wire screen**: Square openings shall not exceed 3/32 or 0.0938 inches (2.38 mm) in the narrow direction, e.g., 3/32 inch x 3/32 inch open mesh.
> **Profile bar screen/Wedge wire**: Openings shall not exceed 0.0689 inches (1.75 mm) in the narrow direction.

Screen area must be large enough to prevent fish impact. Wetted screen area depends on the water flow rate and the approach velocity.

> **Approach velocity**: The water velocity perpendicular to and approximately three inches in front of the screen face.
> **Sweeping velocity**: The water velocity parallel to the screen face.
> **Bypass system**: Any pipe, flume, open channel or other means of conveyance that transports fish back to the body of water from which the fish were diverted.
> **Active pump screen**: Self cleaning screen that has a proven cleaning system.
> **Passive pump screen**: Screen that has no cleaning system other than periodic manual cleaning.

Screen approach velocity for ditch and active pump screens shall not exceed 0.4 fps (feet per second) or 0.12 mps (meters per second). The wetted screen area in square feet is calculated by dividing the maximum water flow rate in cubic feet per second (1 cfs = 449 gpm) by 0.4 fps.

Screen sweeping velocity for ditch screens shall exceed the approach velocity. Screens greater than 4 feet in length must be angled at 45 degrees or less relative to flow. An adequate bypass system must be provided for ditch screens to safely and rapidly collect and transport fish back to the stream.

Screen approach velocity for passive pump screens shall not exceed 0.2 fps or 0.06 mps. The wetted screen area in square feet is calculated by dividing the maximum water flow rate by 0.2 fps. Pump rate should be less than 1 cfs.

For further information please contact:

Statewide Fish Screening Coordinator
Oregon Dept. Fish and Wildlife
4034 Fairview Industrial Drive SE
Salem, OR 97302
(503) 947-6229

APPENDIX C – LABORATORY WATER QUALITY TESTING RESULTS

UNIBEST International, LLC

500 Tausick Way
Walla Walla, WA 99362
1-509-525-3370
www.unibestinc.com

Retailer Name: WWBWC
Submitter Name: Luke Adams
Email: luke.adams@wwbwc.org
City: Milton-Freewater
Country: Oregon
Site Name:
Day Soak: 5 Day

All results are in ppm in extracted solution.
These samples were extracted with 50ml 2M HCl.

Report Date: 12/17/2020
Sample Date: 11/16/2020

Barcode	Sample ID	Depth Low (in.)	Depth High (in.)	Total N	NO3-N	NH4-N	Al	B	Ca	Cu	Fe	K	Mg	Mn	Na	P	S	Zn	pH
2102638	GW-169	0	0		0.13	7.14	0.44	0	9.2	0.02	0.1	5.1	3.43	0	7.35	0.17	13.42	0.11	0
2102665	WQ-1	0	0		0	6.94	0.41	0	4.96	0.01	0.09	2.86	1.9	0	3.7	0.1	12.53	0.04	0
2102624	GW-141	0	0		2.64	6.97	0.44	0	10.93	0.01	0.09	4.96	4.22	0	6.81	0.08	13.46	0.07	0
2102792	WQ-5	0	0		0	7.75	0.41	0	4.93	0.01	0.1	2.24	1.88	0	3.03	0.05	12.48	0.1	0
2102654	GW-160	0	0		0.7	7.19	0.42	0	6.72	0	0.08	2.72	2.54	0	3.41	0.07	12.98	0.08	0
2102655	GW-46	0	0		0	7.96	1.92	0.26	9.53	0	0.12	3.21	2.58	0	3.61	0.09	12.97	0.09	0
2102599	WQ-2	0	0		0	8.55	0.4	0	5.25	0	0.09	2.33	2	0	3.56	0.09	12.71	0.09	0
2102626	WQ-3	0	0		0	8.32	0.4	0	5.58	0	0.09	2.45	2.11	0	3.52	0.05	12.92	0.06	0
2102596	GW-152	0	0		5.76	7.68	3.23	0.43	24.91	0	0.55	4.43	7.67	0.1	10.22	0.2	14.77	0.07	0
2102601	GW-170	0	0		2.23	8.12	0.42	0	17.07	0	0.09	4.97	6.56	0	7.05	0.08	18.09	0.05	0
2102649	GW-171	0	0		7.95	8.09	0.51	0.02	24.82	0	0.09	6.66	9.95	0	9.51	0.15	16.12	0.11	0
2102787	GW-117	0	0		7.42	8.85	0.41	0	16.71	0	0.09	5.08	6.57	0	7.19	0.1	16.36	0.07	0
2102679	GW-142	0	0		0	11.23	0.37	0	8.28	0	0.08	3.4	3.15	0	4.02	0.07	12.91	0.07	0
2102786	GW-151	0	0		2.39	9.78	0.41	0	10.56	0	0.08	3.66	4	0	5.04	0.09	14.41	0.1	0
2102644	GW-151 Duplicate	0	0		2.01	10.99	0.38	0	10.14	0	0.09	3.55	3.86	0	4.82	0.06	13.94	0.09	0
2102600	WQ-4	0	0		0	11.35	0.41	0	5.16	0	0.11	2.19	1.98	0	3.16	0.05	12.29	0.06	0
2102630	GW-119	0	0		15.7	11.36	0.4	0	38.92	0	0.07	10.4	16.36	0	22.29	0.13	19.28	0.09	0
2102651	GW-144	0	0		12.87	11.62	0.5	0.01	32.63	0.02	0.08	9.96	13.03	0.01	21.19	0.12	17.52	0.08	0

Anatek Labs, Inc.
1282 Alturas Drive - Moscow, ID 83843 - (208) 883-2839 - Fax (208) 8829246 - email moscow@anateklabs.com
504 E Sprague Ste. D - Spokane, WA 99202 - (509) 838-3999 - fax (509) 838-4433 - email spokane@anateklabs.com

Client: Walla Walla Basin Watershed Council
Address: 810 S. Main Road
Milton-Freewater, OR 97862
Attn: Luke Adams

Work Order: MAK0409
Project: Managed Aquifer Recharge
Reported: 12/2/2020 14:07

Analytical Results Report

Sample Location: WQ-5
Lab/Sample Number: MAK0409-01
Collect Date: 11/16/20 09:20
Date Received: 11/17/20 10:50
Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/20/20 11:06	BKP	SM 4500-NH3 G	
Nitrate-N	0.228	mg/L	0.100	11/20/20 0:38	BKP	EPA 300.0	H1
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 16:11	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:27	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location:	GW-160		
Lab/Sample Number:	MAK0409-02	Collect Date:	11/16/20 11:00
Date Received:	11/17/20 10:50	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/20/20 11:06	BKP	SM 4500-NH3 G	
Nitrate-N	0.719	mg/L	0.100	11/20/20 1:00	BKP	EPA 300.0	H1
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 16:25	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:30	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location:	GW-141		
Lab/Sample Number:	MAK0409-03	Collect Date:	11/16/20 12:05
Date Received:	11/17/20 10:50	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	0.0581	mg/L	0.0500	11/20/20 11:06	BKP	SM 4500-NH3 G	
Nitrate-N	1.50	mg/L	0.100	11/20/20 1:21	BKP	EPA 300.0	H1
Metals by ICP-MS							
Zinc	0.00133	mg/L	0.00100	11/25/20 16:29	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:31	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location: WQ-1

Lab/Sample Number: MAK0409-04 Collect Date: 11/16/20 11:35

Date Received: 11/17/20 10:50 Collected By:

Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/20/20 11:06	BKP	SM 4500-NH3 G	
Nitrate-N	0.213	mg/L	0.100	11/20/20 4:13	BKP	EPA 300.0	H1
Metals by ICP-MS							
Zinc	0.00680	mg/L	0.00100	11/25/20 16:34	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:32	MYM	EPA 200.7	

Analytical Results Report
(Continued)

Sample Location: WQ-2
Lab/Sample Number: MAK0409-05 Collect Date: 11/16/20 13:05
Date Received: 11/17/20 10:50 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/20/20 11:06	BKP	SM 4500-NH3 G	
Nitrate-N	0.196	mg/L	0.100	11/20/20 4:34	BKP	EPA 300.0	H1
Metals by ICP-MS							
Zinc	0.00125	mg/L	0.00100	11/25/20 16:38	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:33	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location: GW-169
Lab/Sample Number: MAK0409-06 Collect Date: 11/16/20 12:45
Date Received: 11/17/20 10:50 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	0.108	mg/L	0.0500	11/20/20 11:06	BKP	SM 4500-NH3 G	
Nitrate-N	0.616	mg/L	0.100	11/18/20 14:06	BKP	EPA 300.0	H1
Metals by ICP-MS							
Zinc	0.00692	mg/L	0.00100	11/25/20 16:43	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:34	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location:	GW-46		
Lab/Sample Number:	MAK0409-07	Collect Date:	11/16/20 13:30
Date Received:	11/17/20 10:50	Collected By:	
Matrix:	Water		

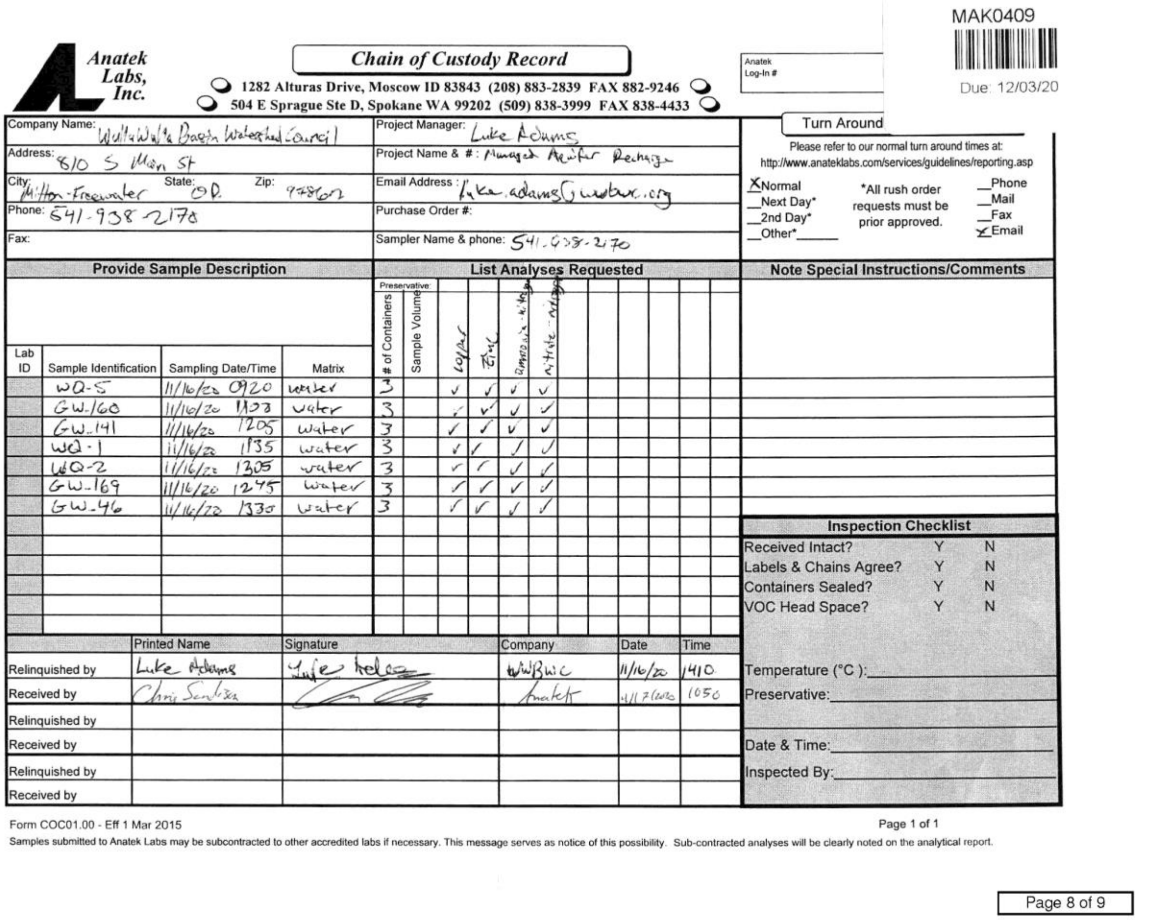
Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/20/20 11:06	BKP	SM 4500-NH3 G	
Nitrate-N	0.109	mg/L	0.100	11/18/20 14:27	BKP	EPA 300.0	H1
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 16:48	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:35	MYM	EPA 200.7	

Authorized Signature,

Justin Doty For Todd Taruscio, Laboratory Manager

B10	Target analyte detected in method blank at or above the method detection limit, but below the method reporting limit.
H1	Sample analysis performed past holding time.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

This report shall not be reproduced except in full, without the written approval of the laboratory
The results reported related only to the samples indicated.



MAK0409

Due: 12/03/20

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Anatek Log-In #:

Company Name: Walla Walla Basin Watershed Council
Address: 810 S Main St
City: Milton-Freewater State: OR Zip: 97862
Phone: 541-938-2170
Fax:

Project Manager: Luke Adams
Project Name & #: Managed Aquifer Recharge
Email Address: luke.adams@wwbwc.org
Purchase Order #:
Sampler Name & phone: 541-938-2170

Turn Around

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

☒ Normal
☐ Next Day*
☐ 2nd Day*
☐ Other*______

*All rush order requests must be prior approved.

☐ Phone
☐ Mail
☐ Fax
☒ Email

Provide Sample Description / **List Analyses Requested**

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	copper	zinc	ammonia-nitrogen	nitrite-nitrogen						
	WQ-5	11/16/20 0920	water	3		✓	✓	✓	✓						
	GW-160	11/16/20 1103	water	3		✓	✓	✓	✓						
	GW-141	11/16/20 1205	water	3		✓	✓	✓	✓						
	WQ-1	11/16/20 1135	water	3		✓	✓	✓	✓						
	WQ-2	11/16/20 1305	water	3		✓	✓	✓	✓						
	GW-169	11/16/20 1245	water	3		✓	✓	✓	✓						
	GW-46	11/16/20 1330	water	3		✓	✓	✓	✓						

Note Special Instructions/Comments

	Printed Name	Signature	Company	Date	Time
Relinquished by	Luke Adams	Luke Adams	WWBWC	11/16/20	1410
Received by	Chris Sandison		Anatek	11/17/2020	1050
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? Y N
Labels & Chains Agree? Y N
Containers Sealed? Y N
VOC Head Space? Y N

Temperature (°C):______
Preservative:______
Date & Time:______
Inspected By:______

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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MAK0409

Due: 12/03/20

Anatek Labs, Inc.

Sample Receipt and Preservation Form

Client Name: Walla Walla Basin Watershed Council Project:

(apply Anatek sample label here)

TAT: [✓ Normal] RUSH: ______ days

Samples Received From: FedEx [✓ UPS] USPS Client Courier Other: ______

Custody Seal on Cooler/Box: Yes [✓ No] Custody Seals Intact: Yes No [✓ N/A]

Number of Coolers/Boxes: 1 Type of Ice: [✓ Ice/Ice Packs] Blue Ice Dry Ice None

Packing Material: Bubble Wrap Bags Foam/Peanuts [✓ None] Other: ______

Cooler Temp As Read (°C): 2.8 Cooler Temp Corrected (°C): — Thermometer Used: IR-5

				Comments:
Samples Received Intact?	[✓ Yes]	No	N/A	
Chain of Custody Present?	[✓ Yes]	No	N/A	
Samples Received Within Hold Time?	[✓ Yes]	No	N/A	
Samples Properly Preserved?	[✓ Yes]	No	N/A	
VOC Vials Free of Headspace (<6mm)?	Yes	No	[✓ N/A]	
VOC Trip Blanks Present?	Yes	No	[✓ N/A]	
Labels and Chains Agree?	[✓ Yes]	No	N/A	
Total Number of Sample Bottles Received:	18 ~~28~~ 21			
Chain of Custody Fully Completed?	[✓ Yes]	No	N/A	
Correct Containers Received?	[✓ Yes]	No	N/A	
Anatek Bottles Used?	[✓ Yes]	No	Unknown	

Record preservatives (and lot numbers, if known) for containers below:

H_2SO4 (1938) → Ammonia → p125ml X 7

Notes, comments, etc. (also use this space if contacting the client - record names and date/time)

Metals → p 250 x 7

Nitrate → p125ml x 7

Received/Inspected By: CS Date/Time: 11/17/2020 1050

Form F18.00 - Eff 8 Feb 2019

Page 1 of 1

Anatek Labs, Inc.

1282 Alturas Drive - Moscow, ID 83843 - (208) 883-2839 - Fax (208) 8829246 - email moscow@anateklabs.com
504 E Sprague Ste. D - Spokane, WA 99202 - (509) 838-3999 - fax (509) 838-4433 - email spokane@anateklabs.com

Client: Walla Walla Basin Watershed Council
Address: 810 S. Main Road
Milton-Freewater, OR 97862
Attn: Luke Adams

Work Order: MAK0490
Project: Managed Aquifer Recharge
Reported: 12/1/2020 14:06

Analytical Results Report

Sample Location: GW-152
Lab/Sample Number: MAK0490-01
Collect Date: 11/17/20 07:15
Date Received: 11/18/20 10:29
Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	2.57	mg/L	0.100	11/19/20 3:42	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	0.167	mg/L	0.00100	11/25/20 16:52	MYM	EPA 200.8	
Metals by ICP							
Copper	0.0789	mg/L	0.0100	11/24/20 15:38	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location:	GW-117		
Lab/Sample Number:	MAK0490-02	Collect Date:	11/17/20 08:00
Date Received:	11/18/20 10:29	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	4.66	mg/L	0.100	11/19/20 1:55	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 17:15	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:39	MYM	EPA 200.7	

Analytical Results Report
(Continued)

Sample Location:	WQ-3		
Lab/Sample Number:	MAK0490-03	Collect Date:	11/17/20 09:05
Date Received:	11/18/20 10:29	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	0.142	mg/L	0.100	11/19/20 0:29	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 17:19	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:40	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location: GW-119

Lab/Sample Number: MAK0490-04 Collect Date: 11/17/20 09:35

Date Received: 11/18/20 10:29 Collected By:

Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	7.23	mg/L	0.100	11/19/20 0:07	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 17:24	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:41	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location:	GW-144		
Lab/Sample Number:	MAK0490-05	Collect Date:	11/17/20 10:15
Date Received:	11/18/20 10:29	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	6.84	mg/L	0.100	11/19/20 1:12	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	0.00155	mg/L	0.00100	11/25/20 17:37	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:44	MYM	EPA 200.7	

Analytical Results Report
(Continued)

Sample Location: GW-142
Lab/Sample Number: MAK0490-06 Collect Date: 11/17/20 08:45
Date Received: 11/18/20 10:29 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	0.0974	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	1.25	mg/L	0.100	11/19/20 0:50	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 17:42	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:45	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location: GW-170

Lab/Sample Number: MAK0490-07

Collect Date: 11/17/20 11:10

Date Received: 11/18/20 10:29

Collected By:

Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	1.69	mg/L	0.100	11/19/20 2:38	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	0.00171	mg/L	0.00100	11/25/20 17:46	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:46	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location:	WQ-4		
Lab/Sample Number:	MAK0490-08	Collect Date:	11/17/20 10:40
Date Received:	11/18/20 10:29	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	0.113	mg/L	0.100	11/19/20 5:30	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	0.00198	mg/L	0.00100	11/25/20 17:51	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:47	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location: GW-171

Lab/Sample Number: MAK0490-09 Collect Date: 11/17/20 11:50

Date Received: 11/18/20 10:29 Collected By:

Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	4.20	mg/L	0.100	11/19/20 1:33	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	0.00100	mg/L	0.00100	11/25/20 17:56	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:48	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location:	GW-151		
Lab/Sample Number:	MAK0490-10	Collect Date:	11/17/20 12:30
Date Received:	11/18/20 10:29	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	2.00	mg/L	0.100	11/19/20 2:16	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 18:00	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:49	MYM	EPA 200.7	

Analytical Results Report

(Continued)

Sample Location: GW-151 Duplicate
Lab/Sample Number: MAK0490-11 Collect Date: 11/17/20 12:35
Date Received: 11/18/20 10:29 Collected By:
Matrix: Water

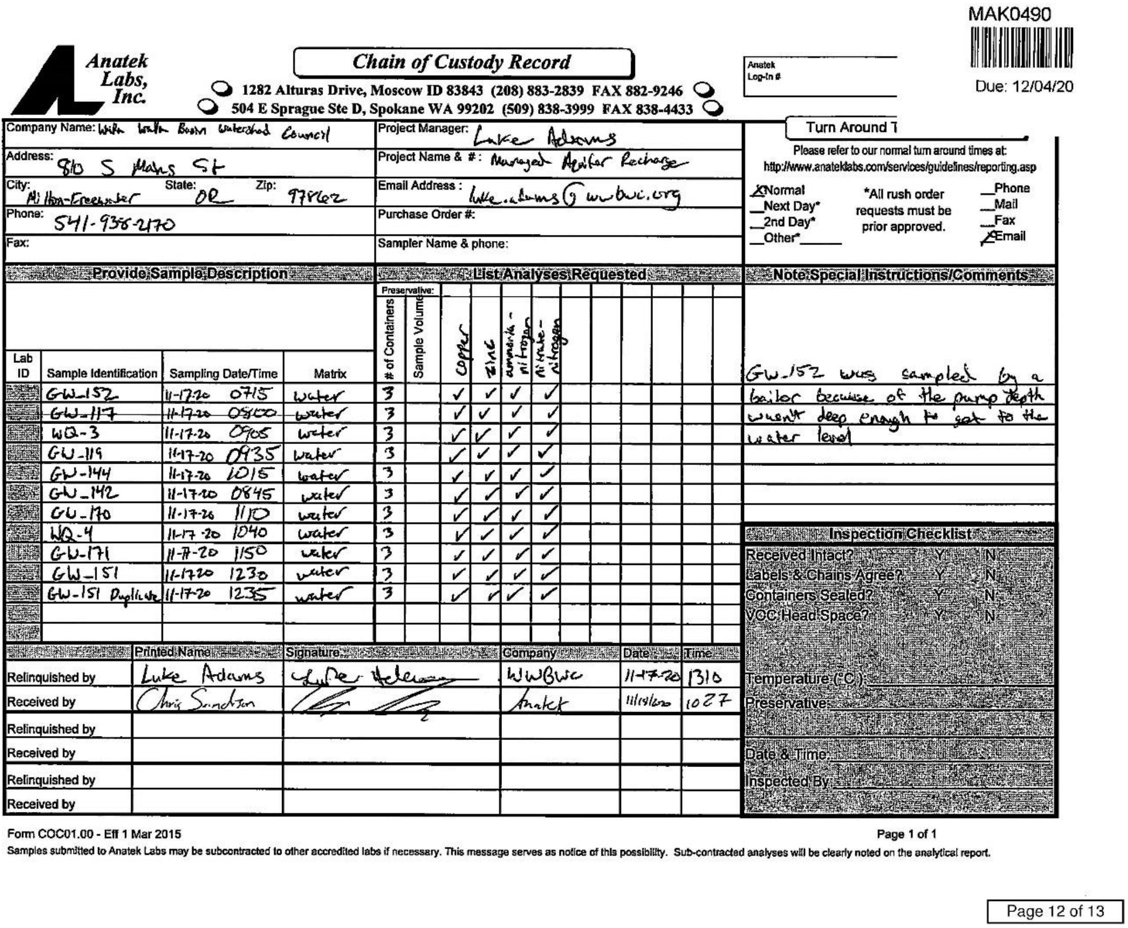
Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Ammonia/N	ND	mg/L	0.0500	11/25/20 15:00	BKP	SM 4500-NH3 G	
Nitrate-N	1.89	mg/L	0.100	11/19/20 5:08	BKP	EPA 300.0	
Metals by ICP-MS							
Zinc	ND	mg/L	0.00100	11/25/20 18:05	MYM	EPA 200.8	
Metals by ICP							
Copper	ND	mg/L	0.0100	11/24/20 15:52	MYM	EPA 200.7	

Authorized Signature,

Justin Doty For Todd Taruscio, Laboratory Manager

B10	Target analyte detected in method blank at or above the method detection limit, but below the method reporting limit.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

This report shall not be reproduced except in full, without the written approval of the laboratory
The results reported related only to the samples indicated.



MAK0490

Due: 12/04/20

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246 ○
○ 504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433 ○

Anatek Log-In #

Company Name: Walla Walla Basin Watershed Council

Address: 810 S Main St

City: Milton-Freewater State: OR Zip: 97862

Phone: 541-938-2170

Fax:

Project Manager: Luke Adams

Project Name & #: Managed Aquifer Recharge

Email Address: luke.adams@wwbwc.org

Purchase Order #:

Sampler Name & phone:

Turn Around T

Please refer to our normal turn around times at: http://www.anateklabs.com/services/guidelines/reporting.asp

☒ Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
☒ Email

Provide Sample Description / **List Analyses Requested**

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	copper	zinc	ammonia-nitrogen	nitrate-nitrogen						
				Preservative:											
	GW-152	11-17-20 0715	water	3		✓	✓	✓	✓						
	~~GW-117~~	~~11-17-20 0800~~	~~water~~	3		✓	✓	✓	✓						
	WQ-3	11-17-20 0905	water	3		✓	✓	✓	✓						
	GW-119	11-17-20 0935	water	3		✓	✓	✓	✓						
	GW-144	11-17-20 1015	water	3		✓	✓	✓	✓						
	GW-142	11-17-20 0845	water	3		✓	✓	✓	✓						
	GW-170	11-17-20 1110	water	3		✓	✓	✓	✓						
	WQ-4	11-17-20 1040	water	3		✓	✓	✓	✓						
	GW-171	11-17-20 1150	water	3		✓	✓	✓	✓						
	GW-151	11-17-20 1230	water	3		✓	✓	✓	✓						
	GW-151 Duplicate	11-17-20 1235	water	3		✓	✓	✓	✓						

	Printed Name	Signature	Company	Date	Time
Relinquished by	Luke Adams	Luke Adams	WWBWC	11-17-20	1310
Received by	Chris Sandison		Anatek	11/19/20	1027
Relinquished by					
Received by					
Relinquished by					
Received by					

Note/Special Instructions/Comments

GW-152 was sampled by a bailor because of the pump depth wasn't deep enough to get to the water level

Inspection Checklist

Received Intact? Y N
Labels & Chains Agree? Y N
Containers Sealed? Y N
VOC Head Space? Y N

Temperature (°C):
Preservative:
Date & Time:
Inspected By:

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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MAK0490

Due: 12/04/20

Anatek Labs, Inc.

Sample Receipt and Preservation Form

Client Name: Walla Walla Basin Watershed Council Project:

(apply Anatek sample label here)

TAT: [✓ Normal] RUSH: ______ days

Samples Received From: FedEx [✓ UPS] USPS Client Courier Other: ______

Custody Seal on Cooler/Box: Yes [✓ No] Custody Seals Intact: Yes No [✓ N/A]

Number of Coolers/Boxes: 1 Type of Ice: [✓ Ice/Ice Packs] Blue Ice Dry Ice None

Packing Material: [✓ Bubble Wrap] Bags Foam/Peanuts None Other: ______

Cooler Temp As Read (°C): 3.4 Cooler Temp Corrected (°C): — Thermometer Used: IR-5

				Comments:
Samples Received Intact?	[✓ Yes]	No	N/A	
Chain of Custody Present?	[✓ Yes]	No	N/A	
Samples Received Within Hold Time?	[✓ Yes]	No	N/A	
Samples Properly Preserved?	[✓ Yes]	No	N/A	
VOC Vials Free of Headspace (<6mm)?	Yes	No	[✓ N/A]	
VOC Trip Blanks Present?	Yes	No	[✓ N/A]	
Labels and Chains Agree?	[✓ Yes]	No	N/A	
Total Number of Sample Bottles Received: 33				

Chain of Custody Fully Completed?	[✓ Yes]	No	N/A	
Correct Containers Received?	[✓ Yes]	No	N/A	
Anatek Bottles Used?	[✓ Yes]	No	Unknown	

Record preservatives (and lot numbers, if known) for containers below:

H_2SO_4 (1958) → Ammonia → p125ml x11

Notes, comments, etc. (also use this space if contacting the client - record names and date/time)

Nitrate → p125ml x11

Metals → p250ml x11

Received/Inspected By: CS Date/Time: 11/18/2020 1029

Form F18.00 - Eff 8 Feb 2019

Page 1 of 1

UNIBEST POST SEASON RESULTS

Eco-Tracker™
Water Quality Monitoring Systems

Eco-Track Services
A division of UNIBEST International, LLC
500 Tausick Way
Walla Walla, WA 99362
1-509-525-3370
www.ecotrackservices.com
www.unibestinc.com

Report Date: 6/18/2021

Retailer Name: WWBWC
Submitter Name: Luke Adams
Email: luke.adams@wwbwc.org
City: Milton-Freewater
State: Oregon
Site Name: Eco-Tracker
Sample Date(s): 6/8/2021

All results are in ppm in extracted solution.
These samples were extracted with 50ml 2M HCl.

Barcode	Sample ID	Depth Low (in.)	Depth High (in.)	Total N	NO3-N	NH4-N	Al	B	Ca	Cu	Fe	K	Mg	Mn	Na	P	S	Zn	pH
2102914	GW_141	0	12		0.000	4.420	0.370	0.010	7.270	0.050	0.130	4.430	2.610	0.010	4.250	0.080	15.320	0.010	0.000
2102743	WQ 4	0	12		0.000	4.270	0.930	0.050	5.730	0.050	0.170	2.720	1.680	0.030	2.200	0.100	14.570	0.010	0.000
2102975	GW_170	0	12		2.570	4.550	0.350	0.010	20.370	0.050	0.120	6.060	7.280	0.040	8.280	0.090	23.720	0.010	0.000
2102666	WQ 1	0	12		0.000	4.160	0.380	0.010	3.080	0.010	0.140	2.380	1.090	0.010	1.520	0.060	15.100	0.010	0.000
2102656	WQ 2	0	12		0.000	4.120	0.310	0.010	3.200	0.020	0.120	2.280	1.130	0.050	1.590	0.110	13.750	0.010	0.000
2102640	GW_046	0	12		0.000	3.870	0.370	0.010	4.510	0.020	0.170	3.250	1.590	0.030	2.590	0.170	14.650	0.010	0.000
2102707	GW_046 Dup.	0	12		0.000	3.510	0.530	0.010	3.400	0.010	0.130	2.610	1.260	0.060	1.650	0.090	13.710	0.010	0.000
2102681	GW_151	0	12		1.440	3.890	1.100	0.160	12.370	0.010	0.220	4.100	3.690	0.010	4.230	0.130	15.480	0.010	0.000
2102639	GW_171	0	12		6.420	4.530	0.400	0.010	23.090	0.020	0.130	6.460	8.620	0.070	7.810	0.130	19.570	0.010	0.000
2102738	WQ 3	0	12		0.000	3.400	0.380	0.010	4.420	0.010	0.160	2.610	1.530	0.010	1.940	0.060	14.660	0.010	0.000
2102796	WQ 5	0	12		0.000	4.180	0.320	0.010	3.220	0.010	0.130	2.210	1.110	0.070	1.320	0.070	14.090	0.010	0.000
2102783	GW_144	0	12		6.480	3.690	0.400	0.010	20.110	0.010	0.120	7.010	7.490	0.060	16.930	0.150	17.900	0.010	0.000
2102672	GW_160	0	12		1.130	4.420	0.370	0.010	7.860	0.020	0.550	3.570	2.690	0.020	2.770	0.090	15.390	0.010	0.000
2102675	GW_152	0	12		2.750	4.450	0.380	0.010	15.190	0.010	0.150	4.120	5.460	0.040	7.820	0.100	16.600	0.010	0.000

Anatek Labs, Inc.

1282 Alturas Drive - Moscow, ID 83843 - (208) 883-2839 - Fax (208) 8829246 - email moscow@anateklabs.com
504 E Sprague Ste. D - Spokane, WA 99202 - (509) 838-3999 - fax (509) 838-4433 - email spokane@anateklabs.com

Client:	Walla Walla Basin Watershed Council	Work Order:	MBE0510
Address:	810 S. Main Road	Project:	Nitrate
	Milton-Freewater, OR 97862	Reported:	5/21/2021 12:51
Attn:	Luke Adams		

Analytical Results Report

Sample Location:	GW-046		
Lab/Sample Number:	MBE0510-01	Collect Date:	05/18/21 08:38
Date Received:	05/19/21 09:53	Collected By:	Luke Adams
Matrix:	Drinking Water		

Analyte	Result	Units	PQL	MCL	Analyzed	Analyst	Method	Qualifier
Inorganics								
Nitrate-N	ND	mg/L	0.100	10	5/19/21 21:31	BKP	EPA 300.0	

Analytical Results Report
(Continued)

Sample Location:	GW-046 Duplicate		
Lab/Sample Number:	MBE0510-02	Collect Date:	05/18/21 08:40
Date Received:	05/19/21 09:53	Collected By:	Luke Adams
Matrix:	Drinking Water		

Analyte	Result	Units	PQL	MCL	Analyzed	Analyst	Method	Qualifier
Inorganics								
Nitrate-N	ND	mg/L	0.100	10	5/19/21 21:52	BKP	EPA 300.0	

Analytical Results Report
(Continued)

Sample Location:	GW-141		
Lab/Sample Number:	MBE0510-03	Collect Date:	05/18/21 07:44
Date Received:	05/19/21 09:53	Collected By:	Luke Adams
Matrix:	Drinking Water		

Analyte	Result	Units	PQL	MCL	Analyzed	Analyst	Method	Qualifier
Inorganics								
Nitrate-N	0.391	mg/L	0.100	10	5/19/21 22:14	BKP	EPA 300.0	

Analytical Results Report

(Continued)

Sample Location: WQ4
Lab/Sample Number: MBE0510-04 Collect Date: 05/18/21 09:47
Date Received: 05/19/21 09:53 Collected By: Luke Adams
Matrix: Drinking Water

Analyte	Result	Units	PQL	MCL	Analyzed	Analyst	Method	Qualifier
Inorganics								
Nitrate-N	ND	mg/L	0.100	10	5/19/21 22:36	BKP	EPA 300.0	

Analytical Results Report

(Continued)

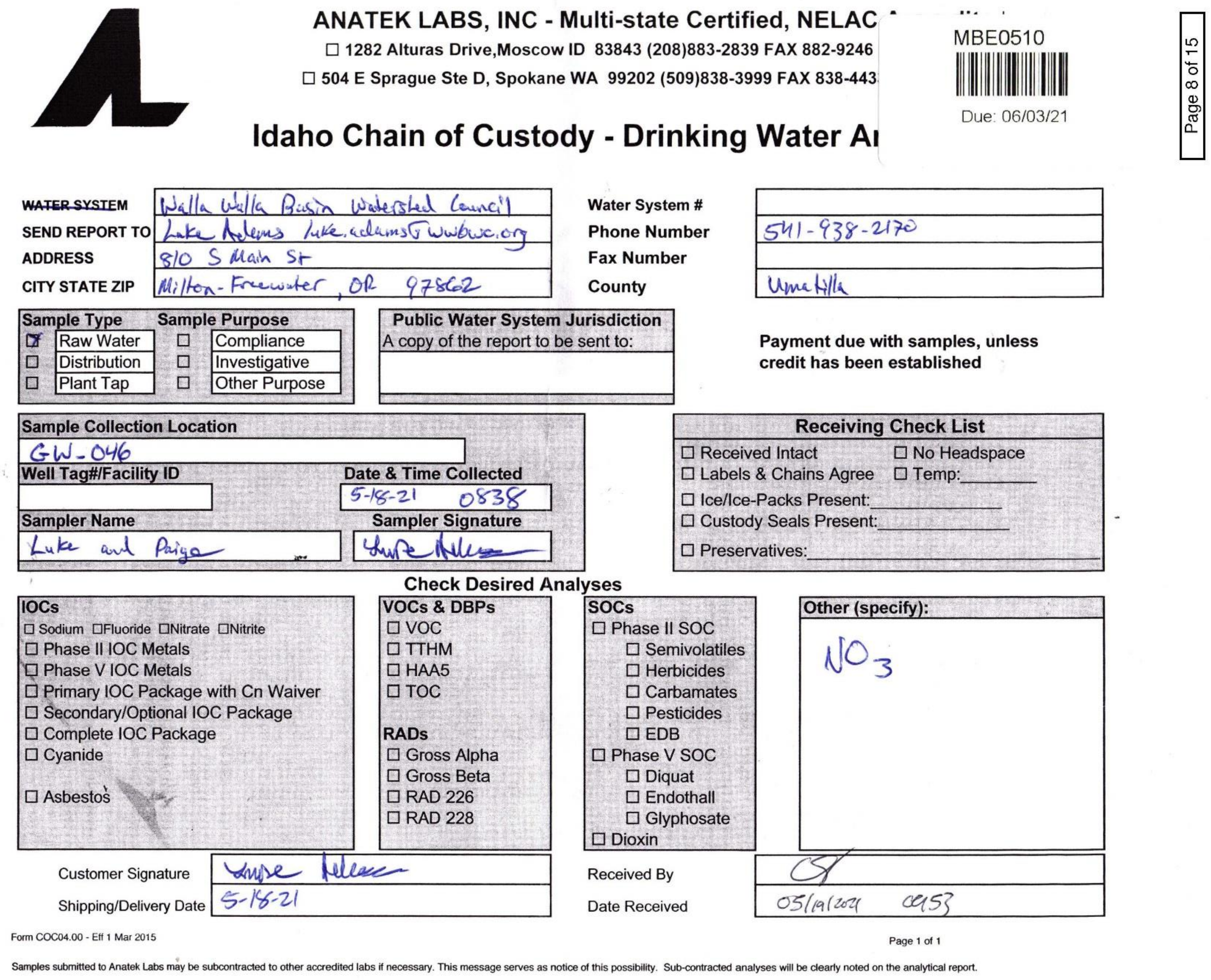
Sample Location:	GW-170		
Lab/Sample Number:	MBE0510-05	Collect Date:	05/18/21 09:26
Date Received:	05/19/21 09:53	Collected By:	Luke Adams
Matrix:	Drinking Water		

Analyte	Result	Units	PQL	MCL	Analyzed	Analyst	Method	Qualifier
Inorganics								
Nitrate-N	2.39	mg/L	0.100	10	5/19/21 22:57	BKP	EPA 300.0	

Analytical Results Report
(Continued)

Sample Location: WQ1
Lab/Sample Number: MBE0510-06 Collect Date: 05/18/21 06:30
Date Received: 05/19/21 09:53 Collected By: Luke Adams
Matrix: Drinking Water

Analyte	Result	Units	PQL	MCL	Analyzed	Analyst	Method	Qualifier
Inorganics								
Nitrate-N	ND	mg/L	0.100	10	5/19/21 23:19	BKP	EPA 300.0	



ANATEK LABS, INC - Multi-state Certified, NELAC

☐ 1282 Alturas Drive,Moscow ID 83843 (208)883-2839 FAX 882-9246

☐ 504 E Sprague Ste D, Spokane WA 99202 (509)838-3999 FAX 838-443

MBE0510

Due: 06/03/21

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Idaho Chain of Custody - Drinking Water Ar

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council

SEND REPORT TO Luke Adams luke.adams@wwbwc.org

ADDRESS 810 S Main St

CITY STATE ZIP Milton-Freewater, OR 97862

Water System #

Phone Number 541-938-2170

Fax Number

County Umatilla

Sample Type
- ☒ Raw Water
- ☐ Distribution
- ☐ Plant Tap

Sample Purpose
- ☐ Compliance
- ☐ Investigative
- ☐ Other Purpose

Public Water System Jurisdiction

A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location GW-046

Well Tag#/Facility ID

Date & Time Collected 5-18-21 0838

Sampler Name Luke and Paige

Sampler Signature

Receiving Check List
- ☐ Received Intact
- ☐ No Headspace
- ☐ Labels & Chains Agree
- ☐ Temp:______
- ☐ Ice/Ice-Packs Present:______
- ☐ Custody Seals Present:______
- ☐ Preservatives:______

Check Desired Analyses

IOCs
- ☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
- ☐ Phase II IOC Metals
- ☐ Phase V IOC Metals
- ☐ Primary IOC Package with Cn Waiver
- ☐ Secondary/Optional IOC Package
- ☐ Complete IOC Package
- ☐ Cyanide
- ☐ Asbestos

VOCs & DBPs
- ☐ VOC
- ☐ TTHM
- ☐ HAA5
- ☐ TOC

RADs
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ RAD 226
- ☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify): NO_3

Customer Signature

Shipping/Delivery Date 5-18-21

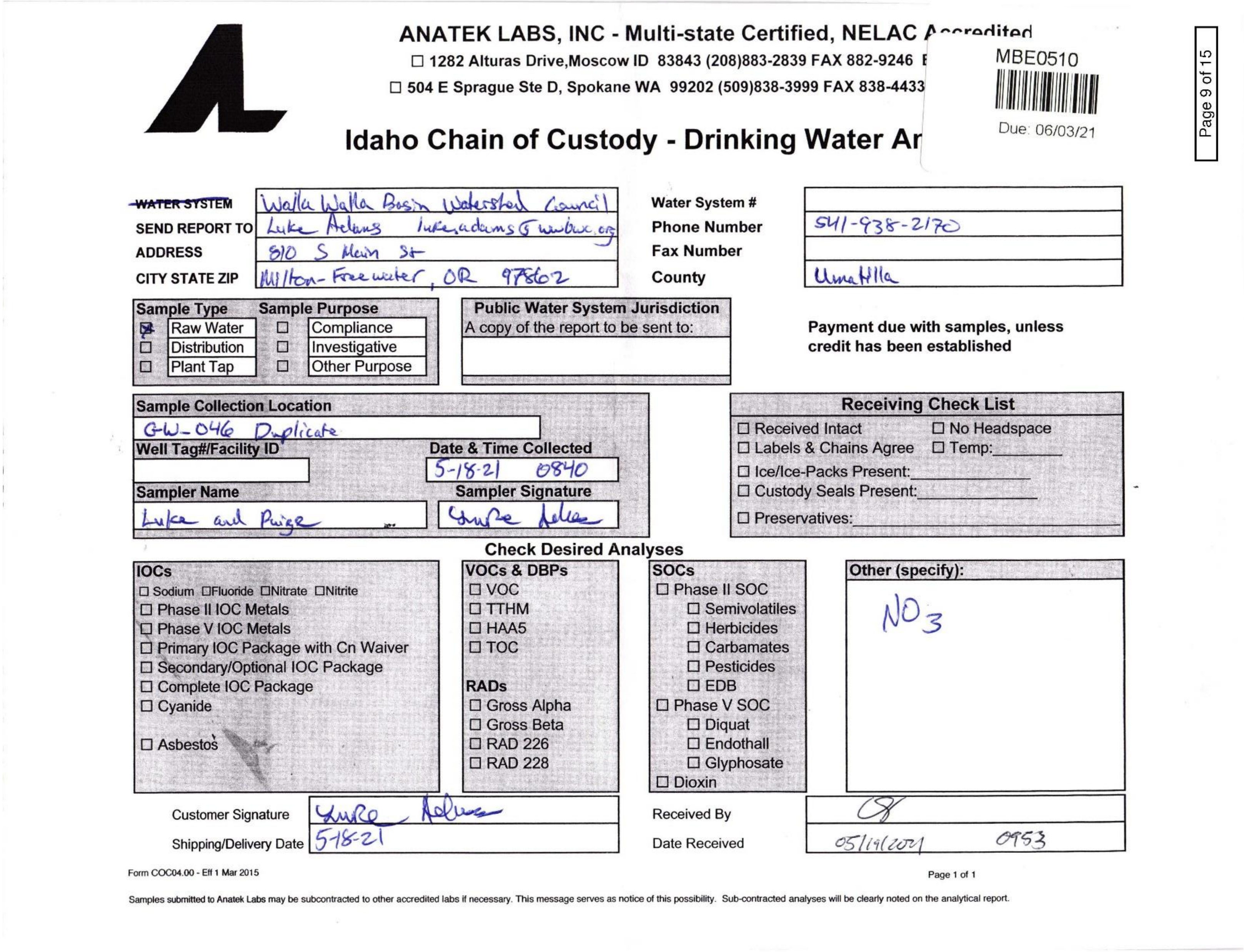
Received By

Date Received 05/19/2021 0953

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.



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MBE0510

Due: 06/03/21

Page 9 of 15

Idaho Chain of Custody - Drinking Water Ar

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council

SEND REPORT TO Luke Adams luke.adams@wwbwc.org

ADDRESS 810 S Main St

CITY STATE ZIP Milton-Freewater, OR 97862

Water System #

Phone Number 541-938-2170

Fax Number

County Umatilla

Sample Type		Sample Purpose	
☒	Raw Water	☐	Compliance
☐	Distribution	☐	Investigative
☐	Plant Tap	☐	Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location GW-046 Duplicate

Well Tag#/Facility ID

Date & Time Collected 5-18-21 0840

Sampler Name Luke and Paige

Sampler Signature Luke Adams

Receiving Check List

☐ Received Intact ☐ No Headspace
☐ Labels & Chains Agree ☐ Temp:______
☐ Ice/Ice-Packs Present:______
☐ Custody Seals Present:______
☐ Preservatives:______

Check Desired Analyses

IOCs
- ☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
- ☐ Phase II IOC Metals
- ☐ Phase V IOC Metals
- ☐ Primary IOC Package with Cn Waiver
- ☐ Secondary/Optional IOC Package
- ☐ Complete IOC Package
- ☐ Cyanide
- ☐ Asbestos

VOCs & DBPs
- ☐ VOC
- ☐ TTHM
- ☐ HAA5
- ☐ TOC

RADs
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ RAD 226
- ☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify): NO_3

Customer Signature Luke Adams

Shipping/Delivery Date 5-18-21

Received By

Date Received 05/19/2021 0953

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

MBE0510

Due: 06/03/21

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Idaho Chain of Custody - Drinking Water Analysis

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council
SEND REPORT TO Luke Adams luke.adams@wwbwc.org
ADDRESS 810 S Main St
CITY STATE ZIP Milton-Freewater, OR 97862

Water System #
Phone Number 541-938-2170
Fax Number
County Umatilla

Sample Type
☒ Raw Water
☐ Distribution
☐ Plant Tap

Sample Purpose
☐ Compliance
☐ Investigative
☐ Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location GW-141
Well Tag#/Facility ID
Date & Time Collected 5-18-21 0744
Sampler Name Luke and Paige
Sampler Signature Luke Adams

Receiving Check List
☐ Received Intact ☐ No Headspace
☐ Labels & Chains Agree ☐ Temp:______
☐ Ice/Ice-Packs Present:______
☐ Custody Seals Present:______
☐ Preservatives:______

Check Desired Analyses

IOCs
☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
☐ Phase II IOC Metals
☐ Phase V IOC Metals
☐ Primary IOC Package with Cn Waiver
☐ Secondary/Optional IOC Package
☐ Complete IOC Package
☐ Cyanide
☐ Asbestos

VOCs & DBPs
☐ VOC
☐ TTHM
☐ HAA5
☐ TOC

RADs
☐ Gross Alpha
☐ Gross Beta
☐ RAD 226
☐ RAD 228

SOCs
☐ Phase II SOC
  ☐ Semivolatiles
  ☐ Herbicides
  ☐ Carbamates
  ☐ Pesticides
  ☐ EDB
☐ Phase V SOC
  ☐ Diquat
  ☐ Endothall
  ☐ Glyphosate
☐ Dioxin

Other (specify):
NO_3

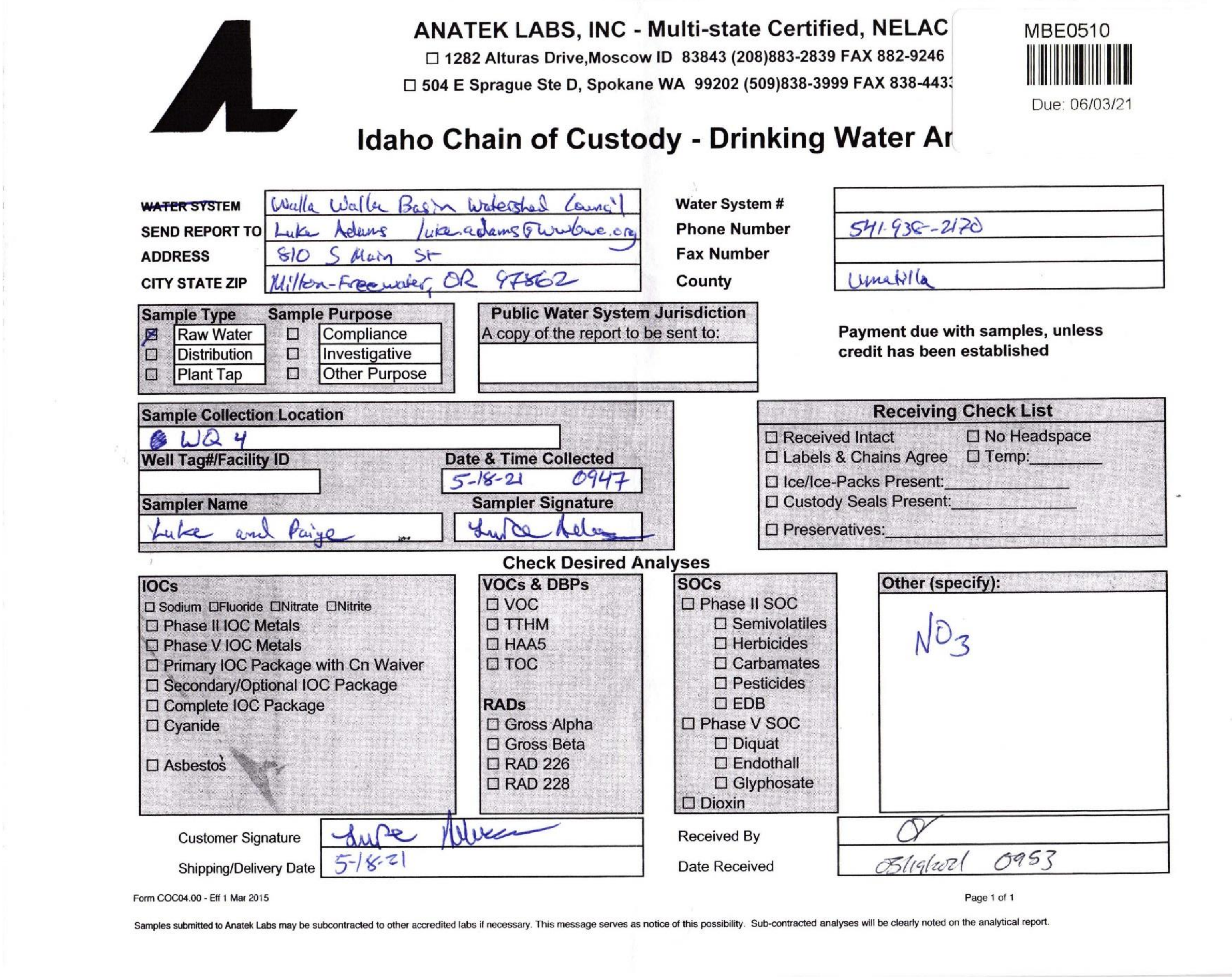
Customer Signature Luke Adams
Shipping/Delivery Date 5-18-21

Received By CS
Date Received 05/19/2021 0953

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.



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MBE0510
Due: 06/03/21

Idaho Chain of Custody - Drinking Water Ar

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council
SEND REPORT TO Luke Adams luke.adams@wwbwc.org
ADDRESS 810 S Main St
CITY STATE ZIP Milton-Freewater, OR 97862

Water System #
Phone Number 541-938-2170
Fax Number
County Umatilla

Sample Type
☒ Raw Water
☐ Distribution
☐ Plant Tap

Sample Purpose
☐ Compliance
☐ Investigative
☐ Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location
WQ 4

Well Tag#/Facility ID

Date & Time Collected 5-18-21 0947

Sampler Name Luke and Paige

Sampler Signature Luke Adams

Receiving Check List
☐ Received Intact ☐ No Headspace
☐ Labels & Chains Agree ☐ Temp:________
☐ Ice/Ice-Packs Present:________
☐ Custody Seals Present:________
☐ Preservatives:________

Check Desired Analyses

IOCs
☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
☐ Phase II IOC Metals
☐ Phase V IOC Metals
☐ Primary IOC Package with Cn Waiver
☐ Secondary/Optional IOC Package
☐ Complete IOC Package
☐ Cyanide
☐ Asbestos

VOCs & DBPs
☐ VOC
☐ TTHM
☐ HAA5
☐ TOC

RADs
☐ Gross Alpha
☐ Gross Beta
☐ RAD 226
☐ RAD 228

SOCs
☐ Phase II SOC
  ☐ Semivolatiles
  ☐ Herbicides
  ☐ Carbamates
  ☐ Pesticides
  ☐ EDB
☐ Phase V SOC
  ☐ Diquat
  ☐ Endothall
  ☐ Glyphosate
☐ Dioxin

Other (specify):
NO3

Customer Signature Luke Adams
Shipping/Delivery Date 5-18-21

Received By
Date Received 05/19/2021 0953

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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MBE0510
Due: 06/03/21

Idaho Chain of Custody - Drinking Water Ana

~~WATER SYSTEM~~	Walla Walla Basin Watershed Council	**Water System #**	
SEND REPORT TO	Luke Adams luke.adams@wwbwc.org	**Phone Number**	541-938-2170
ADDRESS	810 S Main St	**Fax Number**	
CITY STATE ZIP	Milton-Freewater, OR 97862	**County**	Umatilla

Sample Type		**Sample Purpose**	
☑	Raw Water	☐	Compliance
☐	Distribution	☐	Investigative
☐	Plant Tap	☐	Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location
GW-170

Well Tag#/Facility ID

Date & Time Collected
5-18-21 0926

Sampler Name
Luke and Paige

Sampler Signature

Receiving Check List

☐ Received Intact ☐ No Headspace
☐ Labels & Chains Agree ☐ Temp:________
☐ Ice/Ice-Packs Present:________
☐ Custody Seals Present:________
☐ Preservatives:________

Check Desired Analyses

IOCs
☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
☐ Phase II IOC Metals
☐ Phase V IOC Metals
☐ Primary IOC Package with Cn Waiver
☐ Secondary/Optional IOC Package
☐ Complete IOC Package
☐ Cyanide
☐ Asbestos

VOCs & DBPs
☐ VOC
☐ TTHM
☐ HAA5
☐ TOC

RADs
☐ Gross Alpha
☐ Gross Beta
☐ RAD 226
☐ RAD 228

SOCs
☐ Phase II SOC
  ☐ Semivolatiles
  ☐ Herbicides
  ☐ Carbamates
  ☐ Pesticides
  ☐ EDB
☐ Phase V SOC
  ☐ Diquat
  ☐ Endothall
  ☐ Glyphosate
☐ Dioxin

Other (specify):
NO_3

Customer Signature
Shipping/Delivery Date 5-18-21

Received By
Date Received 05/19/2021 0953

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

ANATEK LABS, INC - Multi-state Certified, NELAC Ac

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MBE0510

Due: 06/03/21

Idaho Chain of Custody - Drinking Water Ana

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council
SEND REPORT TO Luke Adams luke.adams@wwbwc.org
ADDRESS 810 S Main St
CITY STATE ZIP Milton-Freewater, OR 97862

Water System #
Phone Number 541-938-2170
Fax Number
County Umatilla

Sample Type	**Sample Purpose**
☒ Raw Water	☐ Compliance
☐ Distribution	☐ Investigative
☐ Plant Tap	☐ Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location WQ 1
Well Tag#/Facility ID
Date & Time Collected 5-18-21 0630
Sampler Name Luke and Paige
Sampler Signature Luke Adams

Receiving Check List

☐ Received Intact ☐ No Headspace
☐ Labels & Chains Agree ☐ Temp:______
☐ Ice/Ice-Packs Present:______
☐ Custody Seals Present:______
☐ Preservatives:______

Check Desired Analyses

IOCs
- ☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
- ☐ Phase II IOC Metals
- ☐ Phase V IOC Metals
- ☐ Primary IOC Package with Cn Waiver
- ☐ Secondary/Optional IOC Package
- ☐ Complete IOC Package
- ☐ Cyanide
- ☐ Asbestos

VOCs & DBPs
- ☐ VOC
- ☐ TTHM
- ☐ HAA5
- ☐ TOC

RADs
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ RAD 226
- ☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify):
NO_3

Customer Signature Luke Adams
Shipping/Delivery Date 5-18-21
Received By CS
Date Received 05/19/2021 0953

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

ANATEK LABS, INC - Multi-state Certified, NELAC Acc

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MBE0510
Due: 06/03/21

Idaho Chain of Custody - Drinking Water Analy

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council
SEND REPORT TO Luke Adams luke.adams@wwbwc.org
ADDRESS 810 S Main St
CITY STATE ZIP Milton-Freewater, OR 97862

Water System #
Phone Number 541-938-2170
Fax Number
County

Sample Type
☑ Raw Water
☐ Distribution
☐ Plant Tap

Sample Purpose
☐ Compliance
☐ Investigative
☐ Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location WQ 2
Well Tag#/Facility ID
Date & Time Collected 5-18-21 0805
Sampler Name Luke and Paige
Sampler Signature Luke Adams

Receiving Check List
☐ Received Intact
☐ No Headspace
☐ Labels & Chains Agree
☐ Temp:________
☐ Ice/Ice-Packs Present:________
☐ Custody Seals Present:________
☐ Preservatives:________

Check Desired Analyses

IOCs
☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
☐ Phase II IOC Metals
☐ Phase V IOC Metals
☐ Primary IOC Package with Cn Waiver
☐ Secondary/Optional IOC Package
☐ Complete IOC Package
☐ Cyanide
☐ Asbestos

VOCs & DBPs
☐ VOC
☐ TTHM
☐ HAA5
☐ TOC

RADs
☐ Gross Alpha
☐ Gross Beta
☐ RAD 226
☐ RAD 228

SOCs
☐ Phase II SOC
  ☐ Semivolatiles
  ☐ Herbicides
  ☐ Carbamates
  ☐ Pesticides
  ☐ EDB
☐ Phase V SOC
  ☐ Diquat
  ☐ Endothall
  ☐ Glyphosate
☐ Dioxin

Other (specify):
NO_3

Customer Signature Luke Adams
Shipping/Delivery Date 5-18-21

Received By
Date Received 05/19/2021 0953

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

MBE0510

Due: 06/03/21

Anatek Labs, Inc.

Sample Receipt and Preservation Form

Client Name: Walla Walla Basin Project:

TAT: [✓ Normal] RUSH: ______ days

Samples Received From: FedEx [✓ UPS] USPS Client Courier Other: ______

Custody Seal on Cooler/Box: Yes [✓ No] Custody Seals Intact: Yes No [✓ N/A]

Number of Coolers/Boxes: 1 Type of Ice: [✓ Ice/Ice Packs] Blue Ice Dry Ice None

Packing Material: Bubble Wrap Bags [✓ Foam/Peanuts] None Other: ______

Cooler Temp As Read (°C): 5.6 Cooler Temp Corrected (°C): — Thermometer Used: IR-5

				Comments:
Samples Received Intact?	[✓ Yes]	No	N/A	
Chain of Custody Present?	[✓ Yes]	No	N/A	
Samples Received Within Hold Time?	[✓ Yes]	No	N/A	
Samples Properly Preserved?	Yes	No	[✓ N/A]	
VOC Vials Free of Headspace (<6mm)?	Yes	No	[✓ N/A]	
VOC Trip Blanks Present?	Yes	No	[✓ N/A]	
Labels and Chains Agree?	[✓ Yes]	No	N/A	
Total Number of Sample Bottles Received: 7				

Chain of Custody Fully Completed?	[✓ Yes]	No	N/A	
Correct Containers Received?	[✓ Yes]	No	N/A	
Anatek Bottles Used?	[✓ Yes]	No	Unknown	

Record preservatives (and lot numbers, if known) for containers below:

None

Notes, comments, etc. (also use this space if contacting the client - record names and date/time)

Nitrate → P125ml x 7

Received/Inspected By: ______ Date/Time: 05/19/2021 0953

Form F19.00 - Eff 8 Feb 2019

Page 1 of 1

Client:	Walla Walla Basin Watershed Council	Work Order:	MBE0575
Address:	810 S. Main Road	Project:	Nitrates
	Milton-Freewater, OR 97862	Reported:	5/27/2021 13:17
Attn:	Luke Adams		

Analytical Results Report

System ID#		System Name:	Walla Walla Basin Watershed Council		
Reference Number:	MBE0575-01	Collect Date:	05/20/21 06:45	DOH Source #:	
Multiple Source Nos:		Sample Type:		County:	
Date Received:	05/21/21 09:41	Sample Purpose:			
Sample Location:	WQ 5				
Matrix:	Drinking Water				

Lab/Sample Number: 125-57501

Inorganics

DOH #	Analyte	Result	Units	LRL	SDRL	Trigger	MCL	Analyzed	Analyst	Method	Qualifier
0020	Nitrate-N	ND	mg/L	0.100	0.5	5	10	5/21/21 19:17	BKP	EPA 300.0	

Client: Walla Walla Basin Watershed Council
Address: 810 S. Main Road
Milton-Freewater, OR 97862
Attn: Luke Adams

Work Order: MBE0575
Project: Nitrates
Reported: 5/27/2021 13:17

Analytical Results Report

System ID#
Reference Number: MBE0575-02
Multiple Source Nos:
Date Received: 05/21/21 09:41
Sample Location: GW-152
Matrix: Drinking Water

System Name: Walla Walla Basin Watershed Council
Collect Date: 05/20/21 07:43
Sample Type:
Sample Purpose:

DOH Source #:
County:

Lab/Sample Number: 125-57502

Inorganics

DOH #	Analyte	Result	Units	LRL	SDRL	Trigger	MCL	Analyzed	Analyst	Method	Qualifier
0020	Nitrate-N	2.36	mg/L	0.100	0.5	5	10	5/21/21 19:38	BKP	EPA 300.0	

Client: Walla Walla Basin Watershed Council
Address: 810 S. Main Road
Milton-Freewater, OR 97862
Attn: Luke Adams

Work Order: MBE0575
Project: Nitrates
Reported: 5/27/2021 13:17

Analytical Results Report

System ID#
Reference Number: MBE0575-03
Multiple Source Nos:
Date Received: 05/21/21 09:41
Sample Location: GW-160
Matrix: Drinking Water

System Name: Walla Walla Basin Watershed Council
Collect Date: 05/20/21 08:29
Sample Type:
Sample Purpose:

DOH Source #:
County:

Lab/Sample Number: 125-57503

Inorganics

DOH #	Analyte	Result	Units	LRL	SDRL	Trigger	MCL	Analyzed	Analyst	Method	Qualifier
0020	Nitrate-N	2.00	mg/L	0.100	0.5	5	10	5/21/21 20:00	BKP	EPA 300.0	

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504 E Sprague Ste. D - Spokane, WA 99202 - (509) 838-3999 - fax (509) 838-4433 - email spokane@anateklabs.com

Client:	Walla Walla Basin Watershed Council	Work Order:	MBE0575
Address:	810 S. Main Road	Project:	Nitrates
	Milton-Freewater, OR 97862	Reported:	5/27/2021 13:17
Attn:	Luke Adams		

Analytical Results Report

System ID#		System Name:	Walla Walla Basin Watershed Council		
Reference Number:	MBE0575-04	Collect Date:	05/20/21 08:58	DOH Source #:	
Multiple Source Nos:		Sample Type:		County:	
Date Received:	05/21/21 09:41	Sample Purpose:			
Sample Location:	WQ 3				
Matrix:	Drinking Water				

Lab/Sample Number: 125-57504

Inorganics

DOH #	Analyte	Result	Units	LRL	SDRL	Trigger	MCL	Analyzed	Analyst	Method	Qualifier
0020	Nitrate-N	ND	mg/L	0.100	0.5	5	10	5/21/21 20:22	BKP	EPA 300.0	

Client:	Walla Walla Basin Watershed Council	Work Order:	MBE0575
Address:	810 S. Main Road	Project:	Nitrates
	Milton-Freewater, OR 97862	Reported:	5/27/2021 13:17
Attn:	Luke Adams		

Analytical Results Report

System ID#		System Name:	Walla Walla Basin Watershed Council		
Reference Number:	MBE0575-05	Collect Date:	05/20/21 09:36	DOH Source #:	
Multiple Source Nos:		Sample Type:		County:	
Date Received:	05/21/21 09:41	Sample Purpose:			
Sample Location:	GW-144				
Matrix:	Drinking Water				

Lab/Sample Number: 125-57505

Inorganics

DOH #	Analyte	Result	Units	LRL	SDRL	Trigger	MCL	Analyzed	Analyst	Method	Qualifier
0020	Nitrate-N	3.85	mg/L	0.100	0.5	5	10	5/21/21 20:43	BKP	EPA 300.0	

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Client:	Walla Walla Basin Watershed Council	Work Order:	MBE0575
Address:	810 S. Main Road	Project:	Nitrates
	Milton-Freewater, OR 97862	Reported:	5/27/2021 13:17
Attn:	Luke Adams		

Analytical Results Report

System ID#		System Name:	Walla Walla Basin Watershed Council		
Reference Number:	MBE0575-06	Collect Date:	05/20/21 10:22	DOH Source #:	
Multiple Source Nos:		Sample Type:		County:	
Date Received:	05/21/21 09:41	Sample Purpose:			
Sample Location:	GW-171				
Matrix:	Drinking Water				

Lab/Sample Number: 125-57506

Inorganics

DOH #	Analyte	Result	Units	LRL	SDRL	Trigger	MCL	Analyzed	Analyst	Method	Qualifier
0020	Nitrate-N	4.48	mg/L	0.100	0.5	5	10	5/21/21 21:05	BKP	EPA 300.0	

Anatek Labs, Inc.

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Client:	Walla Walla Basin Watershed Council	Work Order:	MBE0575
Address:	810 S. Main Road	Project:	Nitrates
	Milton-Freewater, OR 97862	Reported:	5/27/2021 13:17
Attn:	Luke Adams		

Analytical Results Report

System ID#		System Name:	Walla Walla Basin Watershed Council		
Reference Number:	MBE0575-07	Collect Date:	05/20/21 11:00	DOH Source #:	
Multiple Source Nos:		Sample Type:		County:	
Date Received:	05/21/21 09:41	Sample Purpose:			
Sample Location:	GW-151				
Matrix:	Drinking Water				

Lab/Sample Number: 125-57507

Inorganics

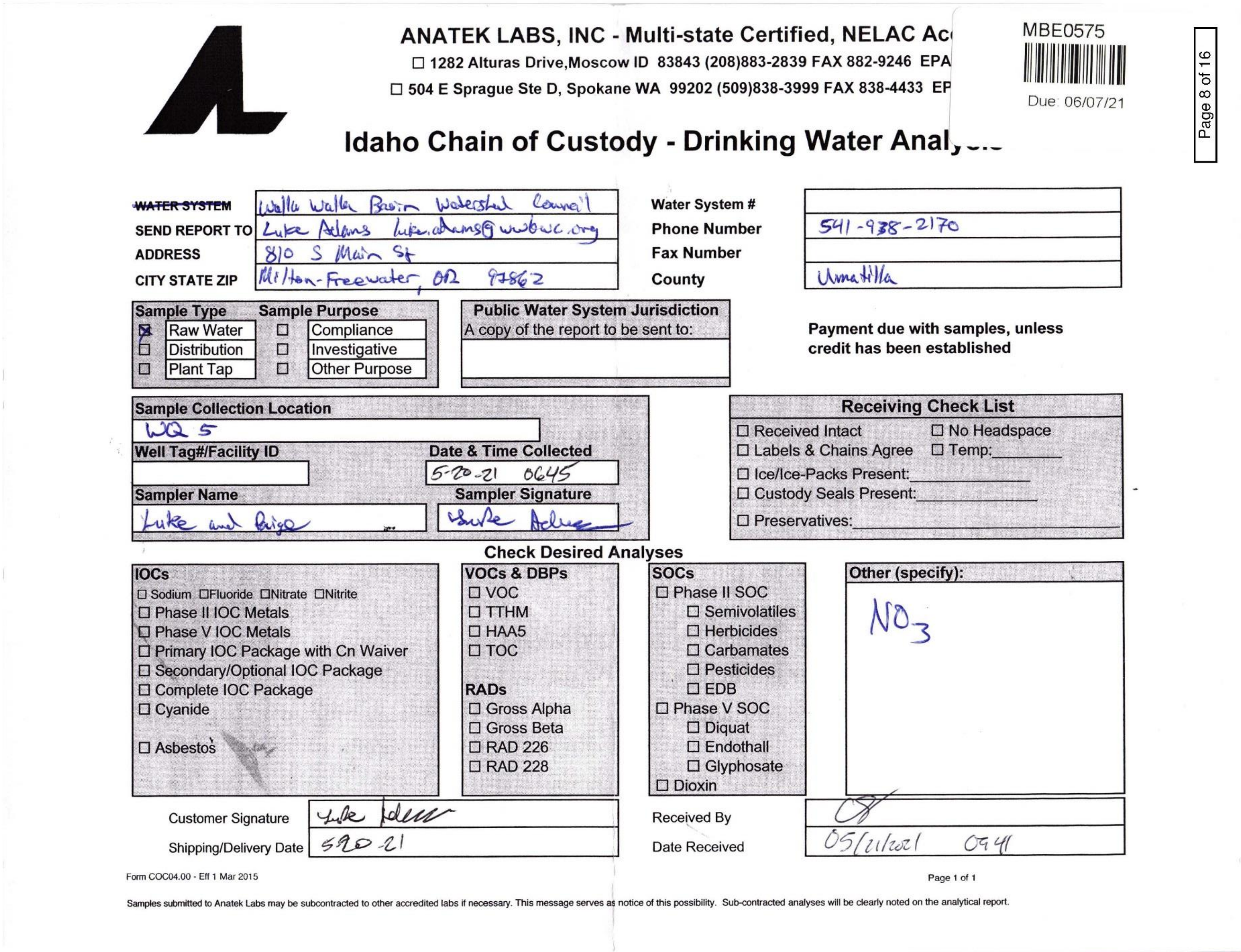
DOH #	Analyte	Result	Units	LRL	SDRL	Trigger	MCL	Analyzed	Analyst	Method	Qualifier
0020	Nitrate-N	1.70	mg/L	0.100	0.5	5	10	5/21/21 21:27	BKP	EPA 300.0	

Authorized Signature,

Justin Doty For Todd Taruscio, Laboratory Manager

LRL	Lab Reporting Limit
SDRL	State Detection Reporting Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
SAL	State Action Level
*	Not a certified analyte

This report shall not be reproduced except in full, without the written approval of the laboratory
The results reported related only to the samples indicated.



ANATEK LABS, INC - Multi-state Certified, NELAC Ac

☐ 1282 Alturas Drive,Moscow ID 83843 (208)883-2839 FAX 882-9246 EPA

☐ 504 E Sprague Ste D, Spokane WA 99202 (509)838-3999 FAX 838-4433 EP

MBE0575

Due: 06/07/21

Page 8 of 16

Idaho Chain of Custody - Drinking Water Anal

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council

SEND REPORT TO Luke Adams luke.adams@wwbwc.org

ADDRESS 810 S Main St

CITY STATE ZIP Milton-Freewater, OR 97862

Water System #

Phone Number 541-938-2170

Fax Number

County Umatilla

Sample Type
- ☒ Raw Water
- ☐ Distribution
- ☐ Plant Tap

Sample Purpose
- ☐ Compliance
- ☐ Investigative
- ☐ Other Purpose

Public Water System Jurisdiction

A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location WQ 5

Well Tag#/Facility ID

Date & Time Collected 5-20-21 0645

Sampler Name Luke and Paige

Sampler Signature Luke Adams

Receiving Check List
- ☐ Received Intact
- ☐ No Headspace
- ☐ Labels & Chains Agree
- ☐ Temp:________
- ☐ Ice/Ice-Packs Present:____________
- ☐ Custody Seals Present:____________
- ☐ Preservatives:____________________

Check Desired Analyses

IOCs
- ☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
- ☐ Phase II IOC Metals
- ☐ Phase V IOC Metals
- ☐ Primary IOC Package with Cn Waiver
- ☐ Secondary/Optional IOC Package
- ☐ Complete IOC Package
- ☐ Cyanide
- ☐ Asbestos

VOCs & DBPs
- ☐ VOC
- ☐ TTHM
- ☐ HAA5
- ☐ TOC

RADs
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ RAD 226
- ☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify): NO_3

Customer Signature Luke Adams

Shipping/Delivery Date 5-20-21

Received By

Date Received 05/21/2021 0941

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

ANATEK LABS, INC - Multi-state Certified, NELAC

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MBE0575

Due: 06/07/21

Idaho Chain of Custody - Drinking Water An

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council

SEND REPORT TO Luke Adams luke.adams@wwbwc.org

ADDRESS 810 S Main St

CITY STATE ZIP Milton-Freewater, OR 97862

Water System #

Phone Number 541-938-2170

Fax Number

County Umatilla

Sample Type	Sample Purpose
☒ Raw Water	☐ Compliance
☐ Distribution	☐ Investigative
☐ Plant Tap	☐ Other Purpose

Public Water System Jurisdiction

A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location GW-152

Well Tag#/Facility ID

Date & Time Collected 5-20-21 0743

Sampler Name Luke and Paige

Sampler Signature Luke Adams

Receiving Check List

☐ Received Intact ☐ No Headspace

☐ Labels & Chains Agree ☐ Temp:________

☐ Ice/Ice-Packs Present:________

☐ Custody Seals Present:________

☐ Preservatives:________

Check Desired Analyses

IOCs

☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite

☐ Phase II IOC Metals

☐ Phase V IOC Metals

☐ Primary IOC Package with Cn Waiver

☐ Secondary/Optional IOC Package

☐ Complete IOC Package

☐ Cyanide

☐ Asbestos

VOCs & DBPs

☐ VOC

☐ TTHM

☐ HAA5

☐ TOC

RADs

☐ Gross Alpha

☐ Gross Beta

☐ RAD 226

☐ RAD 228

SOCs

- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify): NO_3

Customer Signature Luke Adams

Shipping/Delivery Date 5-20-21

Received By

Date Received 05/21/2021 0941

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

ANATEK LABS, INC - Multi-state Certified, NELA

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MBE0575
Due: 06/07/21

Idaho Chain of Custody - Drinking Water A

~~WATER SYSTEM~~	Walla Walla Basin Watershed Council	Water System #	
SEND REPORT TO	Luke Adams luke.adams@wwbwc.org	Phone Number	541-938-2170
ADDRESS		Fax Number	
CITY STATE ZIP		County	Umatilla

Sample Type		Sample Purpose	
☒	Raw Water	☐	Compliance
☐	Distribution	☐	Investigative
☐	Plant Tap	☐	Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location
GW-160

Well Tag#/Facility ID

Date & Time Collected
5-20-21 0829

Sampler Name
Luke And Paige

Sampler Signature
Luke Adams

Receiving Check List
☐ Received Intact ☐ No Headspace
☐ Labels & Chains Agree ☐ Temp:________
☐ Ice/Ice-Packs Present:____________
☐ Custody Seals Present:____________
☐ Preservatives:____________________

Check Desired Analyses

IOCs
☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
☐ Phase II IOC Metals
☐ Phase V IOC Metals
☐ Primary IOC Package with Cn Waiver
☐ Secondary/Optional IOC Package
☐ Complete IOC Package
☐ Cyanide
☐ Asbestos

VOCs & DBPs
☐ VOC
☐ TTHM
☐ HAA5
☐ TOC

RADs
☐ Gross Alpha
☐ Gross Beta
☐ RAD 226
☐ RAD 228

SOCs
☐ Phase II SOC
  ☐ Semivolatiles
  ☐ Herbicides
  ☐ Carbamates
  ☐ Pesticides
  ☐ EDB
☐ Phase V SOC
  ☐ Diquat
  ☐ Endothall
  ☐ Glyphosate
☐ Dioxin

Other (specify):
NO_3

Customer Signature	Luke Adams	Received By	
Shipping/Delivery Date	5-20-21	Date Received	05/21/2021 0941

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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MBE0575
Due: 06/07/21

Idaho Chain of Custody - Drinking Water Analy

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council
SEND REPORT TO Luke Adams luke.adams@wwbwc.org
ADDRESS 810 S Main St
CITY STATE ZIP Milton-Freewater, OR 97862

Water System #
Phone Number 541-938-2170
Fax Number
County Umatilla

Sample Type		**Sample Purpose**	
☒	Raw Water	☐	Compliance
☐	Distribution	☐	Investigative
☐	Plant Tap	☐	Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location WQ 3
Well Tag#/Facility ID
Date & Time Collected 5-20-21 0858
Sampler Name Luke and Paige
Sampler Signature Luke Adams

Receiving Check List
☐ Received Intact ☐ No Headspace
☐ Labels & Chains Agree ☐ Temp:________
☐ Ice/Ice-Packs Present:________
☐ Custody Seals Present:________
☐ Preservatives:________

Check Desired Analyses

IOCs
☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
☐ Phase II IOC Metals
☐ Phase V IOC Metals
☐ Primary IOC Package with Cn Waiver
☐ Secondary/Optional IOC Package
☐ Complete IOC Package
☐ Cyanide
☐ Asbestos

VOCs & DBPs
☐ VOC
☐ TTHM
☐ HAA5
☐ TOC

RADs
☐ Gross Alpha
☐ Gross Beta
☐ RAD 226
☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify): NO_3

Customer Signature Luke Adams
Shipping/Delivery Date 5-20-21
Received By
Date Received 05/21/2021 0941

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

ANATEK LABS, INC - Multi-state Certified, NELAC A
☐ 1282 Alturas Drive,Moscow ID 83843 (208)883-2839 FAX 882-9246 E
☐ 504 E Sprague Ste D, Spokane WA 99202 (509)838-3999 FAX 838-4433

MBE0575
Due: 06/07/21

Idaho Chain of Custody - Drinking Water Ana

WATER SYSTEM Walla Walla Basin Watershed Council
SEND REPORT TO Luke Adams luke.adams@wwbwc.org
ADDRESS 510 S Main St
CITY STATE ZIP Milton-Freewater, OR 97862

Water System #
Phone Number 541-938-2170
Fax Number
County Umatilla

Sample Type	**Sample Purpose**
☒ Raw Water	☐ Compliance
☐ Distribution	☐ Investigative
☐ Plant Tap	☐ Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location GW-144
Well Tag#/Facility ID
Date & Time Collected 5-20-21 0936
Sampler Name Luke and Paige
Sampler Signature Luke Adams

Receiving Check List
☐ Received Intact
☐ No Headspace
☐ Labels & Chains Agree
☐ Temp:________
☐ Ice/Ice-Packs Present:____________
☐ Custody Seals Present:____________
☐ Preservatives:______________________

Check Desired Analyses

IOCs
- ☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
- ☐ Phase II IOC Metals
- ☐ Phase V IOC Metals
- ☐ Primary IOC Package with Cn Waiver
- ☐ Secondary/Optional IOC Package
- ☐ Complete IOC Package
- ☐ Cyanide
- ☐ Asbestos

VOCs & DBPs
- ☐ VOC
- ☐ TTHM
- ☐ HAA5
- ☐ TOC

RADs
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ RAD 226
- ☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify):
NO_3

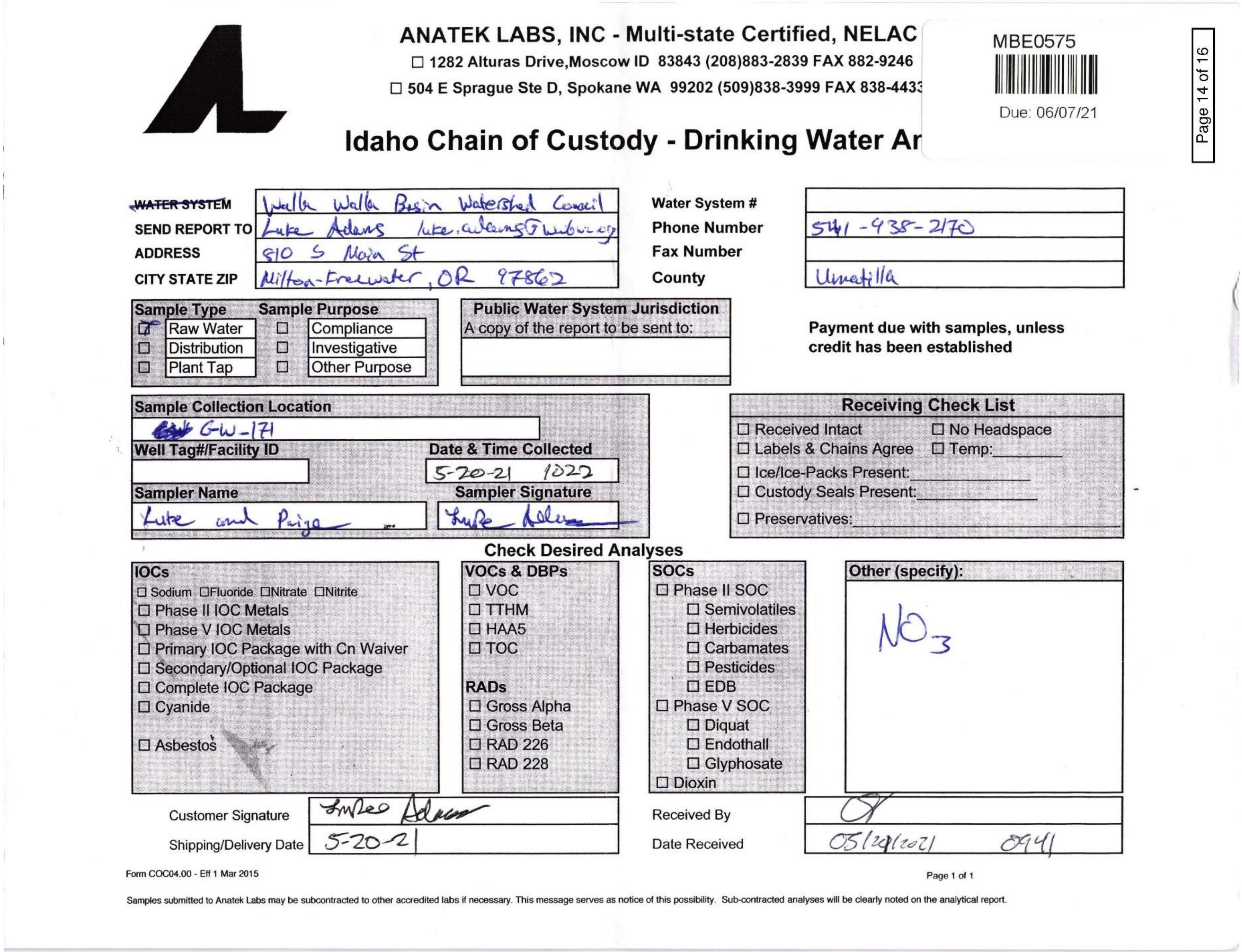
Customer Signature Luke Adams
Shipping/Delivery Date 5-20-21

Received By
Date Received 05/21/2021 0941

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.



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MBE0575

Due: 06/07/21

Page 14 of 16

Idaho Chain of Custody - Drinking Water Ar

~~WATER SYSTEM~~	Walla Walla Basin Watershed Council	Water System #	
SEND REPORT TO	Luke Adams luke.adams@wwbwc.org	Phone Number	541-938-2170
ADDRESS	810 S Main St	Fax Number	
CITY STATE ZIP	Milton-Freewater, OR 97862	County	Umatilla

Sample Type
- ☑ Raw Water
- ☐ Distribution
- ☐ Plant Tap

Sample Purpose
- ☐ Compliance
- ☐ Investigative
- ☐ Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location ~~[illegible]~~ GW-171

Well Tag#/Facility ID

Date & Time Collected 5-20-21 1022

Sampler Name Luke and Paige

Sampler Signature Luke Adams

Receiving Check List
- ☐ Received Intact ☐ No Headspace
- ☐ Labels & Chains Agree ☐ Temp:
- ☐ Ice/Ice-Packs Present:
- ☐ Custody Seals Present:
- ☐ Preservatives:

Check Desired Analyses

IOCs
- ☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
- ☐ Phase II IOC Metals
- ☐ Phase V IOC Metals
- ☐ Primary IOC Package with Cn Waiver
- ☐ Secondary/Optional IOC Package
- ☐ Complete IOC Package
- ☐ Cyanide
- ☐ Asbestos

VOCs & DBPs
- ☐ VOC
- ☐ TTHM
- ☐ HAA5
- ☐ TOC

RADs
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ RAD 226
- ☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify): NO_3

Customer Signature Luke Adams

Shipping/Delivery Date 5-20-21

Received By

Date Received 05/21/2021 0941

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

ANATEK LABS, INC - Multi-state Certified, NELAC Acc

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MBE0575
Due: 06/07/21

Idaho Chain of Custody - Drinking Water Analy

~~WATER SYSTEM~~ Walla Walla Basin Watershed Council
SEND REPORT TO Luke Adams lukeadams@wwbwc.org
ADDRESS 810 S Main St
CITY STATE ZIP Milton-Freewater, OR 97862

Water System #
Phone Number 541-938-2170
Fax Number
County Umatilla

Sample Type		**Sample Purpose**
☑ Raw Water	☐	Compliance
☐ Distribution	☐	Investigative
☐ Plant Tap	☐	Other Purpose

Public Water System Jurisdiction
A copy of the report to be sent to:

Payment due with samples, unless credit has been established

Sample Collection Location ~~[illegible]~~ GW_151
Well Tag#/Facility ID
Date & Time Collected 5-20-21 1100
Sampler Name Luke and Paige
Sampler Signature Luke Adams

Receiving Check List
- ☐ Received Intact
- ☐ No Headspace
- ☐ Labels & Chains Agree
- ☐ Temp:______
- ☐ Ice/Ice-Packs Present:______
- ☐ Custody Seals Present:______
- ☐ Preservatives:______

Check Desired Analyses

IOCs
- ☐ Sodium ☐Fluoride ☐Nitrate ☐Nitrite
- ☐ Phase II IOC Metals
- ☐ Phase V IOC Metals
- ☐ Primary IOC Package with Cn Waiver
- ☐ Secondary/Optional IOC Package
- ☐ Complete IOC Package
- ☐ Cyanide
- ☐ Asbestos

VOCs & DBPs
- ☐ VOC
- ☐ TTHM
- ☐ HAA5
- ☐ TOC

RADs
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ RAD 226
- ☐ RAD 228

SOCs
- ☐ Phase II SOC
  - ☐ Semivolatiles
  - ☐ Herbicides
  - ☐ Carbamates
  - ☐ Pesticides
  - ☐ EDB
- ☐ Phase V SOC
  - ☐ Diquat
  - ☐ Endothall
  - ☐ Glyphosate
- ☐ Dioxin

Other (specify):
NO_3

Customer Signature Luke Adams
Shipping/Delivery Date 5-20-21

Received By
Date Received 05/21/2021 0941

Form COC04.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

MBE0575

Due: 06/07/21

Anatek Labs, Inc.

Sample Receipt and Preservation Form

Client Name: Walla Walla Basin Project:

TAT: [✓ Normal] RUSH: ______ days

Samples Received From: FedEx [✓ UPS] USPS Client Courier Other: ______

Custody Seal on Cooler/Box: Yes [✓ No]

Custody Seals Intact: Yes No [✓ N/A]

Number of Coolers/Boxes: 1

Type of Ice: [✓ Ice/Ice Packs] Blue Ice Dry Ice None

Packing Material: [✓ Bubble Wrap] Bags Foam/Peanuts None Other: ______

Cooler Temp As Read (°C): 5.6

Cooler Temp Corrected (°C): –

Thermometer Used: IR-5

				Comments:
Samples Received Intact?	[✓ Yes]	No	N/A	
Chain of Custody Present?	[✓ Yes]	No	N/A	
Samples Received Within Hold Time?	[✓ Yes]	No	N/A	
Samples Properly Preserved?	~~Yes~~ 05/21 [illegible]	No	[✓ N/A]	
VOC Vials Free of Headspace (<6mm)?	Yes	No	[✓ N/A]	
VOC Trip Blanks Present?	Yes	No	[✓ N/A]	
Labels and Chains Agree?	[✓ Yes]	No	N/A	
Total Number of Sample Bottles Received:	7			

Chain of Custody Fully Completed?	[✓ Yes]	No	N/A	
Correct Containers Received?	[✓ Yes]	No	N/A	
Anatek Bottles Used?	[✓ Yes]	No	Unknown	

Record preservatives (and lot numbers, if known) for containers below:

None

Notes, comments, etc. (also use this space if contacting the client - record names and date/time)

Nitrate → p125ml x7

Received/Inspected By: ______

Date/Time: 05/21/2021 0941

Form F19.00 - Eff 8 Feb 2019

Page 1 of 1

Matrix SCIENCES | PAL PACIFIC AGRICULTURAL LABORATORY

PACAGLAB.COM

503.626.7943
21830 S.W. Alexander Ln
Sherwood, OR 97140

Walla Walla Basin Watershed Council
810 S. Main Street
Milton-Freewater, OR 97862

Report Number: P210605
Report Date: June 07, 2021
Client Project ID: [none]

Analytical Report

Client Sample ID: GW-144
Matrix: water

PAL Sample ID: P210605-01
Sample Date: 5/20/21
Received Date: 5/21/21

Extraction Date	Analysis Date	Analyte	Amount Detected	Limit of Quantitation	Notes
Method: Modified EPA 8270D (GC-MS/MS)					
5/25/21	5/27/21	Chlorpyrifos	ND	0.060 ug/L	
5/25/21	5/27/21	Malathion	ND	0.060 ug/L	
Surrogate Recovery: 98 % **Surrogate Recovery Range:** 60-141 (TPP-d15 used as Surrogate)					
Method: Modified EPA 8321B (LC-MS/MS)					
5/25/21	5/26/21	Azinphos-methyl	ND	0.12 ug/L	
5/25/21	5/26/21	DCPMU	ND	0.060 ug/L	
5/25/21	5/26/21	Diuron	ND	0.060 ug/L	
Surrogate Recovery: 90 % **Surrogate Recovery Range:** 69-120 (TPP-d15 used as Surrogate)					

Rick Jordan, Laboratory Director

This analytical report complies with the ISO/IEC 17025:2017 Quality Standard.

Walla Walla Basin Watershed Council
810 S. Main Street
Milton-Freewater, OR 97862

Report Number: P210605
Report Date: June 07, 2021
Client Project ID: [none]

Analytical Report

Client Sample ID: GW-171
Matrix: water

PAL Sample ID: P210605-02
Sample Date: 5/20/21
Received Date: 5/21/21

Method: Modified EPA 8270D (GC-MS/MS)

Extraction Date	Analysis Date	Analyte	Amount Detected	Limit of Quantitation	Notes
5/25/21	5/27/21	Chlorpyrifos	ND	0.060 ug/L	
5/25/21	5/27/21	Malathion	ND	0.060 ug/L	

Surrogate Recovery: 105 %
Surrogate Recovery Range: 60-141
(TPP-d15 used as Surrogate)

Method: Modified EPA 8321B (LC-MS/MS)

Extraction Date	Analysis Date	Analyte	Amount Detected	Limit of Quantitation	Notes
5/25/21	5/26/21	Azinphos-methyl	ND	0.12 ug/L	
5/25/21	5/26/21	DCPMU	ND	0.060 ug/L	
5/25/21	5/26/21	Diuron	ND	0.060 ug/L	

Surrogate Recovery: 88 %
Surrogate Recovery Range: 69-120
(TPP-d15 used as Surrogate)

Rick Jordan, Laboratory Director

This analytical report complies with the ISO/IEC 17025:2017 Quality Standard.

Walla Walla Basin Watershed Council
810 S. Main Street
Milton-Freewater, OR 97862

Report Number: P210605
Report Date: June 07, 2021
Client Project ID: [none]

Quality Assurance

Method Blank Data **Matrix:** water

Extraction Date	Analysis Date	Batch QC Sample #	Analyte	% Recovery	Expected % Recovery	Notes
5/25/21	5/26/21	21E2501-BLK1	Azinphos-methyl	Not Detected	< 0.12 ug/L	
5/25/21	5/26/21	21E2501-BLK1	Chlorpyrifos	Not Detected	< 0.060 ug/L	
5/25/21	5/26/21	21E2501-BLK1	DCPMU	Not Detected	< 0.060 ug/L	
5/25/21	5/26/21	21E2501-BLK1	Diuron	Not Detected	< 0.060 ug/L	
5/25/21	5/26/21	21E2501-BLK1	Malathion	Not Detected	< 0.060 ug/L	

Blank Spike Data **Matrix:** water

Extraction Date	Analysis Date	Batch QC Sample #	Analyte	% Recovery	Expected % Recovery	Notes
5/25/21	5/26/21	21E2501-BS1	Azinphos-methyl	101	76-117	
5/25/21	5/26/21	21E2501-BSD1	Azinphos-methyl	98	76-117	
5/25/21	5/26/21	21E2501-BS1	Chlorpyrifos	105	69-128	
5/25/21	5/26/21	21E2501-BSD1	Chlorpyrifos	106	69-128	
5/25/21	5/26/21	21E2501-BS1	Diuron	92	62-128	
5/25/21	5/26/21	21E2501-BSD1	Diuron	90	62-128	
5/25/21	5/26/21	21E2501-BS1	Malathion	105	45-157	
5/25/21	5/26/21	21E2501-BSD1	Malathion	107	45-157	

Rick Jordan, Laboratory Director

This analytical report complies with the ISO/IEC 17025:2017 Quality Standard.