



TECHNICAL MEMORANDUM- FINAL

Polk County State of Water Supply Needs

To: Austin McGuigan, Polk County Community Development

From: Ronan Igloria, GSI Water Solutions, Inc.
Tim Henkle, GSI Water Solutions, Inc.
Leah Cogan, GSI Water Solutions, Inc.

Attachments: A - Water Provider Overview and Water Rights
B - Water Demand Analysis Data
C - Water Demand Projections Figures

Date: August 9, 2022

1. Introduction

Polk County (County) and its communities continue to seek additional water supplies to meet growing water needs. After completing the *Polk County Regional Water Supp Strategy* in 2005 (HDR-EES, 2005) and identifying long-term water needs, the County applied for and secured a Willamette River water right permit (S-54681). The County also has the opportunity to access water that can be developed under the City of Adair Village's Willamette River water right permit (S-35819). Both permits can provide a substantial amount of water to help meet the water needs of communities in the County. Polk County also worked with Lincoln County to evaluate storage and non-storage options to develop new supplies as documented in *2012-2013 Valsetz Water Storage Concept Analysis* (Environ, 2013). This study looked at updating water demands and water supply options for these two counties. In addition, individual communities have continued their efforts to meet their own water supply needs. However, communities continue to face many challenges developing new water supplies, including economic and environmental complexities.

After receiving federal funding in 2021, the Polk County Board of Commissioners decided to invest in an update and re-assessment of a Willamette River regional water supply opportunity. The County's goal with this project is to equitably improve water supply resiliency and reliability throughout the County. In particular, the project will use a facilitated, collaborative process to evaluate the feasibility of a regional water supply solution centered around the Willamette River to serve Polk County communities, while leveraging ongoing water supply efforts by individual communities. The project's goals are to:

1. Understand the long-term water needs of communities and their existing sources of supply.
2. Define a regional supply concept that can help address those needs.
3. Develop preliminary engineering and cost estimates for the regional supply concept.
4. Identify communities and water providers interested in participating in a regional supply.
5. Evaluate possible governance models.
6. Prepare a "road map" document for implementing the regional water supply concept.

This technical memorandum summarizes the first step in the project to understand the water needs of the individual communities. An initial draft of this tech memo was discussed at a workshop with the

communities in Polk County conducted on December 6, 2021. The workshop was used to introduce the project and to confirm the baseline information and understanding of water demands for subsequent tasks in the project.

2. Polk County Water Providers

Polk County includes 11 municipal water providers with service areas within or partially within the County's boundary (excluding the City of Salem). The 11 water providers are:

- City of Dallas (Dallas)
- City of Falls City (Falls City)
- City of Independence (Independence)
- City of Monmouth (Monmouth)
- City of Willamina (Willamina)
- Buell-Red Prairie Water District
- Grand Ronde Community Water Association
- Luckiamute Domestic Water Cooperative
- Perrydale Domestic Water Association
- Rickreall Community Water Association
- Rock Creek Water District

Figure 1 presents the locations of these suppliers and the relative size of each of their recent maximum day demands. These providers range in the number of water connections served, from slightly over 100 in Rock Creek Water District to over 7,100 in Dallas. Generally, these connections represent a combination of residential and non-residential customers. Residential connections are generally defined as single and multifamily dwellings up to two or four units, and non-residential connections generally include connections to larger multifamily dwellings, commercial, and industrial businesses. Among these providers, residential metered connections far exceed non-residential connections by a ratio of five to one or greater, depending upon the supplier.

Attachment A provides a summary of key attributes of these providers, including location, size based on meter connections, combined rates of diversions authorized by the providers' water rights¹, and a comparison of long-term demand versus supply.

3. Sources of Supply

This section summarizes the existing sources of supply available to the Polk County water providers. Many of the water providers exclusively rely on either groundwater or surface water as their primary source of supply, but some use a combination of these supplies to meet system demands, such as Buell-Red Prairie Water District. The types of water rights held by these providers include municipal and quasi-municipal groundwater, surface water, or storage rights that enable all but one supplier to meet all their system demands with local supplies. Luckiamute Domestic Water Cooperative receives wholesale water from Falls City to help offset peak season demands.

¹ Note that the authorized rates indicated in the water rights do not equate to supply capacity. The authorized rates are often reduced due to infrastructure, hydrologic, and regulatory limits. This is discussed further in Section 3.1.

A survey of the water providers' water rights is presented in **Table A-1 (in Attachment A)**. The relatively larger surface water rights are held by Independence and Monmouth, including water rights that have not been developed to-date for use of the Willamette River. The relatively larger groundwater rights are held by Monmouth, the Luckiamute Domestic Water Cooperative, and the Perrydale Domestic Water Association.

3.1 Capacity Limitations

Water providers often hold water rights authorizing a quantity of water in excess of the amount of water actually available to them. The authorized quantity (flow rate) under a surface or groundwater right is affected by infrastructure constraints, seasonal hydrologic limitations, and water right/permit conditions that reduce the actual capacity or reliability of these water supplies to the providers. GSI Water Solutions, Inc. (GSI) reviewed the most recent available water system plans and conducted interviews with operational staff, when possible, to determine the available supply capacity for each water provider.

The quantities shown in **Table 1** are estimates that are intended to provide a starting point in assessing potential future supply deficiencies that could potentially be served under a regional supply concept. These quantities may vary over time as new sources are developed and infrastructure changes.

3.2 Water Rights Targeted for Regional Supply

As described in the introduction, the Willamette River water use permit available for use by Polk County is the primary interest of this study for leveraging into a potential regional supply. This source can serve as back up source of supply for use during emergency events, to meet source redundancy needs, to provide primary sources of supply to replace unreliable existing sources, or to meet the additional demands associated with burgeoning growth. A regional supply system can also leverage existing Willamette River water use permits held by Independence and Monmouth.

Permit S-54681 authorizes Polk County water providers to divert up to 25 cubic feet per second (cfs) (16.2 million gallons per day [mgd]) from the Willamette River for municipal use. It has a priority date of April 5, 2007. The points of diversion for Permit S-54681 are at approximately river mile (RM) 106 (Buena Vista County Park) and RM 96 (Social Security Fishing Hole County Park). The completion date to put the authorized water to beneficial use is currently October 29, 2030.

Permit S-35819 (in the name of City of Adair Village) has a priority date of July 7, 1971. As part of the last extension of time for Permit S-35819 in 2012, Oregon Water Resources Department (OWRD) issued a final order and settlement agreement that authorizes a total of 82 cfs (53 mgd) for municipal use. Specific allocations for Polk County and Adair Village are:

- Polk County Municipal Water Providers are authorized to divert up to 16 cfs (10.3 mgd) and must be developed by October 1, 2050.
- Adair Village is authorized to divert up to 8.2 cfs (5.3 mgd) and must be developed by October 1, 2050.

An important condition of the Adair Village water right settlement agreement limits Willamette River diversions by the Polk County Water Providers to a total of 25 cfs (16.2 mgd) from both Permits S-54681 and S-35819 at any time. In other words, the access to Adair Village's permit is not additive to the 25 cfs authorized under the County's permit. None of the Polk County entities listed on Permits S-54681 and S-35819 have diverted water under these permits to date. It should be noted that conditions on these permits may limit diversions of water in some circumstances, however, used in combination, these permits can provide a robust Willamette River supply. The next phase of this study will include more detailed analysis of the conditions on these permits to assess how these permits can add to a regional supply concept. For example, the conditions on the Polk County permit do not allow any diversion when certain low flow conditions exist on the Willamette River, which are expected to occur during peak demand season in some years.

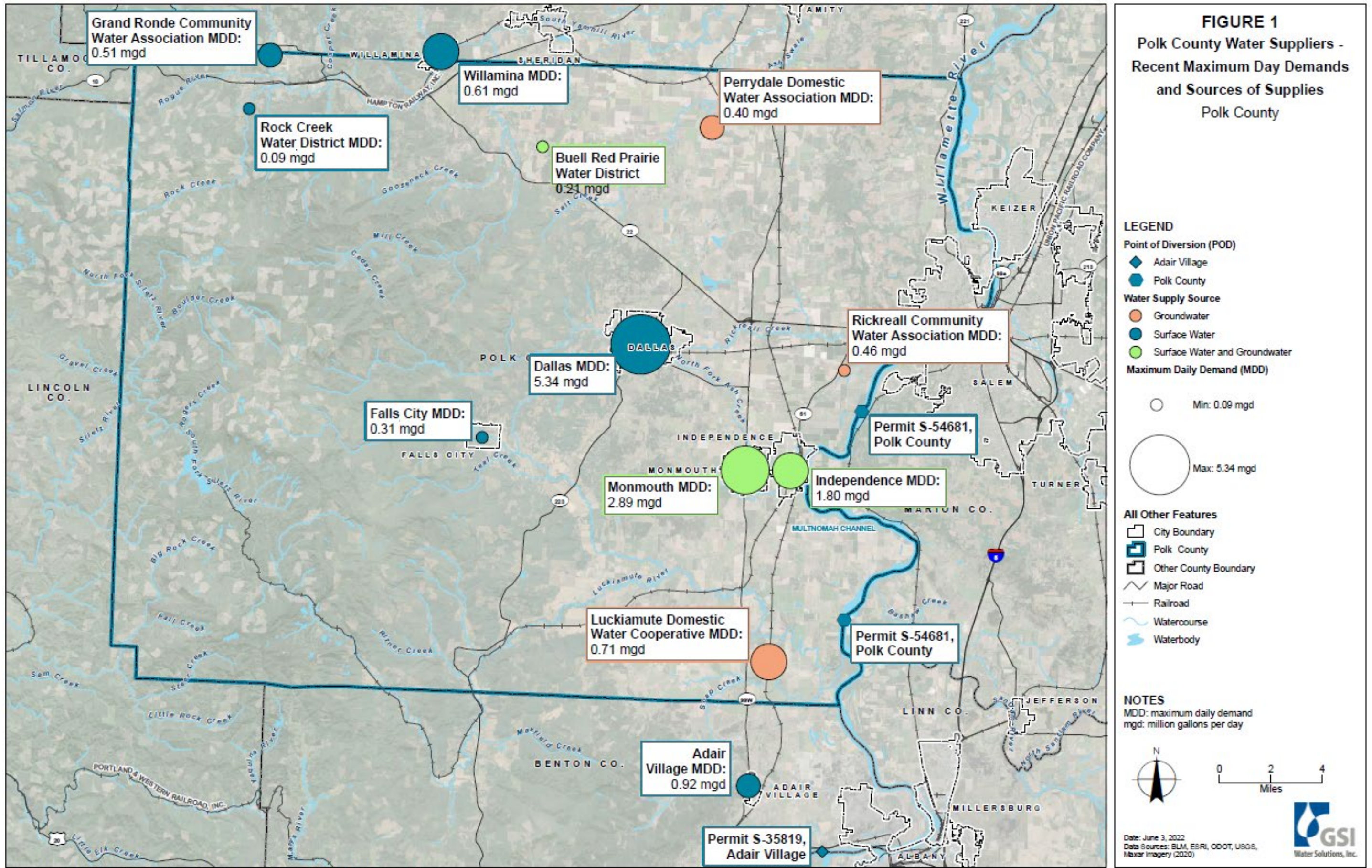


Table 1. Authorized Water Right Rate of Diversion/Withdrawal and Current Supply Capacity

Water Provider	Authorized Rate (cfs) ¹	Authorized Rate (mgd) ¹	Estimated Current Supply Capacity (mgd)	Notes on the Limiting Factor(s) for Supply Capacity
City of Dallas	25.33	16.36	8.00	Capacity of 8 mgd based on WTP. Total authorized rate includes authorized diversion rate from Mercer Reservoir. The storage rights have volume limits and the maximum flow rate cannot be diverted year-round.
City of Falls City	6.06	3.92	0.56	Limited by WTP max operating capacity of 390 gpm (0.562 mgd)
City of Independence	12.30	7.95	3.03	Well capacity equivalent to 2,105 gpm in summer (3.03 mgd); Willamette River permit not developed yet (accounts for 2.88 mgd of max authorized diversion rate); and a water rights transfer pending for 2 cfs.
City of Monmouth	20.95	13.54	2.92	Current design capacity at full production from three wells 2,030 gpm; Willamette River permit (2.88 mgd) not developed yet.
City of Willamina	3.80	2.46	1.01	WTP maximum is 700 gpm (1.01 mgd); usable water rights total 0.87 mgd, which does not meet peak demands without using stored water
Buell-Red Prairie Water District	0.68	0.44	0.44	Two wells limited to combined 100-200 gpm due to seasonal variability and interference from nearby wells, plus 125 gpm for surface water filtration; capacity assumed limited by water right limit (~300 gpm)
Grand Ronde Community Water Association	1.47	0.95	0.52	360 gpm (0.52 mgd) flow from springs, need to reduce water loss and/or increase storage to meet max demands
Luckiamute Domestic Water Cooperative	6.05	3.91	2.39	1,663 gpm (2.39 mgd) operating capacity total for all four wells
Perrydale Domestic Water Association	9.58	6.19	1.00	Total capacity uncertain but able to meet current demand
Rickreall Community Water Association	3.51	2.27	0.93	645 gpm (0.93 mgd) total operating capacity of wells
Rock Creek Water District	0.20	0.13	0.14	100 gpm WTP capacity (but only operates at about 25 gpm); storage limited to 17.64 AFY but does not appear to be a constraint

Notes

¹ These values are based on the sum of the authorized instantaneous rate listed on all the water provider's water rights, assuming no development limitations on water rights.

AFY = acre-feet per year

cfs = cubic feet per second

gpm = gallons per minute

mgd = million gallons per day

WTP = water treatment plant

4. Regional Water Demand Projections

This section provides a summary of the water demands served by each Polk County water provider. The Polk County water right permit (S-54681) currently has a development deadline of 2030 and the Adair Village permit needs to be developed by 2050. Water supply planning typically uses a longer study period of 50 years because of the long-term outlook needed to develop a new source of supply. For this reason, GSI’s approach extends the demand forecasts to 2072, which is well beyond the development period of the two permits.

4.1 Current Water Demand

To create a baseline for projecting future demand, current water use and population information was used to estimate per capita consumption for each water provider in the study area. Data sources for the analysis included available water system master plans, water management and conservation plans (WMCPs), and direct communications with water system operators. Average day and maximum (peak) day demands were converted to mgd for comparison across water providers. Average day demand (ADD) is equal to the total annual system demand divided by 365 days. Maximum day demand (MDD) is equal to the highest system demand that occurs on any single day during a year. Population estimates described in the water providers’ plans were used for consistency in calculating per capita daily water use. **Table 2** presents a summary of the most recent water demand information available. Footnotes below the table indicate the years associated with these demands and the sources of data.

Table 2. Most Recent Water Demand Data from Available System Plans

Water Provider	ADD (mgd)	MDD (mgd)	Average per Capita Daily Use (gpcd)	Applicable Year
City of Dallas ¹	2.52	5.34	149	2020
City of Falls City ²	0.16	0.31	168	2015
City of Independence ³	1.03	1.80	106	2020
City of Monmouth ⁴	1.12	2.89	83	2020
City of Willamina ⁵	0.32	0.61	159	2021
Buell-Red Prairie Water District ⁶	0.08	0.21	99	2020
Grand Ronde Community Water Association ⁷	0.23	0.51	90	2020
Luckiamute Domestic Water Cooperative ⁸	0.49	0.71	174	2017
Perrydale Domestic Water Association ⁹	0.18	0.40	112	2015
Rickreall Community Water Association ¹⁰	0.26	0.46	159	2016
Rock Creek Water District ¹¹	0.04	0.09	182	2021

Notes

¹ 2015–2020 average (personal communication)

² 2010–2015 average (HBH Consulting Engineers, 2017)

³ 2020 (GSI Water Solutions, 2022)

⁴ 2020 (4B Engineering and Consulting, 2020); per capita water use does not include university irrigation (4B Engineering and Consulting, 2020)

⁵ 2021 (Keller Associates, 2021)

⁶ 2020 production data from Buell-Red Prairie Water District; per capita water use based on estimated population using 315 connections x 2.67 persons per connection. MDD est. at 2.5x ADD.

⁷ 2020 (Grand Ronde Community Water Association, 2021)

⁸ 2017 (Luckiamute Domestic Water Cooperative, 2018)

⁹ 2015 (Perrydale Domestic Water Association, 2018); per capita water use from HDR-EES, 2005

¹⁰ 2012–2016 average (Oregon Association of Water Utilities, 2018)

¹¹ 2021, communication with Rock Creek Water District

— = not applicable

ADD = average day demand

gpcd = gallons per capita per day

MDD = maximum day demand

mgd = million gallons per day

4.2 Water Demand Projections

Water providers in Polk County used a variety of methods to project their future water demands to account for their mix of residential and non-residential customers, anticipated growth rates, and unique situations specific to their service area. Most water providers developed demand projections based on an assumed population growth rate and per capita water use. Some water providers accounted for special circumstances, such as Falls City’s bulk water sales, Western Oregon University’s transient student population in Monmouth, Dallas’ accounting for providing water to a future large industrial water user, and several large dairies served by Luckiamute Domestic Water Cooperative. In addition, Rickreall Community Water Association has a policy limiting them to 10 new connections per year, and Rock Creek Water District expects to reach its buildout condition of 107 total connections by the beginning of the planning period. Water system master plans and water management and conservation plans typically provide forecasts of demand for 10- and 20-year increments, and therefore most of the plans referenced for this study do not forecast demand beyond 2040.

Using the available data from existing water system plans and direct information from water providers who participated in interviews and provided comments to the draft of this memo, GSI developed water demand projections for both ADD and MDD through the 50-year planning period (2022 to 2072) by multiplying per capita water use factors (refer to Table 2) by forecasted service area populations. In general, the latest population and stated growth rates reported in each plan were used to linearly extrapolate population, or the growth rate was applied directly to the current ADD and MDD. In some cases, the available data was unclear or inconsistent, and GSI completed additional steps or assumptions to extend the demand projections. These cases are described further below. Because these forecasts extend well beyond the projections developed by water providers, there is uncertainty around changing conditions or potential limits to growth.

A summary of the demand projections for each water provider is described below and listed in **Table 3**. The *total* ADD for all the water providers ranges from 7.3 mgd in 2022 to approximately 16.7 mgd in 2072, while the *total* MDD ranges from 15.0 mgd to 35.9 mgd. **Figure 2** shows graphically the sum of the MDD projections for all of the water providers, and their relative magnitudes. **Attachment B** provides additional detail on the data and calculations for the demand projections.

The following is a summary of the results, assumptions and unique circumstances associated with each provider’s demand projection.

City of Dallas. Dallas applied a per capita ADD of 149 mgd and MDD of 312.9 gpcd (2.1 peaking factor) to its population forecasts to project future demands. A placeholder volume of 0.5 mgd for a future high water use customer was also added to each projected demand value. Overall, the MDD is projected to increase from 5.3 mgd to 14.2 mgd by 2072 based on a forecasted population of 43,701. Dallas relies on stored water (storage water right) to help meet peak season demands.

City of Falls City. The population of Falls City is estimated to increase from approximately 1,060 to 2,400 during the 50-year period based on a constant annual average growth rate of 1.7 percent. With average per

capita water use factor of 168 gpcd and peaking factor of 2.23, MDD is projected to increase from 0.40 mgd to 0.80 mgd.²

City of Independence. The population of Independence is estimated to increase from approximately 9,960 to 34,140 during the 50-year period based on an annual average growth rate of 2.3 percent. With a per capita water use factor of 106 gpcd and peaking factor of 2.0, the MDD is projected to increase from 2.36 mgd to 6.67 mgd. This future data was obtained from the City's draft 2022 Water Master Plan and draft 2022 WMCP.

City of Monmouth. The population of Monmouth is estimated to increase from approximately 10,500 to 22,200 during the 50-year period. Consistent with information in the Monmouth Water System Master Plan (2020), the demand projection separated university "domestic" and irrigation demands from the general city-wide demands. Average growth rates for each were based on information from the water master plan and assumed to extend out at the same rate, with the exception that the university irrigation rate was assumed to remain constant. Without the university demands average per capita water use factor was 89 gpcd and peaking factor of 2.5.³ The MDD is projected to increase from 3.0 mgd to 5.8 mgd.

City of Willamina. The population of Willamina within Polk and Yamhill counties were separated and extended out separately using growth rates derived from the Polk County WMCP (Mcguigan, 2015). Population is estimated to increase from approximately 2,200 to 3,700 during the 50-year period. A per capita water use factor of 159 gpcd and peaking factor of 2.25 was used resulting in MDD increasing from 0.8 mgd to 1.3 mgd.

Buell-Red Prairie Water District⁴. The population served by Buell-Red Prairie Water District is estimated to remain at approximately 841 over the 50 year planning period due to a moratorium on growth.

Grand Ronde Community Water Association. The population served by Grand Ronde Community Water Association is estimated to increase from approximately 2,500 to 3,100 during the 50-year period based on an annual average growth rate of 0.40 percent. With a per capita water use factor of 90 gpcd and peaking factor of 2.25, the MDD is projected to increase from 0.23 mgd to 0.28 mgd.

Luckiamute Domestic Water Cooperative. Information from the Luckiamute WMCP (2018) was used to extend population through 2070, and to separate water use by dairies served by Luckiamute Domestic Water Cooperative. The population is estimated to increase from approximately 2,900 to 6,900 during the 50-year period, with an annual average growth rate of 1.7 percent. The dairy use (0.1 mgd) was assumed to stay constant through the planning period. A per capita water use factor of 174 gpcd and peaking factor of 1.88 was used resulting in MDD increasing from 1.06 mgd to 2.35 mgd.

Perrydale Domestic Water Association. The most recent water use data from the Perrydale WMCP (2018) was used to derive per capita water use, and their assumed growth rate of 2.8 percent was used to extend the population and water demand (ADD and MDD). The population is estimated to increase from approximately 2,800 to 11,200 during the 50-year period. With a per capita water use factor of 112 gpcd and peaking factor of 2.5, the MDD is projected to increase from 0.75 mgd to 2.9 mgd.

² City of Falls City forecast through 2035 per the City's Water System Master Plan (2017) shows the peaking factor changing slightly over this period, but stabilizes from 2035 at 2.23.

³ The peaking factor for the City of Monmouth is shown in the City's Water System Master Plan (2020) to decrease over time from 3.41 through 2040. The forecast for 2040 and beyond held the peaking factor constant at 3.0.

⁴ Note: Immediately prior to routing this report for distribution to Polk County and the water providers for review, Buell Red Prairie staff contacted GSI (on 11/22/2021), requesting that the analysis assume NO (zero) growth through 2072. This information will be used to update the analysis.

Rickreall Community Water Association. The population served by Rickreall Community Water Association is estimated to increase from approximately 1,750 to 3,000 during the 50-year period based on adding 10 connections (2.5 persons per connection) per year, as noted in their WMCP (Oregon Association of Water Utilities, 2018). With a per capita water use factor of 159 gpcd and peaking factor of 2.0, the MDD is projected to increase from 0.56 mgd to 0.96 mgd.

Rock Creek Water District. The population served by Rock Creek Water District is assumed essentially remain unchanged over the 50-year period. Therefore, the MDD is also projected to remain constant at 0.09 mgd.

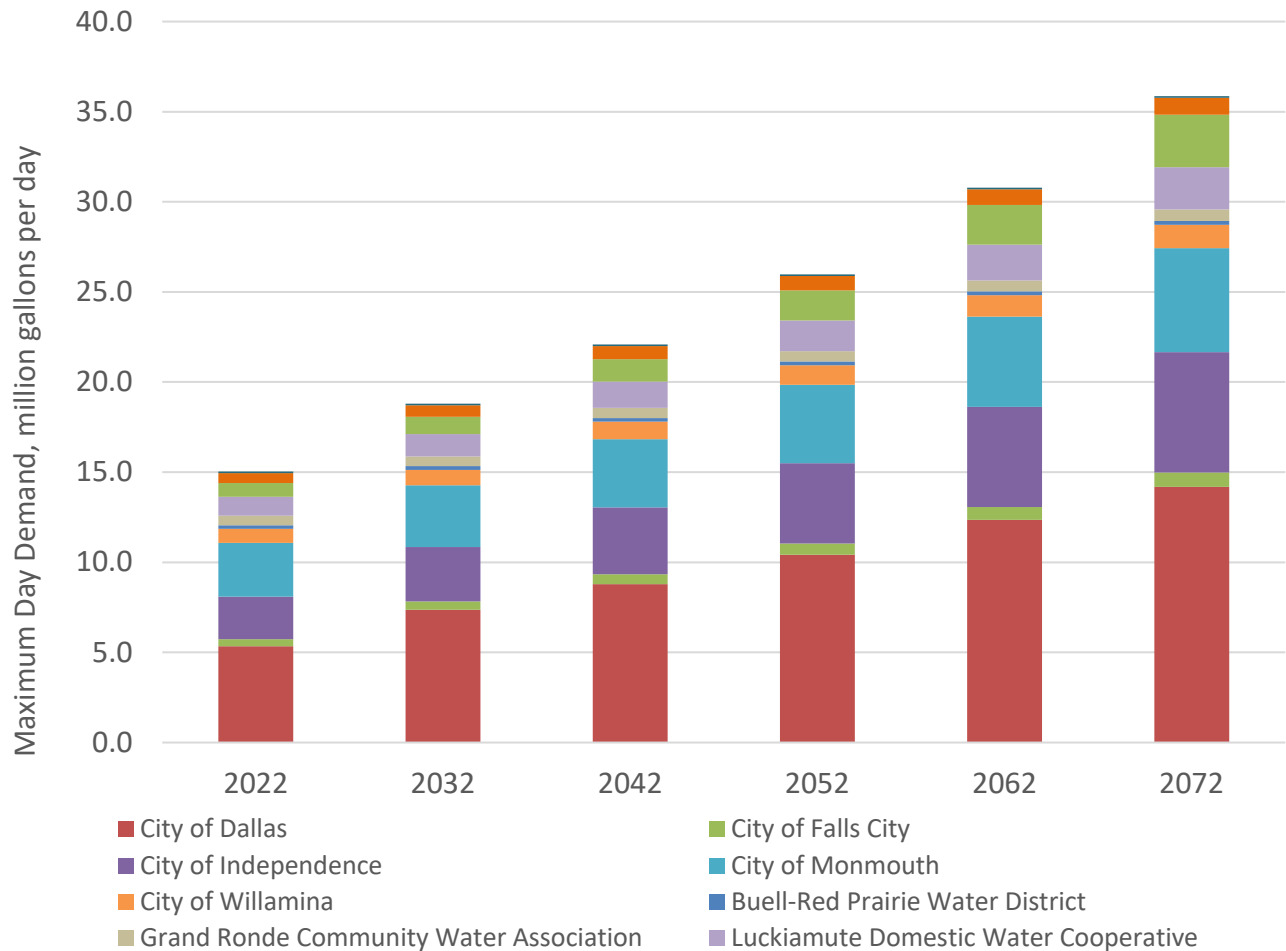
Table 3. Projected Average Day Demands (million gallons per day)

Water Provider	2022	2032	2042	2052	2062	2072
City of Dallas	2.91	3.26	3.94	4.72	5.65	6.85
City of Falls City	0.18	0.21	0.25	0.28	0.32	0.36
City of Independence	1.15	1.51	1.86	2.27	2.77	3.33
City of Monmouth	1.15	1.34	1.54	1.75	1.99	2.27
City of Willamina	0.35	0.38	0.43	0.48	0.53	0.58
Buell-Red Prairie Water District	0.08	0.08	0.08	0.08	0.08	0.08
Grand Ronde Community Water Assoc.	0.23	0.24	0.25	0.26	0.27	0.28
Luckiamute Domestic Water Cooperative	0.61	0.71	0.82	0.95	1.11	1.30
Perrydale Domestic Water Association	0.3	0.38	0.5	0.66	0.88	1.16
Rickreall Community Water Association	0.28	0.32	0.36	0.4	0.44	0.48
Rock Creek Water District	0.04	0.04	0.04	0.04	0.04	0.04
Total	7.28	8.47	6.13	11.89	14.08	16.73

Table 4. Projected Maximum Day Demands (million gallons per day)

Water Provider	2022	2032	2042	2052	2062	2072
City of Dallas	5.34	7.36	8.78	10.42	12.36	14.18
City of Falls City	0.40	0.47	0.56	0.63	0.71	0.8
City of Independence	2.36	3.01	3.71	4.45	5.55	6.67
City of Monmouth	2.97	3.43	3.78	4.35	5.01	5.77
City of Willamina	0.78	0.86	0.97	1.08	1.19	1.31
Buell-Red Prairie Water District	0.21	0.21	0.21	0.21	0.21	0.21
Grand Ronde Community Water Assoc.	0.52	0.54	0.56	0.58	0.6	0.63
Luckiamute Domestic Water Cooperative	1.06	1.24	1.45	1.70	2.00	2.35
Perrydale Domestic Water Association	0.75	0.95	1.25	1.66	2.2	2.91
Rickreall Community Water Association	0.56	0.64	0.72	0.8	0.87	0.95
Rock Creek Water District	0.09	0.09	0.09	0.09	0.09	0.09
Total	15.04	18.80	22.08	25.97	30.79	35.87

Figure 2. Maximum Day Demand Projection (2022–2072)



4.3 Water Conservation

Water conservation measures practiced by water providers covers a wide array of management and operational activities and policies. For purposes of this study the demand projections analysis assumes that the water providers are implementing some level of water conservation as best practice or as required under their approved water management and conservation plans. There may be opportunities to further reduce water consumption with more aggressive water conservation by the individual water providers. Greater reduction in water use would be contingent on the customer base (i.e., percentage of commercial/industrial and residential accounts), the resources dedicated to conservation measures, and other considerations that vary widely between different water systems. The costs and benefits of these activities is wide ranging. Often, implementation requires a more detailed analysis of the tradeoffs for various programmatic options and technology deployment. A detailed assessment of the individual water conservation programs was beyond the scope of the study at this stage, but should be evaluated further as implementation occurs.

Some of the more common measures implemented by Polk County providers include progressive, tiered water rate structures; leak detection and repair; and public education. Municipal water management and conservation planning under Oregon Administrative Rules Chapter 690, Division 86 applies to most County water providers holding municipal and quasi-municipal water rights. These rules require that water utilities should be aggressively pursuing the measures noted above along with full metering of customer use, meter testing and maintenance, annual water auditing, and introduction of low water use appliances. There are also less traditional ways than conservation that water providers can realize new sources of supplies. Reuse, also known as use of reclaimed water, is often associated with treated municipal wastewater, but innovative

projects also enable the reuse of stormwater. Similar to use of reclaimed water, options for use of non-potable sources might target the use of the non-treated (raw) water for commercial or industrial application, such as irrigation or process operations in which a high, quality source water is not needed.

5. Future Water Supply Needs

This section compares the water providers’ available water supply capacity (see Section 3) with the projected water demands (see Section 4) to estimate the supply deficit that could potentially be served by a Willamette River regional water supply. These water rights could also provide supply redundancy and reliability for those water providers that do not have projected deficits.

The supply deficits are evaluated with respect to MDD, which is typically the design criteria applied in water system planning when evaluating water supply capital improvements. Table 5 lists the available supply and the associated supply deficits for each water provider based on the MDD projections listed in Table 4. Figures C-1 to C-3 in Attachment C illustrates water demand projections for each water provider and when the MDD exceeds their respective current supply capacity. While all water providers generally have surplus water supply available to meet average day demands throughout the 50-year planning period, there are supply deficiencies in meeting MDD within the next 10 years for Monmouth and Grande Ronde. Independence and Dallas are projected to have a supply deficiency within the next 20 years. Perrydale Domestic Water Association also appears to have a supply deficiency within the next 20 years. Finally, with the exception of Luckiamute Domestic Water Cooperative, Buell-Red Prairie Water District and Rock Creek Water District, all of the water providers are projected to have supply deficiencies in meeting MDD by the end of the 50-year period.

Table 5. Projected MDD Supply Deficiencies and Timing by Polk County Water Provider

Water Provider	Current Supply Capacity (mgd)	2022	2032	2042	2052	2062	2072
City of Dallas	8.00	--	--	0.78	2.42	4.36	6.18
City of Falls City	0.56	--	--	--	0.07	0.15	0.23
City of Independence	3.03	--	--	0.68	1.51	2.52	3.64
City of Monmouth	2.92	0.05	0.51	0.86	1.43	2.09	2.85
City of Willamina	1.01	--	--	--	0.07	0.18	0.30
Buell-Red Prairie Water District	0.44	--	--	--	--	--	--
Grand Ronde Community Water Assoc.	0.52	--	0.02	0.04	0.06	0.08	0.11
Luckiamute Domestic Water Cooperative	2.39	--	--	--	--	--	--
Perrydale Domestic Water Association	1.00	--	--	0.25	0.66	1.20	1.91
Rickreall Community Water Association	0.93	--	--	--	--	--	0.02
Rock Creek Water District	0.14	--	--	--	--	--	--
Total		0.05	0.53	2.61	6.22	10.57	15.24

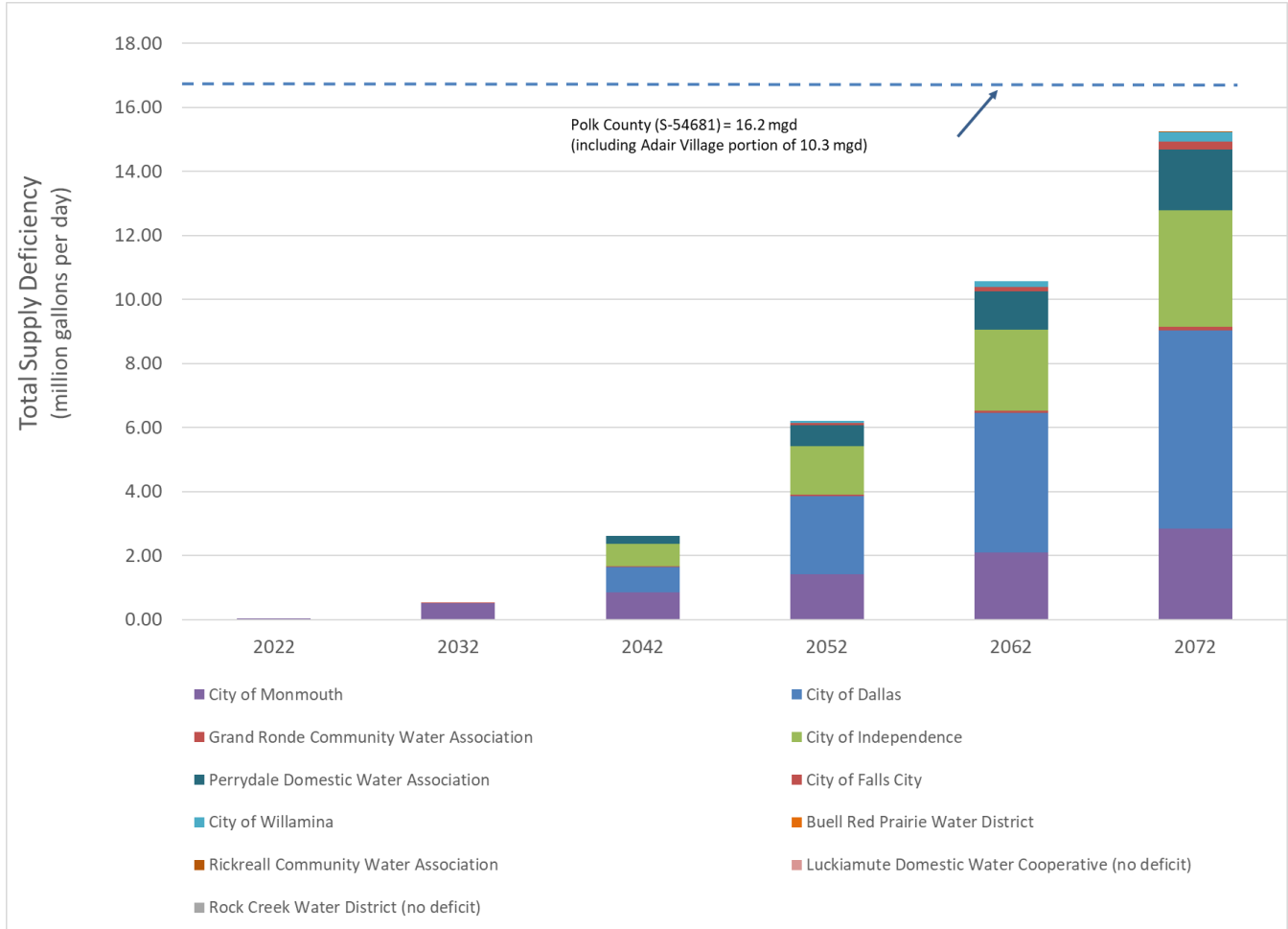
Notes

Values indicate the supply deficiency in million gallons per day (mgd); shaded cells indicate the first 10-year milestone when a supply deficiency occurs based on projected maximum day demands (MDD) and estimated supply capacity.
 mgd = million gallons per day

Figure 3 illustrates the relative magnitude of supply deficiency and timing among the water providers. Dallas and Monmouth are projected to have the most significant supply deficiencies over the next 50 years, with Monmouth experiencing the earliest deficiency. It should be noted that Monmouth and Independence have their own Willamette River water right permits, but a regional system could leverage the development of their

own water rights. The total combined deficiency of 15.2 mgd in 2072 remains below the total authorized diversion under the Polk County permit (S-54681) of 16.2 mgd. Although the Polk County water right needs to be put to beneficial use by October 2030, an application to extend the permit development period can be submitted.

Figure 3. Estimated Total Water Supply Deficit by Water Providers Compared to Polk County Water Right



6. Conclusion

Polk County’s goal is to equitably improve water supply resilience and reliability throughout the County. This project is evaluating how two Willamette River water right permits (S-54681 and S-35981) available to Polk County can be used to meet this broad goal, while leveraging ongoing water supply efforts by individual communities. This technical memorandum presents the water needs and supply deficiencies facing the County’s water providers. The projected demands and supply capacities estimated under this analysis differ somewhat from the analysis in the 2013 Valsetz Water Storage Concept Analysis (Environ, 2013), but some of that difference is attributable to data used in more recent water plans prepared by the water providers.

Based on a review of available water planning documents and water provider interviews, the water demand projection identified supply deficiencies for most of the water providers. Deficiencies begin to occur within the next 10 years with the largest deficiencies associated with the larger communities of Dallas, Independence, and Monmouth. The 50-year projection shows that the supply deficiency (15.2 mgd) is less than the total authorized diversion rate under Polk County’s Willamette River permit (16.2 mgd), but is greater than the 10.3 mgd portion of the Adair Village permit available to the County. Regardless of the projected supply deficiency related to growing water demands, the project will also look at supply

redundancy and/or replacing existing sources to improve supply reliability as key beneficial uses of the water right.

7. References

- 4B Engineering and Consulting. 2020. *City of Monmouth Water System Master Plan*. Prepared for the City of Monmouth, Oregon.
- Environ. 2013. 2012-2013 Valsetz Water Storage Concept Analysis. Prepared for Polk County Community Development, Dallas Oregon. June.
- GSI Water Solutions, Inc. 2022. City of Independence Draft Water Management and Conservation Plan. Prepared for the City of Independence, Oregon
- Grand Ronde Community Water Association. 2021. *Grande Ronde Water Management and Conservation Plan*. Prepared for Grand Ronde Community Water Association.
- HBH Consulting Engineers. 2017. *City of Falls City Water System Master Plan*. Prepared for City of Falls City. September.
- HDR-EES. 2005. *Polk County Regional Water Supply Strategy*. Prepared for Polk County Water Providers.
- Jacobs. 2018. *City of Dallas Water Supply Study*. Prepared for City of Dallas, Oregon. August.
- Keller Associates. 2021. *City of Willamina Water Management and Conservation Plan Update*. March.
- Luckiamute Community Water District. 2018. *Luckiamute Water Management and Conservation Plan*. Prepared for Luckiamute Community Water District.
- Oregon Association of Water Utilities. 2018. *Rickreall Water Management and Conservation Plan*. Prepared for Rickreall Community Water Association. September.
- Perrydale Domestic Water Association. 2018. *Perrydale Water Management and Conservation Plan*. March.
- McGuigan, Auston. 2015. Polk County Water Management and Conservation Plan. Prepared for Polk County Community Development Departement. October.
- Westech Engineering. 2022. City of Independence Draft Water System Master Plan. Prepared for the City of Independence.

Appendix A

Water Provider Overview and Water Rights

Water Rights of Polk County Public Water Providers

6/1/22

Water Provider	Source	Application / Claim / Decree	Permit	Certificate	Transfer	Priority Date	Development Deadline	Type of Beneficial Use	Maximum Authorized Rate (cfs) or Volume (AF)
City of Dallas	Rickreall Creek	Rickreall Creek	--	38631	--	1909	--	Municipal	0.50 cfs
	Canyon Creek	Rickreall Creek	--	80166	T-6446	3/23/1903	--	Municipal	0.77 cfs
	Rickreall Creek, Applegate Creek, and Rockhouse Creek	S-6385	S-4053	68474	T-6447	1/22/1919	--	Municipal	4.0 cfs total (1.0 cfs Applegate Creek, 3.0 cfs Rockhouse and Rickreall Creeks)
	Rickreall Creek	R-32085	R-2283	80162	--	1/28/1958	--	Storage for Municipal Use in Mercer Reservoir	890.0 AF
	Mercer Reservoir	S-32086	S-26397	80163	--	1/28/1958	--	Municipal	890.0 AF at a rate of 10.0 cfs
	Rickreall Creek	R-48694	R-5755	80164	--	9/16/1971 (600.0 AF) 12/14/1971 (190.0 AF)	--	Storage for Municipal Use	790.0 AF
	Mercer Reservoir (enlarged)	S-48695	S-35718	80165	--	9/16/1971 (600.0 AF) 12/14/1971 (190.0 AF)	--	Municipal	790.0 AF at a rate of 10.0 cfs
	Dallas Reservoir and Rickreall Creek	S-44279	S-33202	39181	--	11/22/1967 (Dallas Reservoir) 8/8/1968 (Rickreall Creek)	--	Domestic	0.06 cfs
City of Falls City	Teal Creek	S-4606	S-2700	1832	--	11/4/1915	--	Municipal	1.00 cfs
	Bouhey Creek	S-7271	S-4592	5072	--	5/11/1920	--	Municipal	0.5 cfs
	Little Luckiamute River	S-18337	S-13970	14247	--	8/12/1939	--	Mill Pond (Industrial/Manufacturing)	0.5 cfs
	Spring	S-47360	S-35215	39319	--	8/6/1970	--	Municipal	0.26 cfs
	Berry Creek	S-47642	S-35222	--	--	10/14/1970	10/1/2043	Municipal	1.0 cfs (0.77 cfs development limitation per WMCP FO)
	Glaze Creek	S-63381	S-46807	82931	--	3/4/1982	--	Municipal	2.0 cfs
City of Independence	South Fork Ash Creek	S-18304	S-14237	14494 89411	T-7926	7/28/1939	--	Pond Maintenance for Recreational Use	1.0 cfs

Water Provider	Source	Application / Claim / Decree	Permit	Certificate	Transfer	Priority Date	Development Deadline	Type of Beneficial Use	Maximum Authorized Rate (cfs) or Volume (AF)
	Willamette River	S-86398	S-54331	—		8/10/2005	8/17/2026	Municipal	4.46 cfs
	South Well 1, South Well 2, South Well 3, South Well 4, South Well 5	GR-3183	--	—	T-13060	8/2/1951	--	Municipal	0.557 cfs (250 gpm)
	South Well 1, South Well 2, South Well 3, South Well 4, South Well 5	GR-3184	--	—	T-13061	9/15/1951	--	Municipal	0.8912 cfs (400 gpm)
	South Well 1, South Well 2, South Well 3, South Well 4, South Well 5	GR-3185	--	—	T-13062	3/25/1953	--	Municipal	0.8912 cfs (400 gpm)
	Riverdrive Well, Polk Well 1, Polk Well 2, Polk Well 3	G-2469	G-2279	31510 95502	T-12261	10/15/1962	--	Municipal	0.56 cfs (0.25 cfs from Riverdrive Well)
	Riverdrive Well, Polk Well 1, Polk Well 2, Polk Well 3	G-11243	G-10375	83231 95501	T-10827	3/8/1984	--	Municipal	0.94 cfs total (0.25 cfs from Riverdrive Well)
	A well	G-12736	G-12134	—	--	12/19/1991	10/1/1998 (extension application 4/10/2017 pending)	Municipal	2.0 cfs
	Willamette Wellfield 1, Willamette Wellfield 2, Willamette Wellfield 3	G-13871	G-13015 G-17868	—	T-12511	11/7/1994	10/1/2020	Municipal	1.0 cfs total (0.33 cfs from each well; 0.46 cfs total development limitation per WMCP FO)
	Park Well	G-18256	G-17750	—	--	2/4/2016	4/6/2037	Municipal	0.56 cfs
City of Monmouth	Teal Creek	S-6716	S-4305	9761 49729	T-3710	8/19/1919	--	Municipal	.045 cfs
	Teal Springs	S-9883	S-6521	45801	—	10/13/1924	--	Municipal	0.13 cfs
	Overflow from Falls City Reservoir	S-16134	S-11941	11656	—	11/7/1935	--	Municipal	0.3 cfs
	Unnamed springs	S-16248	S-12058	11662	—	2/13/1936	--	Municipal	1.0 cfs
	Unnamed spring	S-16832	S-12602	15055	—	4/2/1937	--	Municipal	0.25 cfs

Water Provider	Source	Application / Claim / Decree	Permit	Certificate	Transfer	Priority Date	Development Deadline	Type of Beneficial Use	Maximum Authorized Rate (cfs) or Volume (AF)
	Two unnamed streams	S-22133	S-18321	16992	—	12/11/1946	—	Municipal	1.00 cfs
	Teal Creek	S-41310	S-30886	36021	—	8/31/1965	—	Municipal	0.61 cfs
	Willamette River	S-86399	S-54332	—	—	8/10/2005	8/17/2026	Municipal	4.46 cfs
	Well 1, Well 2, Well 3	G-4332	G-4087	39278	—	4/17/1968	—	Municipal	1.27 cfs total (0.56 cfs from Well 1, 0.33 cfs from Well 2, 0.38 cfs from Well 3)
	Well 1, Well 2	G-8926	G-8579	—	—	8/14/1978	10/1/2025	Municipal	5.0 cfs
	Well 4, Well 5	G-5106	G-4818	62436	—	2/17/1970	—	Municipal	0.88 cfs total (0.55 cfs from Well 4, 0.33 cfs from Well 5)
	Well A, Well B	G-13521	G-12976	—	—	10/1/1993	10/1/2055	Municipal	6.0 cfs
City of Willamina	Lady Creek	S-320	S-127	1018	—	9/22/1909	—	Municipal	1.00 cfs
	Willamina Creek	S-14457	S-10476	11706	—	2/15/1932	—	Municipal	0.2 cfs
	Willamina Creek	S-18772	S-14420	14501 86657	T-6752	6/10/1940	—	Domestic	0.45 cfs
	Willamina Creek	R-19369	R-768	14359 41796	T-10642	6/13/1941	10/1/2011	Storage for public fish facility	20.0 AF
	Willamina Creek	S-19368	S-15022	67793	T-10642	6/13/1941	10/1/2011	Pond Maintenance	0.2 cfs
	Willamina Creek	S-19368	S-15022	14536 41795 86656	T-6752	6/13/1941	—	Municipal	0.70 cfs
	Willamina Creek (River)	S-30116	S-23560	—	—	7/6/1955	10/1/2017 (extension application 4/23/2019 pending)	Municipal	1.45 cfs
City of Adair Village	Willamette River	S-19551	S-15077	28782	—	11/7/1941	—	Domestic	3.0 cfs

Water Provider	Source	Application / Claim / Decree	Permit	Certificate	Transfer	Priority Date	Development Deadline	Type of Beneficial Use	Maximum Authorized Rate (cfs) or Volume (AF)
	Willamette River	S-48146	S-35819	—	—	7/7/1971	10/1/2050	Municipal	82.0 cfs (8.2 cfs for Adair Village, limited to 2.93 cfs per WMCP FO; 16.0 cfs Polk County; 57.7 cfs City of Hillsboro)
Polk County	Willamette River	S-86827	S-54681	—	—	4/5/2007	10/29/2030	Municipal	25.0 cfs (updated WMCP required to begin diversion)
Buell Red Prairie Water District	Gooseneck Creek	S-38861	S-28946	40054 87337	T-6287	6/28/1963	---	Domestic, Commercial, and Livestock	0.21 cfs
	Gooseneck Creek	R-41412	R-4592	40055 87338	T-6287	9/21/1965	---	Storage for Domestic, Commercial, and Livestock	3.0 AF
	Reservoir	S-41422	S-30517	40056 87339	T-6287	9/23/1965	---	Domestic, Commercial, and Livestock	3.0 AF
	Gooseneck Creek	R-43211	R-4840	40057 41646 87340	T-6287	1/19/1967	---	Storage for Domestic, Commercial, and Livestock	60.85 AF
	Mt. Springs Ranch Reservoir	S-43212	S-31865	40058 41647 87341	T-6287	1/19/1967	---	Domestic, Commercial, and Livestock	60.85 AF
	Gooseneck Creek	R-50051	R-6100	47083 87335	T-6291	2/16/1973	---	Storage for Domestic, Commercial, and Livestock	6.0 AF
	Gooseneck Creek and Reservoir	S-50052	S-37623	47084 87336	T-6291	2/16/1973	---	Domestic, Commercial, and Livestock	0.02 cfs
	Gooseneck Creek	R-71755	R-12221	—	---	7/12/1991	10/1/2051	Storage in enlarged Mountain Springs Reservoir for Quasi-Municipal (Nov. 1 – April 30)	61.0 AF
	Mountain Springs Reservoir	S-71756	S-53238	—	---	7/12/1991	10/1/2051	Quasi-Municipal	61.0 AF
	Well 1, Well 2	G-9326	G-8748	—	---	7/23/1979	10/1/2046	Quasi-Municipal	0.4456 cfs (200 gpm) from Well 1, 0.2228 cfs (100 gpm) from Well 2
	Gooseneck Creek	S-66101	S-51165	87392	T-11390	6/8/1984	10/1/2017	Groundwater Recharge, Oct. 1 – May 31	0.1671 cfs (75.0 gpm), max. 61.0 AF

Water Provider	Source	Application / Claim / Decree	Permit	Certificate	Transfer	Priority Date	Development Deadline	Type of Beneficial Use	Maximum Authorized Rate (cfs) or Volume (AF)
	Artificially recharged groundwater diverted from Well 1 and Well 2	G-12608	G-13521	—	—	7/12/1991	10/1/2053	Quasi-Municipal	61.0 AF
Grand Ronde Community Water Association	Rock Creek	S-20041	S-15608	15613 68530	T-3379	9/22/1943	—	Quasi-Municipal	0.30 cfs
	Spring area	S-52769	S-41436	—	—	2/10/1975	10/1/2018	Group Domestic and Livestock	0.44 cfs
	Spring area	S-52770	S-41437	—	—	2/10/1975	10/1/2018	Quasi-Municipal	0.44 cfs
	Three unnamed springs	S-87207	S-54818	—	—	6/25/2008	6/25/2018	Quasi-Municipal, June 1 – Sept. 30	0.29 cfs, max. 69 AF
Luckiamute Domestic Water Cooperative	Well 1	G-4938	G-4480	—	—	7/16/1969	10/1/2015	Group Domestic	1.0 cfs
	Well 2	G-6816	G-6093	—	—	2/18/1975	10/1/2015	Quasi-Municipal	0.52 cfs
	Well 3	G-9321	G-8747	—	—	7/23/1979	10/1/2015	Group Domestic	0.7798 cfs (350 gpm)
	Well 1, Well 2, Well 3	G-9789	G-9543	—	—	1/6/1982	10/1/1992 (COBU received 5/4/2009)	Group Domestic	0.05 cfs
	Well 1, Well 2, Well 3, Well 4, Well 5	G-12706	G-12001 G-16896 G-16914	—	T-10886	11/13/1991 (Well 1-4) 5/22/2009 (Well 5)	10/1/2025	Quasi-Municipal	3.7 cfs total (1.0 cfs from Well 5)
Perrydale Domestic Water Association	A well	G-5958	G-5655	45798	T-10935	12/18/1972	10/1/2015 (COBU received 3/2/2021)	Quasi-Municipal, March 1 – Oct. 31	0.33 cfs, max. 208.25 AF
	A well	G-6717	G-6352	60020	—	11/8/1974	—	Quasi-Municipal	0.2 cfs
	Well 3	G-11825	G-10908	90023	—	6/22/1988	—	Quasi-Municipal	0.42 cfs
	Well 4	G-11913	G-10986	94064	—	4/24/1989	—	Quasi-Municipal	0.2673 cfs (120 gpm)
	Well 2A	G-11935	G-10987	—	—	6/16/1989	10/1/2017	Quasi-Municipal	0.1337 cfs (60.0 gpm)

Water Provider	Source	Application / Claim / Decree	Permit	Certificate	Transfer	Priority Date	Development Deadline	Type of Beneficial Use	Maximum Authorized Rate (cfs) or Volume (AF)
	Wells A through R (18 wells)	G-13929	G-12721	—	—	12/28/1994	10/1/2025	Quasi-Municipal	4.0 cfs
	Well L-5	G-17130	G-16772	—	—	10/28/2008	7/15/2015	Quasi-Municipal	2.23
	Radley Well	G-18166	G-17909	—	—	12/4/2015	11/7/2022	Quasi-Municipal	2.0 cfs
Rickreall Community Water Association	A well	G-2080	G-1911	30825 46725	T-6696	7/26/1961	10/1/2000	Quasi-Municipal, March 1 – Oct. 31	0.64 cfs
	A well	G-3668	G-3444	36907 37055	T-6491	9/14/1966	10/1/1995	Quasi-Municipal, March 1 – Oct. 31	0.63 cfs, max. 126.5 AF
	Well 1	G-5536	G-5701	—	—	6/4/1971	10/1/2044	Quasi-Municipal	0.27 cfs (0.11 cfs development limitation per WMCP FO)
	Orchard Well 2, Rankin Well 4, Highway Well 1, Highway Well 2	G-12107	G-11288 G-17497	—	T-11970	5/10/1990	10/1/2046	Quasi-Municipal	0.74 cfs (0.39 cfs development limitation per WMCP FO)
	Well 5 (Setnicker Well)	G-12838	G-11977	—	—	3/25/1992	10/1/2047	Domestic and Commercial	0.56 cfs (During July and August, 0.01 cfs for Domestic only)
	Well 6	G-13567	G-12403	—	—	11/30/1993	10/1/2047	Quasi-Municipal, Nov. 1 – April 30	0.67 cfs (0.36 cfs development limitation per WMCP FO)
Rock Creek Water District	Unnamed stream	R-42854	R-4872	61768 90329	T-8473	9/26/1966	—	Storage in Rock Creek Hideout Reservoir for Municipal Use	0.15 AF
	Unnamed stream and Rock Creek Hideout Reservoir	S-42855	S-32029	61769 90330	T-8473	9/26/1966	—	Municipal	0.14 cfs
	Rock Creek	S-47263	S-35398	47319 88014 88710	T-9581	7/24/1970	—	Municipal	0.05 cfs, max. 17.49 AF
	Rock Creek	S-53020	S-40017	52404 88015 88711	T-9581	4/21/1975	—	Municipal	0.01 cfs, max. 17.49 AF

Attachment A: Summary of Polk County Water Suppliers

Polk County Water Suppliers

City of Dallas. The City of Dallas is the Polk County seat and is located approximately 15 miles west of Salem along Highway 22. In 2020, the City had approximately 6,053 residential connections and 80 non-residential. Rickreall Creek bisects the City and serves as the City's source of water supply. The City's water rights authorize storage and diversions of water from the creek at the City's Mercer Dam site. The City holds 25.33 cfs of water rights. A Water Supply Report (2018) noted the City may be susceptible to 50 and 100-year drought conditions and provided options for increasing the City's water supply.

City of Independence. The City of Independence is located on the west bank of the Willamette River, directly east of the City of Monmouth. The City had approximately 2,640 residential and 360 non-residential retail meter connections. The City holds 7.40 cfs of water rights for groundwater and 4.46 cfs of surface water rights from the Willamette River. The City relies on groundwater to meet system demand. Preliminary forecasts of demand associated with the City's draft Water Management and Conservation Plan indicate a deficit of groundwater supply within 20 years.

City of Monmouth. The City of Monmouth is located just west of the City of Independence along State Highway 51. The City provided water service to an estimated 2,545 residential customer accounts and 359 non-residential accounts in 2020. The City holds 13.15 cfs of groundwater rights and 7.80 cfs of surface water rights, including a permit for 4.46 cfs of surface water from the Willamette River with a development deadline of 8/17/2026. These rights should suffice to meet the City's 20 year demand according to the City's 2020 Water System Master Plan.

City of Willamina. The City of Willamina is located in both Polk and Yamhill Counties along the South Yamhill River, approximately 8 miles east of Grand Ronde along Highway 18. The water system served approximately 257 residential retail meter connections and 20 non-residential connections in 2020, including Hampton Lumber Mill outside the city limits. The City is in the planning phase for constructing a new municipal water intake. The City's source of water is Willamina Creek, for which it holds 2.8 cfs of municipal water rights. The City also holds a 1.0 cfs certificate for the use of water from Lady Creek, which is not currently in use. The City's 2021 Water Management and Conservation Plan concludes the City's current supply should meet projected demand through 2040.

City of Falls City. Falls City is located about 7 miles southwest of Dallas and includes land on both sides of the Little Luckiamute River. The water system served an estimated 447 residential retail meter accounts and 8 non-residential accounts. The City holds 4.76 cfs of municipal water rights from a variety of surface water sources. The primary drinking water supply comes from Glaze Creek in the winter and spring, and Teal Creek in the summer and fall. The City's 2017 Water Management and Conservation Plan notes an excess of supply capacity through 2035.

Buell Red Prairie Water District. The district was formed in 1979 as a private non-profit association. The district boundaries run from the eastern foothills of the coastal range at an elevation of approximately 1,000 feet above sea level to the Yamhill River valley at about 300 feet elevation covering an area of approximately 50 square miles. The district receives its water from a combination of surface water diversions from a man-made reservoir on Gooseneck Creek and wells that are supplemented by wet-season recharge from their surface water source. In 2020, the district served 315 residential retail service connections and 12 non-residential connections and had a population of 788.

Attachment A: Summary of Polk County Water Suppliers

Rickreall Community Water Association. The association was incorporated in 1973 to supply domestic water to rural homeowners in unincorporated Polk County. The service area extends for 17 square miles from the City of Dallas eastward along Highway 22. Residential customer connections number 467 accounts and non-residential number 80 accounts. The Association holds groundwater rights totaling 3.51 cfs. These supplies are predicted to meet demand through at least 2038 according to the Association's 2018 Water Management and Conservation Plan.

Grand Ronde Community Water Association. The Grand Ronde Community Water Association is a non-profit cooperative. The service area extends from the Grand Ronde community east along state Highway 18 to the town of Willamina, covering approximately 23 square miles of Polk County and bordering the Rock Creek and Buell Red Prairie Water Districts. The Association's service area included 968 residential and non-residential retail meter connections as of 2020. The association has a total of 1.17 cfs of permitted water rights authorizing uses of springs and a 0.30 cfs surface water right on Rock Creek. The Association predicts that these rights will meet average day demands through 2040, however due to restrictions on the use of one of the City's rights (Permit S-54818), high demands in the early fall may eclipse available supplies within this period of time based on the Association's 2021 Water System Master Plan.

Luckiamute Domestic Water Cooperative. The Luckiamute Domestic Water Cooperative is a privately owned cooperative established in 1966. The cooperative covers an approximate service area of 165 square miles in the southeast corner of Polk County. The cooperative provides service to approximately 1,085 rural households and 10 non-residential customers. The City's customers are located within the unincorporated communities of Airlie, Suver, Pedee, and Buena Vista and include seven commercial dairies. The cooperative holds 6.05 cfs of groundwater rights and purchases bulk water from Falls City to meet peak demands. These supplies will be adequate to meet demands at least through 2038 based on comparison of forecasted demand to available supplies documented in the Cooperative's 2017 Water Management and Conservation Plan.

Rock Creek Water District. The Rock Creek Water District was established in 1998. The district is located in the southern portion of Grand Ronde, Oregon along state Highway 18. In 2020, the district served 106 residential retail service connections, with a service area population of approximately 235. The District holds 0.2 cfs of water rights for Rock Creek and up to 17.64 acre-feet per year of stored water in Rock Creek Hideout Reservoir. The reservoir's source of water is an unnamed tributary of Rock Creek. The District also holds one groundwater right used as a back-up supply. Based on an interview with the District manager conducted in October 2021, the District anticipates the addition of one new residential connection within the next 20 year and the District will be able to meet demands at least through 2040 with existing supplies.

Perrydale Domestic Water Association. Perrydale Domestic Water Association was incorporated as a rural private non-profit cooperative water system in 1970. The association's service area covers 130 square miles in the unincorporated portions of northeast Polk County. The source of supply is a series of wells with a total of 9.58 cfs of groundwater rights. This supply was used to serve approximately 809 residential connections and 50 non-residential retail meter connections in 2018. Perrydale's 2018 Water Management and Conservation Plan concludes the Association has enough available supply to meet demand through 2038.

Appendix B

Water Demand Analysis Data

City of Dallas

City of Dallas, personal communication

- City provided demand forecast projections
- Not every forecast of demand provided by the City corresponds to the per capita forecast methodology

Falls City

Water System Master Plan, HBH, 2017

- future population growth 1.5%, starting with a population of 950 in 2015
- average water consumption 85 gpcd, not including Luckiamute bulk sales
- Luckiamute assumed to purchase 10,203,000 gallons per year = 27,953 gal/day
- average day 2015 = 73 gpm (0.11 mgd), 2035 = 156 gpm (0.22 mgd)
- ADD 2015 based on gpcd = 0.08 mgd; ADD 2015 based on gpm = 0.11 mgd
- MDD 2035 based on gpm = 0.50 mgd, which is also the MDD the plan says will be reached by 2032
- peaking factor for 2015 is either 3.33 or 4.38 depending on where you look in the plan
- peaking factor for 2035 is 2.22
- use 85 gpcd for the ADD, add Luckiamute, and a peaking factor of 3.33 to find MDD
- these numbers do not match the few example years listed; assumptions made are unknown

City of Independence

Draft Independence Water System Master Plan, Westech Engineering, 2022, and Draft Water Management and Conservation Plan, GSI Water Solutions, 2022

- 106 gpcd average, 212 gpcd MDD
- future population growth 2.3%, starting with a population of 9,961 in 2021

City of Monmouth

Monmouth Water System Master Plan, 4B Engineering & Consulting, 2020

- future population growth 1.5%, starting with a population of 10,353 in 2020 (our numbers match projections in the plan)
- ADD is based on 100 gpcd plus Western Oregon University 9-month average demand
- MDD is based on 250 gpcd plus WOU summer 3-month demands
- simplified to use 1.5% average annual increase for ADD, peaking factor of 2.52 for MDD

City of Willamina

Willamina Water Management and Conservation Plan, Keller Associates, 2021

- future population growth 0.9% 2017-2035 and 0.6% 2035-2067 on Polk County side
- future population growth 1.2% 2017-2035 and 0.7% 2035-2067 on Yamhill County side
- starting with population of 2,158 in 2020; 928 in Polk and 1,230 in Yamhill
- since the projected numbers in the plan don't match the growth rates, used PSU projections combining Polk and Yamhill portions
- 159 gpcd for ADD but only counts residential use so that doesn't produce the projected ADD/MDD numbers in the plan, unknown assumptions
- used ADD and MDD projections in the plan and extrapolated straight line slope

Buell Red Prairie Water District

Buell Red Prairie Water District Water System, Personal Communication, 2021

- Buell Red Prairie Water District currently has a moratorium on growth and does not anticipate lifting this moratorium in the near future. Therefore, the District requested that the District's future demands remain at current levels.

Grand Ronde Community Water Association

Grand Ronde Community Water Association Water System Master Plan, 2021

- 2.58 people per connection, 968 connections in 2020
- PSU projections about 1%, Grand Ronde Tribal Community projected growth rate 3%
- given their projected population numbers, AAGR would be about 0.40%; used their numbers and kept projecting out at that rate
- ADD was projected for 2020-2040, using 90 gpcd
- MDD was projected for 2020-2040, using 202.5 gpcd

Luckiamute Domestic Water Cooperative

Luckiamute DWC WMCP 2018

- population of 2,738 in 2017 with 1.7% annual growth rate
- projected population 3,220 in 2027 and 3,780 in 2037
- ADD of 440 gal/day/connection, 2.62 people per connection
- MDD of 827 gal/day/connection, 2.62 people per connection

Perrydale Domestic Water Association

Perrydale DWA WMCP 2018

- population 2,405 in 2018, about 2.8 people per connection
- projected growth rate for the service area is given as 2.8%
- no population projections are given (graph goes from 1970 to 2010)
- demand is forecasted 2017-2026 in gallons used annually; 2020-2023 are all the same and then it starts going up
- no MDD information

Rickreall Community Water Association

- new connections limited to 10 per year, estimated 2.5 people per connection, so added 25 people per year for population projection (limit?)
- 159 gpcd ADD, 319 gpcd MDD
- Rickreall CWA WMCP 2018

Rock Creek Water District

- build out population 107 connections = 237 people
- ADD based on 5 MG/year
- no info about MDD

Rock Creek Water District

- build out population 107 connections = 237 people
- ADD based on 5 MG/year
- no info about MDD

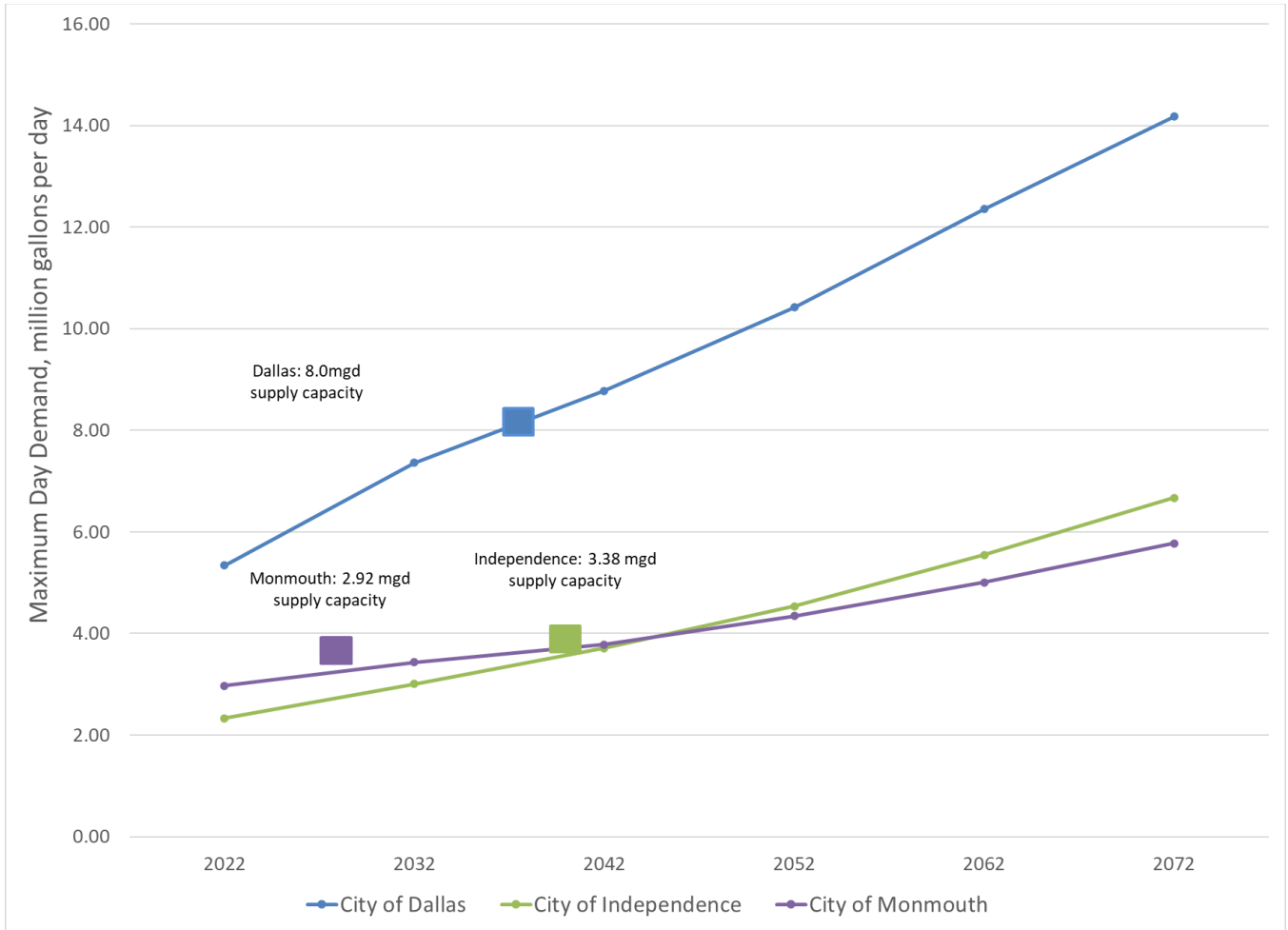
Water Provider	Water Rights (cfs)				Source or Treatment Capacity Limitations	Current Demand (mgd) & Year	Current Peak Demand (mgd) and Year	Projected Demand (Year)	Projected Peak Demand (mgd) and Year	Notes
	Surface Water (Authorized)	Surface Water (Dev't Limitations)	Groundwater (Authorized)	Groundwater (Dev't Limitations)						
City of Dallas	25.33	-	-	-	Mercer Reservoir storage volume limits City's ability to meet 100 and 50 yr. droughts. WR = 3.45 mgd on Rickreal Cr.	Production ADD 2.52 mgd, MDD 5.34 (2015-2020 avg.)	5.72 (2015-2020 max.)	MDD 14.18 mgd (2072)	MDD 14.18 mgd (2070)	Needs to expand supply in the Rickreal watershed-- ASR didn't work as planned. Plans to build additional impoundment.
City of Falls City	4.76	4.53	-	-	390 gpm (WTP)	MDD 243 gpm (2015)	0.35 (2015)	MDD 346 gpm (2035)	0.50 (2035)	Sells bulk water to Luckiamute Water Coop
City of Independence	4.46	-	7.4	6.86	Summer well capacities = 2,105 gpm (3.3 mgd)	PHD 2.48 cfs (2019)	1.60 (2019)	MDD 2,700 gpm or 3.9 mgd (2045)	MDD 2,700 gpm or 3.9 mgd (2045)	No surface water currently used. Permit for Willamette River (4.46 cfs)
City of Monmouth	7.8	-	13.15	-	Combined well capacities are less than 2040 MDD. Wells have WQ issues. B/c water rights far exceed future need, WSMP suggests City should consider modifying rights (e.g. via transfers) to gain access to additional water under existing rights.	ADD 0.88 mgd (2019)	MDD 2.6 mgd (2019)	ADD 1.5 mgd	MDD 3.8 mgd (2040)	Additional data available in 2020 WSMP in folder. Permit for Willamette River (4.46 cfs). Did not confirm WR after receipt of WSMP.
City of Willamina	3.8	-	-	-	Must transfer S-23560 to new POD (new diversion) on Willamina Cr. to meet 2040 demand. (Old diversion abandoned?)	PHD 875 gpm (2020)	1.26 (2020)	PHD 921 gpm (2030) PHD 962 gpm (2040)	1.33 (2030) 1.39 (2040)	Important: 2005 Polk Co. Water Supply Strategy doesn't accurately describe population. See Draft WMCP Sect. 5.6.2.
Polk County	25	0	-	-	no infrastructure yet					Willamette River permit not yet developed - potential regional supply. If not fully developed by 2051, it will be diminished to the amount beneficially used.
Buell Red Prairie Water District	0.23	-	0.4456	-	2 wells limited to combined 100-200 gpm (0.2-0.4 cfs) due to seasonal variability & interference from "nearby" ASR.	TBD	TBD	TBD		District has a moratorium on growth due to availability of stored water or possibly due to the size of the storage reservoir. Additional stored water rights with no rate limitation.
Grand Ronde Community Water Association	1.47	-	-	-	WR rates too low to meet 2040 demand. Must expand storage capabilities, reduce 30% loss, and/or new sources of supply.	Consumption ADD 0.24 mgd + 30% water loss (2020)	Consumption MDD 0.51 mgd + 30% water loss (2020)	ADD 0.24 mgd (2040) +30% water loss	MDD 0.55 mgd (2040) +30% water loss	Did not confirm WR after receipt of WSMP. Serves customers in Polk County and Yamhill County.
Luckiamute Domestic Water Cooperative	-	-	6.05	-	1663 gpm (wells)	PHD 1020 gpm (2017)	1.47 (2017)	PHD 1207 gpm (2027) PHD 1428 gpm (2037) PHD 2002 gpm (2057)	1.74 (2027) 2.06 (2037) 2.88 (2057)	
Perrydale Domestic Water Association	-	-	9.58	-	Difficult to discern from WMCP. Appears o.k. for the next 20 years.		est. 101.5 mgd (2017)	MDD 117 MGD (2026)	MDD 117 MGD (2026)	WMCP expresses interest in regional supply - Valsetz storage project. Demand estimates are not clear from WMCP but appear to indicate that water usage will approach total authorized rates around 2036.
Rickreall Community Water Association	-	-	3.51	2.69	645 gpm (wells)	MDD 0.41 cfs (2018)	0.26 (2018)	MDD 0.93 cfs (2028) MDD 1.05 cfs (2038)	0.60 (2028) 0.68 (2038)	Contract to buy surplus water from Dallas, rarely if ever used
Rock Creek Water District	0.2	-	-	-	None of note. WTP capacity = 100 gpm, but usage of 25 gpm on avg. Storage limited to 17.64 af/yr, but doesn't appear to be a constraint.	0.0432	0.09216	See notes	See notes	Data based on interview w/ Mel Wheeler. No WSMP. Only 1 more property to be developed, maxing out at 107 connections, bringing build out pop to 237 ppl.
City of Adair Village	11.2	5.93	-	-	2.3 mgd (WTP)	ADD 0.18 mgd (2013) ADD 0.26 mgd (2009-2013 avg.)	0.92 (highest MDD from 2009 to 2013)	MDD 4.22 cfs (2025) MDD 5.93 cfs (2035)	2.73 (2025) 3.83 (2035)	Surface water authorization includes 3.0 cfs certificate and City's portion (8.2 cfs) of 82 cfs Willamette River permit. Of the 82 cfs permit, 16.0 cfs is allocated to Polk County and 57.7 cfs is allocated to City of Hillsboro. Adair Village has a development limitation of 2.93 cfs on its portion.

Appendix C

Water Demand Projections Figures

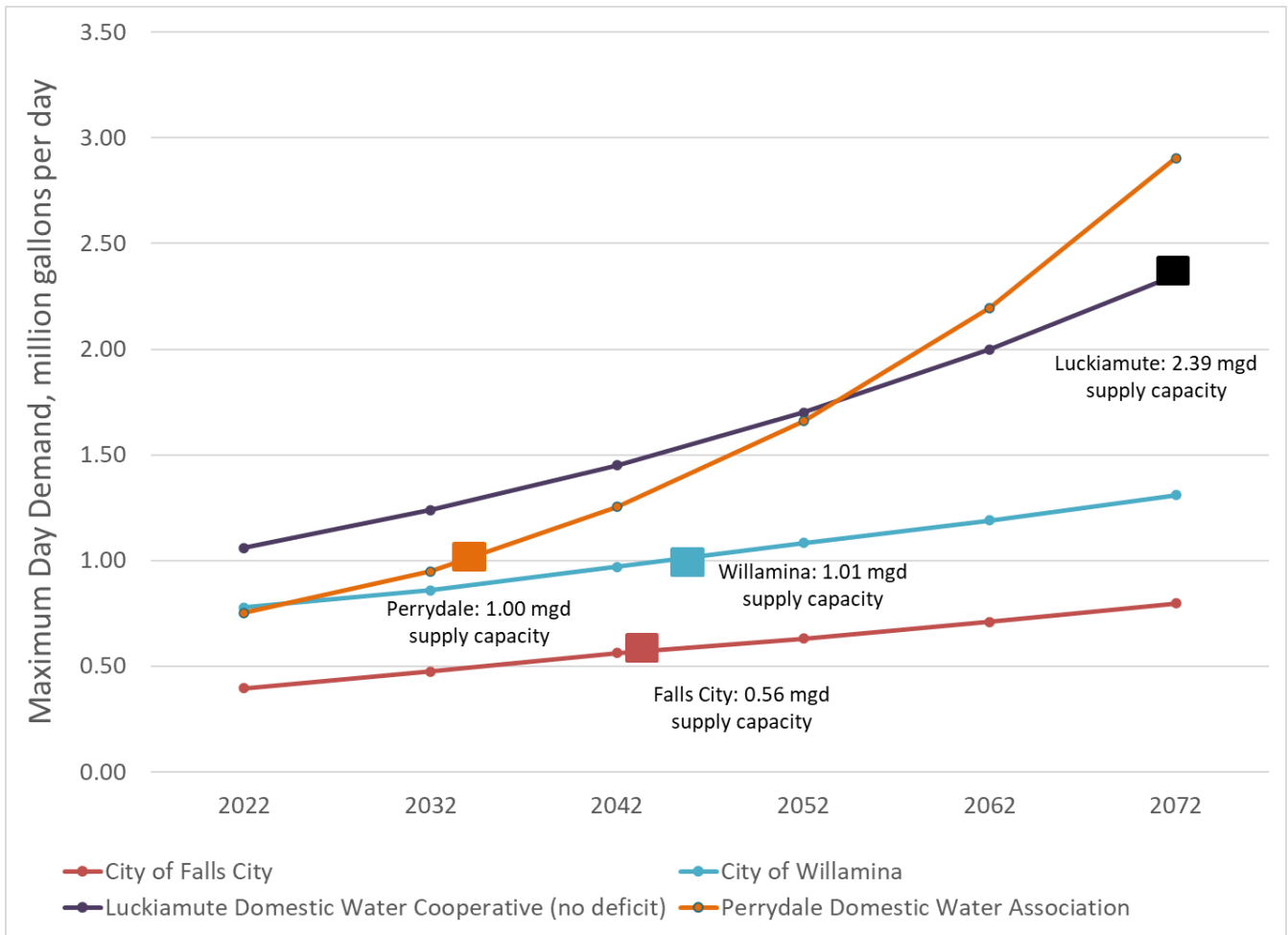
Attachment C

Figure C-1. Supply Capacity vs. MDD: Dallas, Independence, Monmouth



Attachment C

Figure C-2. Supply Capacity vs. MDD: Falls City, Willamina, Luckiamute DWC, Perrydale DWA



Attachment C

Figure C-3: Supply Capacity vs. MDD: Buell Red Prairie WD, Grande Ronde CWA, Rickreall CWA, Rock Creek WD

