DRAFT STRATEGY SCOPING: STREAMFLOWS, GROUNDWATER AND WATER SUPPLY

Executive Summary

To be drafted once all comments are received.

Background

The Walla Walla Water 2050 Strategic Plan (Strategic Plan) was completed in June 2021. This memo is part of Phase 2 of the Walla Walla 2050 Strategic Plan process – an effort to build on the completed Strategic Plan by analyzing and refining implementation details of the Tier 1 strategies. The Strategic plan identified 60 strategies to manage water resources to meet multiple benefits in the Walla Walla watershed. These strategies were prioritized into three tiers; the highest tier, Tier 1, included 23 strategies. This memo, along with a series of subsequent memos will provide additional detail on these Tier 1 strategies to help move these strategies forward to implementation. This memo is focused on priority strategies related to **Streamflows, Groundwater, and Water Supply.**

Introduction

Strategies scoped in this memo include those in Tier 1 related to streamflows, groundwater and water supply. The strategies discussed here include:

- Strategy 1.03: Direct additional winter flow down the Little Walla Walla River to support alluvial aquifer recharge and stream function;
- Strategy 1.04: Water rights acquisitions (short-term, long-term, and split season) to restore streamflow (covered in detail in Appendix A);
- Strategy 1.05: Improve and expand managed aquifer recharge (MAR);
- Strategy 1.08: Decrease surface water diversions or substitute for basalt wells during low flow periods and;
- Strategy 1.13: Expand and support Aquifer Storage and Recovery (ASR) to maintain groundwater quality and capacity.

One strategy will be scoped in a separate memo by Jacobs Engineering, which will be attached here as an Appendix once completed:

- Strategy 1.02: Support the ongoing analyses of the Bi-State Flow Study and work toward a recommendation on implementation of the preferred alternative.

The remainder of this memo more fully explains each of these strategies and their components and provides information on status, implementation, potential barriers, and relationships of these and other strategies.

Note: there are two distinct strategies for groundwater storage in Oregon and Washington: managed aquifer recharge (MAR) and aquifer storage and recovery (ASR) projects. While both strategies can benefit groundwater resources, they are accomplished in different ways and for different objectives. MAR is meant to supplement the natural groundwater recharge process, typically through the infiltration of rain and snowmelt, by diverting surface water into infiltration basins where it naturally seeps into unconfined aquifers. This can reverse groundwater level declines, help add to interconnected surface water discharges, and/or be used as mitigation for other water withdrawals. ASR projects divert surface water when it is available and inject it into confined aquifers as a way to store that water for recovery during periods when surface water is more limited. ASR is essentially another form of storage, which is less costly and impactful on the environment than surface water storage infrastructure like dams and reservoirs.

Current Status

Strategies that impact streamflow and aquifer levels drive many critical dynamics in the Walla Walla Basin. The amount of water flowing through the basin's streams dictates water availability for agricultural water rights and instream flow levels for important fish species; it also influences water quality, fish passage and other variables. At the same time, water flowing in streams is only one part of the basin's water budget; the basin's aquifers, invisible though they are, carry similar importance for influence on the health of the basin. Shallow aquifers are closely connected to surface water and what happens to one source, whether that is a diversion, pumping from shallow groundwater or managed aquifer recharge, has repercussions for the other source. Deep basalt groundwater provides the basin with a critical resource that, if managed for long-term sustainability, can provide an additional water source that can be leveraged alongside other sources to help balance water supply and demand. This section provides further details on the status of surface water and both shallow and deep basalt aquifers in the basin as well as discussing at a high level the role these sources play for the basin's ecosystems, communities and water users.

Walla Walla Subbasin

Surface Water

Surface water in the Walla Walla River and its primary tributaries follows a typical runoff pattern for a semi-arid region with relatively small, lower-elevation mountain ranges. The system responds rapidly to precipitation and snowmelt events and has minimal baseflow from late spring through late fall. Due to a lack of substantial snowpack in the relatively low-elevation Blue Mountain range, natural streamflows are typically low year-round, but particularly during the drier summer months. Naturally low flows occur annually from late June through the end of October and are compounded by the impact of irrigation diversions, groundwater withdrawals, hydraulic alterations for flood control, climate change, and other factors. The amount of streamflow lost due to these factors can represent a significant portion of the rivers' and creeks' flow on a given day during baseflow conditions in summer and early fall (e.g. <1% to 80% of baseflow) (Baker 2013).

Many of the lower reaches of the Walla Walla River, Touchet River, and Mill Creek have been dewatered during low flow periods; however, water management efforts have had a positive impact on low flows in some reaches. The 2013 Walla Walla River Ecological Flows study recommended streamflow targets to support fisheries habitat and floodplain function (Stillwater Sciences 2013). The ecological flow targets for each reach in the basin are summarized in Table 1. New appropriations of surface water are closed for most of the year throughout the basin. The Washington portion of the Walla Walla River is closed to new appropriations from July to November and open only to new permits that qualify as environmental enhancement projects from November to July (WAC 173-532-055). On the Oregon side, the river is closed to appropriations between May and December with some limited availability from January to April.

Table 1. Summary of summer ecological flow targets recommended by the Walla Walla River Ecological Flows study (Stillwater Sciences 2013).

Ecological Flow Target Reach	Recommended Winter & Spring Flow (CFS)		
	July	August	September
S. Fork Walla Walla River	70	70	70
N. Fork Walla Walla River	11	6	7
WWR Reach 5	90	90	90
WWR Reach 4	91	90	90
WWR Reach 3	143	135	135
WWR Reach 2	146	137	137
Mill Creek Reach 5	51	44	44
Mill Creek Reach 2	52	45	45
N. Fork Touchet River	43	40	25
Touchet River Reach 2	35	25	32
Touchet River Reach 1	36	26	33

In addition to flow targets during the typical low flow times of year, winter and spring flow targets are also important (minimum flow targets are described in Table 2). Several of the strategies discussed below involve diverting surface water during higher flow times of year (mainly in the winter and spring). Even though flows in the basin's rivers are higher during these times and there is less demand for irrigation, rivers, aquatic species and riparian areas depend on high flows; peak and high flows help with channel formation, flushing sediment and other processes that are vital to maintaining healthy streams and floodplains. Ecological peak flows are described as 2-year and 7-year recurrence interval flow values Table 3. Flows at the 2-year recurrence interval are defined as the "bankfull" or "habitat maintenance" flows, and 7-year recurrence interval flows are "riparian refreshment" flows which overtop stream banks (Stillwater Sciences 2013).

Table 2. Summary of winter and spring ecological flow targets recommended by the Walla Walla River Ecological Flows study (Stillwater Sciences 2013).

Ecological Flow Target Reach	Recommended Winter & Spring Flow (CFS)						
	October	November	December	January	February	March	April
S. Fork Walla Walla River	70	70	70	70	74	85	111
N. Fork Walla Walla River	11	21	21	27	30	38	52
WWR Reach 5	91	96	97	105	112	197	297
WWR Reach 4	92	105	106	117	127	215	322
WWR Reach 3	138	160	170	191	215	319	471
WWR Reach 2	142	169	180	208	235	338	488
Mill Creek Reach 5	43	49	55	62	75	90	131
Mill Creek Reach 2	46	55	64	74	88	104	149
N. Fork Touchet River	25	46	58	55	88	102	140
Touchet River Reach 2	45	60	78	96	140	196	219
Touchet River Reach 1	48	64	82	102	152	212	236

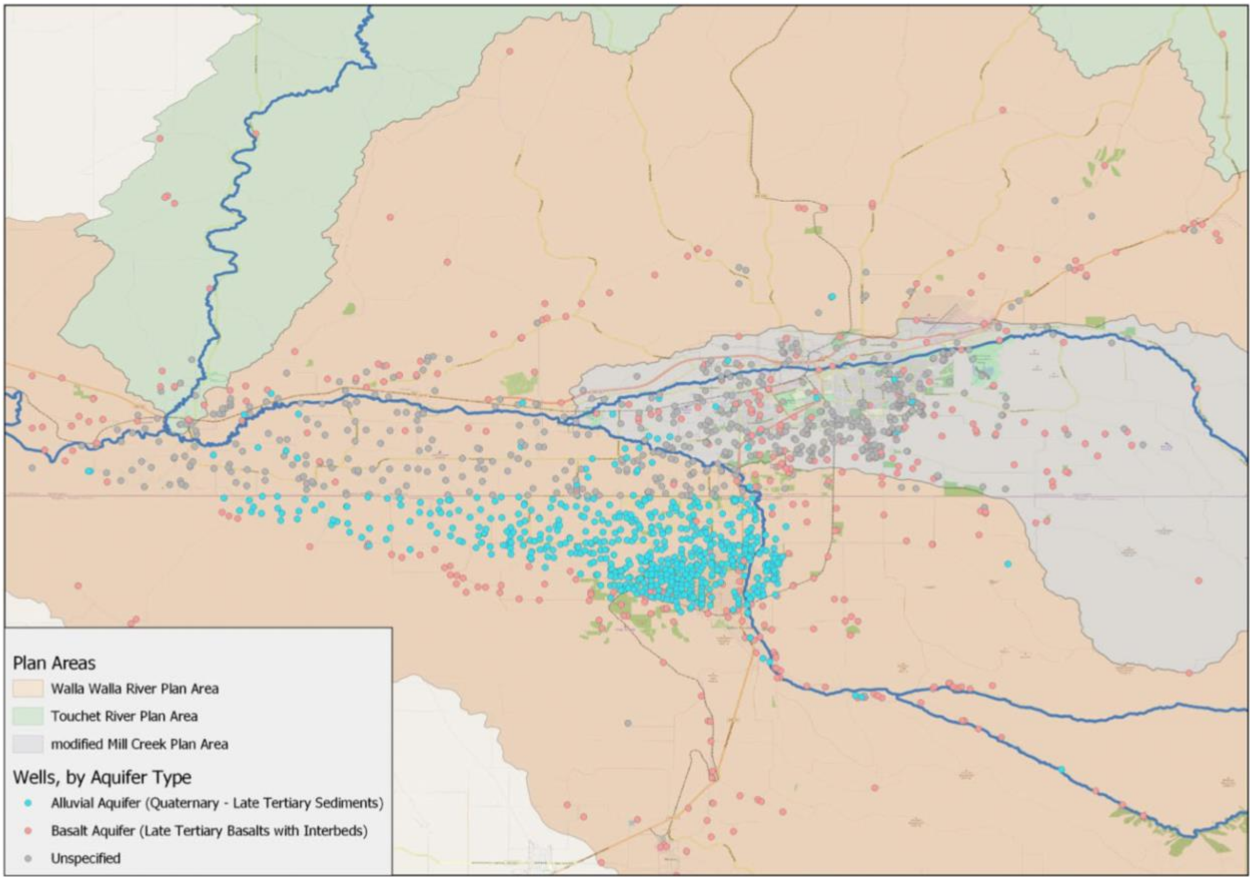
Table 3. Summary of peak ecological flows, described as the 2-year and 7-year recurrence interval flows (Stillwater Sciences 2013).

Ecological Flow Target Reach	Period of Analysis	2-year Recurrence Interval Flow (cfs)	7-year Recurrence Interval Flow (cfs)
S. Fork Walla Walla River	1908-2009	600	820
N. Fork Walla Walla River	1931-2009	406	555
WWR Reach 5	1934-2009	1,151	1,558
WWR Reach 4	1934-2009	1,374	1,905
WWR Reach 3	1940-1971	2,015	3.571
WWR Reach 2	1949-1971	2,205	3,571
Mill Creek Reach 5	1940-1971	630	995
Mill Creek Reach 2	1940-1971	801	1,170
N. Fork Touchet River	1941-1967	700	1,300
Touchet River Reach 2	1952-1989	1,591	2,636
Touchet River Reach 1	1952-1989	1,780	2,850

Groundwater

In addition to surface flows, basin water users depend heavily on groundwater sources as both a primary and supplemental water supply. The Basin's groundwater supply is derived from the Blue Mountain range's underground aquifer systems, which consist of both shallow alluvial and basalt aquifers (Figure 1). These aquifer systems are hydrologically interconnected with the Walla Walla River and tributaries – discharging to the river via springs and flowing through the streambed in some places while recharging streams in other areas. Aquifer recharge of both alluvial and basalt aquifers occurs from winter and year-round precipitation; in some locations, rivers and creeks recharge aquifers directly. Recharge and discharge rates, surface water connectivity, and groundwater movement between and within the alluvial and basalt aquifer differ laterally and vertically in the basin.

Figure 1. Map of groundwater wells tapping into both alluvial and basalt aquifers in the Walla Walla Basin (Oregon Water Resources Department, n.d.).



In general, groundwater occurs in two aquifer systems in the Walla Walla Basin – a shallow alluvial aquifer and basalt aquifer. The alluvial aquifer covers 190 square miles under a lowland portion of the basin and consists of Pliocene to recent age water-bearing sediments and sedimentary rocks with local, poorly permeable interbeds. It serves as an important source of water for the agricultural sector and rural communities, where many wells are constructed. In gaining reaches, the alluvial aquifer discharges cool, high-quality water locally to the Walla Walla River, Touchet River, and Mill Creek (and their tributaries) and feeds wetlands, springs, and seeps. In losing reaches, the river loses water to the alluvial aquifer and recharges it. Long-term trends (over a period of 70 years) indicate groundwater level declines throughout a significant portion of the basin – at rates ranging from 0.03 to 0.4 feet per year [53]. Declines are attributable to management changes affecting hydrological and floodplain systems, including (Wolcott 2010):

- river and creek channelization, resulting in loss of recharge in historic floodplains and alluvial fans of the Walla Walla River and Mill Creek;
- diversion of surface water from stream reaches where recharge occurred historically;
- groundwater withdrawals for water supply and reduction of alluvial aquifer storage; and
- efficiency in agricultural conveyance/irrigation reducing recharge.

No new consumptive, unmitigated water rights have been issued for the alluvial aquifer on the WA side of the basin since 2003. The aquifer was closed to new consumptive (non-domestic) water rights in accordance with the Washington State Water Management Rule in 2007 (WAC 173-532). The Washington Water Management rule requires mitigation for some new permit exempt wells however these requirements are not integrated with the building permit process, meaning there may be permit exempt wells being installed and put to use that are required to mitigate but do not obtained mitigation. On the Oregon side, alluvial and basalt groundwater is restricted for exempt well use only without a mitigation requirement (Oregon Water Resources Department n.d.).

The basalt aquifer comprises multiple aquifers occurring in Miocene age rocks of the Columbia River Basalt Group and spans a much larger area (2,500 total square miles), extending beyond the watershed boundaries. Individual aquifers generally consist of porous basalt interflow zones that occur between dense, low-permeable basalt flow interiors. The basalt aquifer is an important source of water for agricultural, municipalities, and industrial/commercial entities. Recharge rates and storage properties are typically low, and declining water levels indicate that water use exceeds recharge in some areas. Over the past 70 years, water levels in the basalt aquifer have been declining at rates of approximately 1-4 feet per year, with total declines over 100 feet in some areas. Long-term water level declines suggest that the current withdrawals from the basalt aquifer are unsustainable. Declines can be reduced by either decreasing withdrawals or increasing recharge.

In some areas, declining water levels may indicate the presence of basalt “blocks” that are somewhat hydraulically isolated and therefore may be favorable for aquifer storage and recovery (ASR) – recharge water can be reasonably contained in these areas, so that treated source water can be injected, stored, then pumped out for use as needed. Since 1999, the City of Walla Walla has been researching, developing, and utilizing basalt ASR facilities to treat Mill Creek flows so that the City can store and later supply this recharged water to its customers.

Mid-Lower Mainstem Walla Walla River

The Walla Walla Bi-State Flow Enhancement Study (Flow Study) investigated current flow conditions and identified streamflow targets for the lower mainstem Walla Walla River (the reach extending from the controlled diversion into the Little Walla Walla River near Cemetery Bridge in Milton-Freewater, Oregon, to the confluence with the Columbia River) (Walla Walla Watershed Flow Study Steering Committee 2019). The primary objective of the Flow Study was to sustain streamflow at levels that support naturally sustaining harvestable populations of native fish species, while maintaining the long-term viability of agricultural, municipal, commercial, and residential uses of water. The Flow Study identified streamflow targets for the lower Walla Walla River, which are summarized in Table 4.

Table 4. Critical period streamflow targets for the lower mainstem Walla Walla River (Walla Walla Watershed Flow Study Steering Committee 2019).

Time Period	Flow Study Target Streamflow
April 1 - June 15	150 cfs
June 16 - June 30	100 cfs
July 1 - November 30	65 cfs

The Flow Study focused on defining streamflow targets based only for critical time periods for fish species from April 1 to November 30. Information on prescribed flow targets and peak flows for the winter months (December through March) were described in Stillwater Sciences' 2013 report (Stillwater Sciences 2013). In this report, there were five delineated reaches which cover the lower mainstem Walla Walla River as defined in the Strategic Plan (from the mouth to Milton-Freewater). The five reaches which make up the lower mainstem Walla Walla and the prescribed winter flows for each reach are described in Table 5 (Stillwater Sciences 2013).

Table 5. Winter flow targets for the lower mainstem Walla Walla River.

Reach	Reach Description	Prescribed Winter Flow (CFS)			
		December	January	February	March
WW Mainstem Reach 1	Mouth to confluence with Touchet River	268	320	398	561
WW Mainstem Reach 2	Touchet River confluence to Dry Creek confluence	180	208	235	338
WW Mainstem Reach 3	Dry Creek confluence to Mill Creek confluence	170	191	215	319
WW Mainstem Reach 4	Mill Creek confluence to Yellowhawk Creek confluence	106	117	127	215
WW Mainstem Reach 5	Yellowhawk Creek confluence to Couse Creek confluence (just upstream of Milton-Freewater)	97	105	112	197

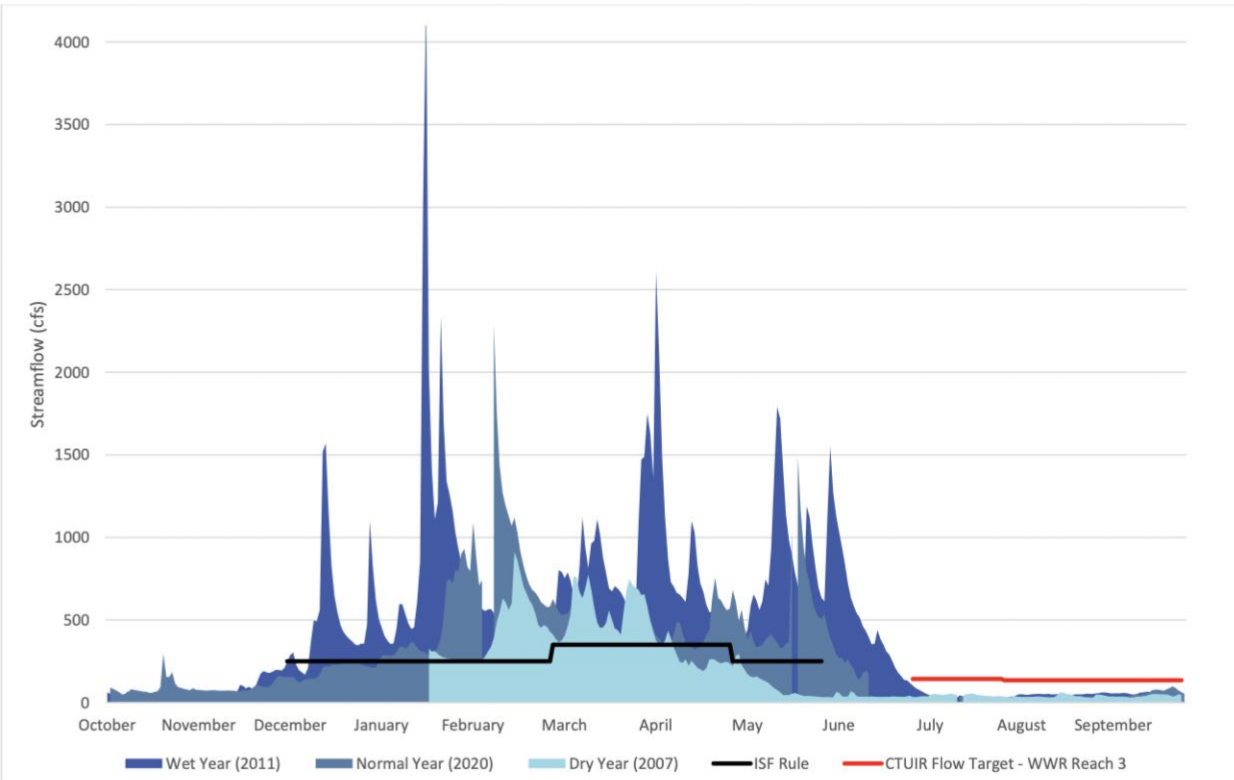
The Flow Study aims to sustain these streamflow targets throughout the entire reach of the Walla Walla River from Cemetery Bridge to the mouth. To date, three primary projects and about a dozen secondary projects have been identified and are currently being evaluated in greater detail:

- Primary projects – water source exchange (Columbia River Pump Exchange) and two new water storage reservoirs (Pine Creek and Warm Springs reservoirs)
- Secondary projects – managed aquifer recharge (MAR), aquifer storage and recovery (ASR), piping of open canals/ditches, a water market, and other water conservation strategies.

The WWW2050 Strategic Plan measured streamflow in the Lower Walla Walla River at a stream gage at E. Detour Road, located just downstream of where Mill Creek and the Little Walla Walla

River enter the mainstem Walla Walla. Figure 2 shows streamflows in representative wet, normal, and dry years. During normal and dry years, this site can experience low flows below the Washington Instream Flow (ISF) Rule levels during the winter months, with the biggest gaps occurring from the end of April into June. Flows in all representative year types remain low from the end of June through September, lower than the CTUIR flow target for Walla Walla River reach 3.

Figure 2. Hydrograph of the Lower Walla Walla River at E. Detour Road during representative dry, normal, and wet years.



Little Walla Walla River

The Little Walla Walla River and Spring Branches are historic channels and/or side channels of the Walla Walla River. The head of the Little Walla Walla system is controlled by a headgate off of the mainstem Walla Walla River and fish are screened out of the system. The Little Walla Walla surface water system function as points of interaction between the discharge of the mainstem Walla Walla River and the shallow alluvial aquifer. Data collected have stablished a strong direct correlation of diversion flows in the Little Walla Walla system and area groundwater levels. The Little Walla Walla and Spring Branches System absorb and release flows, but the temporal nature is not well understood.

As irrigated agriculture increased in the second half of the 1800s, water was diverted from the mainstem Walla Walla River into a combination of existing stream channels and constructed ditches that conveyed water to irrigators. The irrigation diversions from the Walla Walla mainstem reduced the spring flooding that historically recharged the shallow aquifer; however, irrigation system inefficiencies (leakages) and applied irrigation allowed a significant percentage of the water to infiltrate into the shallow aquifer (HDR 2006). However, over the last couple of decades irrigation districts made improvements to their conveyance systems (lining and piping) and since 2000 three of the largest irrigation districts operate under an instream flow settlement agreement administered by the US Fish and Wildlife Service, which both result in less water being diverted from the Walla Walla River mainstem into the Little Walla Walla system. Installation of a headgate at the start of the Little Walla Walla system and a focus on flow in the mainstem Walla Walla to meet instream flow needs for fish have had a significant negative impact on flows in the Little Walla Walla and Spring Branches System. The headgate at the start of the Little Walla Walla system screens out fish from accessing the Little Walla Walla, so diverters from this reach are not required to have ESA-compliant diversion operations.

The Little Walla Walla River Assessment and Initial Action Plan (Wolcott 2010) described actions that could provide benefit toward the goals of increasing year-round flows in the Little Walla Walla River and improving groundwater level and spring flows. Specific actions described for these goals include the following:

- improve water management to and between diversions with coordinated rotations (already being implemented by WWRID for upper Little Walla Walla River);
- improve water measurement at diversions (already being implemented on irrigation district turnouts and increasingly at the turnouts of individual farms);
- improve irrigation efficiency on farms;
- clear non-native vegetation and sediments preventing adequate flows;
- implement passive groundwater recharge by maintaining winter flows in the Little Walla Walla River; and
- continue operating existing recharge sites and install additional shallow aquifer recharge sites.

The Tier 1 strategy for the Little Walla Walla River identified by WWW2050 is to direct additional winter flow down the Little Walla Walla River to support alluvial aquifer recharge and stream function.

Upper Walla Walla River Mainstem

The 2017 Flow Study set targets for summer flows in the upper reach of the Walla Walla River mainstem (the reach from the confluence of the Forks to Milton-Freewater), as measured at the Cemetery Bridge diversion/gage. Long-term target flows were determined to be 150 cfs for April through June and 65 cfs for July through November (Walla Walla Watershed Flow Study Steering Committee, Walla Walla Watershed Management Partnership, and Aspect Consulting 2017). Additional analysis of instream flow needs for this reach was conducted by Stillwater Sciences as part of a planning effort for a potential Pine Creek storage reservoir which would divert its storage water from the Walla Walla River. This analysis applied the instream flow recommendation methodology from Stillwater Sciences' 2013 Ecological Flows report to determine flow targets for the winter months not covered by the 2017 Flow Study. Recommended winter flow targets were 95 cfs in December and January and 120 cfs in February and March (Table 6) (Confederated Tribes of the Umatilla Indian Reservation (CTUIR) 2018).

Table 6. Recommended instream flow targets at Cemetery Bridge.

Analysis	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1. Mean Monthly Flow (1952-68)	56	87	129	145	161	160	193	157	95	59	50	50
2. ODFW IFIM Optimal (1973)	69	74	120	120	137	137	137	137	105	85	85	77
3. Stillwater Prescribed (2013)	91	96	97	105	112	197	297	230	156	90	90	90
4. ODFW IFIM Minimum (1973)	35	40	95	95	120	120	120	120	80	55	55	55
5. WWBIFES Flow Targets (2017)	65	65	--	--	--	--	150	150	150/100	65	65	65
6. WWBIFES Scenario a. (2018)	65	65	95	95	120	120	150	150	150/100	65	65	65
7. WWBIFES Scenario b. (2018)	65	65	95	95	112	120	150	150	150/100	65	65	65
8. WWBIFES Scenario c. (2018)	65	65	95	95	95	120	150	150	150/100	65	65	65

IFIM = Instream Flow Incremental Methodology, developed by USFWS, used by ODFW in 1973 report.
WWBIFES = Walla Walla Bi-State Integrated Flow Enhancement Study

Walla Walla River Headwaters Including North and South Forks

Stillwater Sciences' 2013 Ecological Flows report investigated historic mean monthly flows and prescribed ecological flow targets for the summer months (July – September) for both the North and South Forks of the Walla Walla River. Flows in the South Fork are much higher year-round than flows in the North Fork (Table 7).

Table 7. Mean monthly flows for North and South Fork Walla Walla River.

Reach	Period of analysis	Mean monthly flow (WY Oct–Sept) (cfs)											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
South Fork Walla Walla	1952–1968	114	132	175	178	202	193	275	295	196	122	107	107
North Fork Walla Walla	1952–1968	11	21	52	60	76	68	120	93	30	7	4	6

The Ecological Flows report recommended ecological target summer flows of 70 cfs for the South Fork Walla Walla and targets of 11 cfs in July, 6 cfs in August, and 7 cfs in September for the North Fork Walla Walla. Recommended winter and spring flows were also described in the Ecological Flows report (Table 8) (Stillwater Sciences 2013).

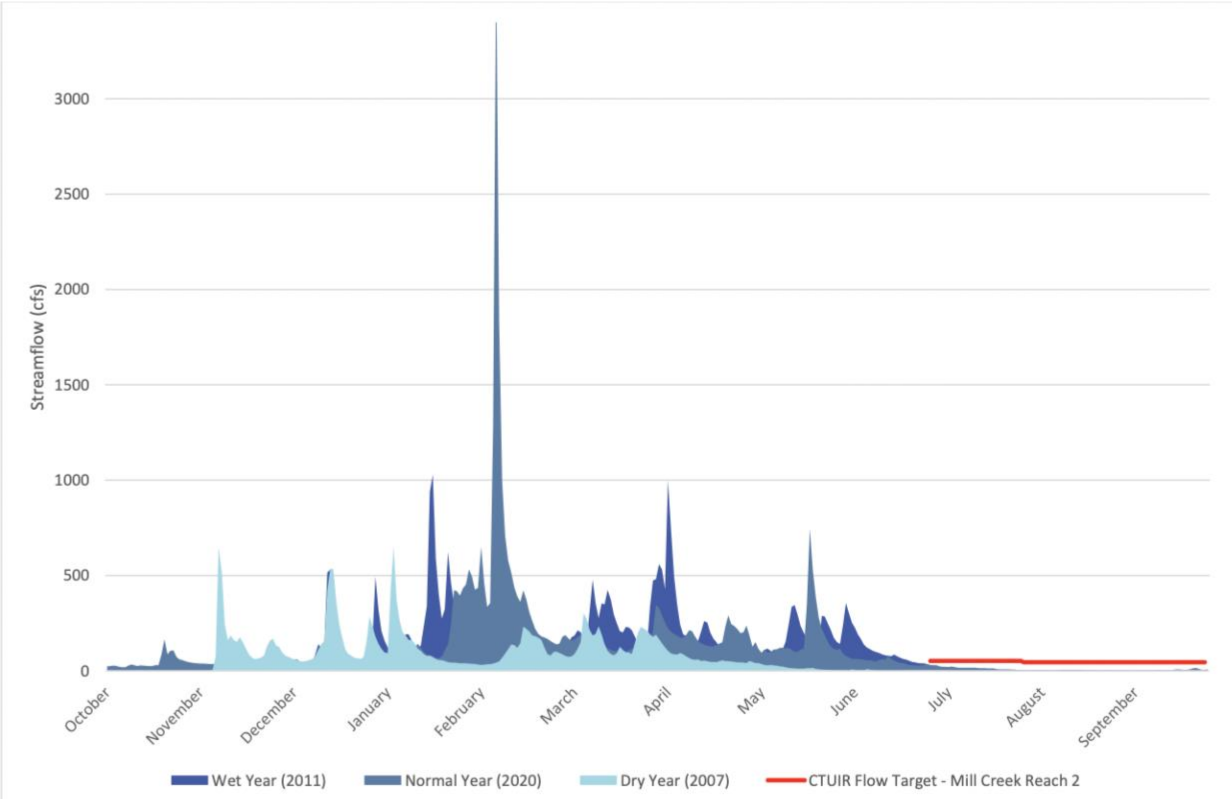
Table 8. Winter and spring flow targets for north and South Fork Walla Walla Rivers.

Reach	Recommended Ecological Flows (cfs)								
	October	November	December	January	February	March	April	May	June
North Fork Walla Walla	11	21	21	27	30	38	52	43	21
South Fork Walla Walla	70	70	70	70	74	85	111	122	82

Mill Creek Subbasin

Streamflows in the Mill Creek subbasin exhibit a similar hydrograph as those in the mainstem Walla Walla River (Figure 3). Late summer low flows are clear in every representative year type. In dry years, flows drop precipitously in May in part because the Washington Department of Ecology has historically directed water from Mill Creek be diverted to Yellowhawk Creek (whose source is managed by a headgate off of Mill Creek) to satisfy water rights (Cascadia Consulting 2021). Total flow diverted from Mill Creek to satisfy water rights on Yellowhawk Creek as well as Garrison Creek ranges from 10-30 cfs**.** Low flows can also partially be attributed to climate change, declines in recharge, additional out of stream diversions and other land use factors. These low flows then persist through the end of September. In wet and normal years, the timing of the drop to base flows shifts from May to June or July. In all cases, extremely low flow levels are seen in August and September, well below the CTUIR flow target for Mill Creek reach 2.

Figure 3. Hydrograph of Mill Creek streamflow during representative dry, normal, and wet years.



Streamflow targets on Mill Creek were prescribed in the Ecological Flows report for each month of the year. The ecological flow targets described in Table 9 are at the mouth of Mill Creek where it enters into the Walla Walla River (Stillwater Sciences 2013).

Table 9. Recommended streamflow targets for Mill Creek at its mouth.

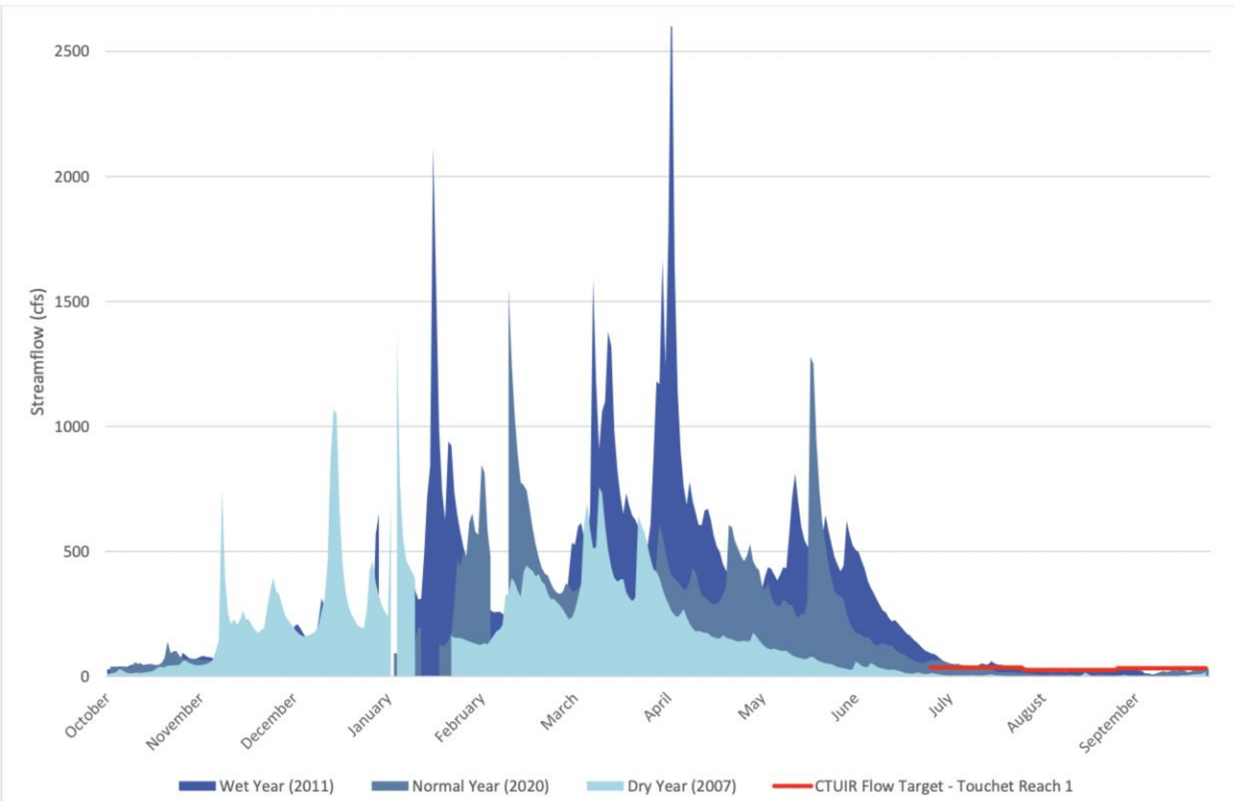
Reach	Recommended Ecological Flows (cfs)					
	October	November	December	January	February	March
Mill Creek at mouth	46	55	64	74	88	104
Reach	**Recommended Ecological Flows (cfs)**					
	April	May	June	July	August	September
Mill Creek at mouth	149	110	72	52	45	45

The City of Walla Walla relies on Mill Creek as its primary source of water, providing 88 to 90% of the City's municipal water supply. The secondary source is seven groundwater wells that tap into the basalt aquifer, used historically to supplement water supply during periods of low flow in Mill Creek. While the basalt aquifer has limited connection to the streams, depletion of this resource is a concern – water levels within these aquifers have declined through much of the Columbia Basin (Burns et al. 2012). Many organizations have worked to increase low summer flows and improve summer aquifer levels. Management actions, such as limiting new well permits and providing incentive programs for water conservation, have helped increase available water in basalt aquifers. Direct alluvial and basalt aquifer recharge programs have been active in the Mill Creek watershed for over a decade. The City of Walla Walla has implemented ASR projects to inject and store water in confined basalt aquifers and recover it when it's needed (see discussion of strategy 1.13 below).

Touchet River Subbasin

Streamflow in the Touchet River is severely impact by irrigation diversions in the lower reach. Increasingly, groundwater use from the alluvial and basalt aquifers and climate change also contribute to low flows. At the Lower Touchet River at Cummins Road gage, flows drop to near zero in the representative dry year during the late summer months (Figure 4). They are only slightly higher in representative wet and normal years, and only partially meet CTUIR flow targets for Touchet reach 1.

Figure 4. Hydrograph of Touchet River streamflow during representative dry, normal, and wet years.



Streamflow targets for Touchet River and its tributaries were described in Stillwater Sciences' 2013 Ecological Flows report. Ecological flows prescribed for summer months for the Touchet River at its mouth where it flows into the Walla Walla River are 36 cfs in July, 26 cfs in August, and 33 cfs in September (Table 10) (Stillwater Sciences 2013).

Table 10. Recommended target flows for Touchet River and its tributaries.

Reach	Recommended Ecological Flows (cfs)											
	October	November	December	January	February	March	April	May	June	July	August	September
North Fork Touchet River	25	46	58	55	88	102	140	124	63	43	40	25
South Fork Touchet River	2	3	5	7	12	13	14	7	3	1	1	1
Coppei Creek	2	3	4	6	12	16	17	8	3	1	1	1
Touchet River at mouth	48	64	82	102	152	212	236	157	64	36	26	33

Detailed Description of Strategies

This section describes the five Tier 1 streamflows, groundwater and water supply strategies identified in the Strategic Plan in detail including the strategy itself, lead entities and their roles in implementing the strategy, and high-level details on implementation phases.

Strategy 1.03 Direct additional winter flow down the Little Walla Walla River to support alluvial aquifer recharge and stream function

The Strategic Plan did not discuss how much water to direct down the Little Walla Walla River during the winter; it simply stated that additional flow was needed to support alluvial aquifer and stream function. Given that flow down the little Walla Walla River is controlled entirely by a headgate, any flow down the system is intentionally managed. Any water directed down the little Walla Walla River is also streamflow that will bypass the mainstem of the Walla Walla River.

In recent years the Walla Walla River Irrigation District has directed additional 15-20 cfs of flow down the Little Walla Walla during the non-irrigation season from November 15th-March 1st. During the irrigation season from March 1st to November 15th, flow down the little Walla Walla averages around 50 cfs. Winter flow down the Little Walla Walla falls under WWRID's year-round water right. ORWD does not provide any regulatory direction for winter flow down the little Walla Walla and the system is managed by WWRID for irrigation benefit.

The Little Walla Walla River Assessment and Initial Action Plan (Wolcott 2010) identified a need to increase year-round flows in the Little Walla Walla River and to improve groundwater level and recover spring flows. The initial action plan for the latter goal recommended implementing passive groundwater recharge by maintaining winter flows in the Little Walla Walla River (Wolcott 2010). As described previously, the Little Walla Walla River and Spring Branches System is a dynamic surface/groundwater system with a high degree of connectivity between surface water and the shallow alluvial aquifer.

A 2006 report recommended conceptual designs for restoration projects on the Little Walla Walla River and Spring Branches System (HDR 2006). Shallow aquifer recharge, riparian restoration and wetland restoration were among the project types considered in this report; however, no specific recharge actions were designed as it was ultimately considered out of the scope of the report (HDR 2006). In 2012, a habitat assessment for the West Little Walla Walla River found low summer flow to be the most restrictive problem for habitat. The report identified increasing winter flows down the Little Walla Walla to increase groundwater recharge as the most effective restoration option – in both implementation and cost – for improving summer flows (Little Walla Walla Rivers Working Group 2012). While shallow aquifer recharge may benefit water supply and streamflows and restoration would benefit general aquatic habitat, the current controlled headgate and fish screen mean these actions would have minimal benefit to critical fish species. Lack of benefit to ESA listed fish can also make funding challenging.

As mentioned above, there is not a current agreement amongst interested parties over how much flow should be directed down the Little Walla Walla River in the wintertime. The current amount in the non-irrigation season flow down the little Walla Walla is 15-20 cfs. While winter water is more plentiful than summer water there is still a finite amount of winter water available and, as noted above, much of it is needed for channel formation and other important habitat and hydrologic dynamics. Additionally, there are several other strategies discussed within this memo that identify winter water as a source (1.03, 1.05 and 1.13). Further discussion will be needed to decide how to best utilize winter water in the Walla Walla Basin.

Implementation Phases

Given the lack of agreement on what constitutes implementation of this particular strategy a basin wide discussion of wintertime surface flow needs is the most important next step.

Define and discuss physical and legal winter water availability: The next step is to wait until sufficient information is available on physical water availability in the Walla Walla Basin. OWRD could than present this to interested parties as a beginning point of discussion. Interested parties can then begin to quantify their need for winter water and those needs can be considered together including the complimentary or competitive nature of various water management strategies.

Lead Entities and Roles

Walla Walla River Irrigation District: water user and manager of the little Walla Walla system

Oregon Department of Water Resources: legal and regulatory for water management in Oregon

Little Walla Walla Users Group: organized groups of landowners and water users on the Little Walla Walla system

Strategy 1.08 Decrease surface water diversions or substitute for basalt wells during low flow periods

The primary example of Strategy 1.08 is City of Walla Walla's (the City) source switch from Mill Creek to basalt wells for the benefit of Mill Creek stream flows. There may be opportunities to work with other current conjunctive users of ground and surface water to swap one for the other to benefit streamflows. However, no other specific opportunities have been identified by the working group thus far so this section focuses on implementation of the City's project.

The City's primary water source (88 to 90% of its supply) comes from surface water diversions from Mill Creek. During periods of low flow, the City supplements its water supply with groundwater from seven basalt wells (Tetra Tech 2017). The City is also engaged in an ASR program (see Strategy 1.13 below) which injects Mill Creek surface water into the basalt for the purposes of aquifer storage and recovery. The City's ASR program allows the City extra capacity to increase basalt water pumping in August and September and decrease surface water use when flows are lowest in Mill Creek. The City has an agreement with the CTUIR to help compensate them during the summer months for the increased pumping costs that are required to switch their summer water source from Mill Creek to basalt wells. However, this agreement is temporary and not guaranteed over the long-term. In addition to helping increase flow in Mill Creek during summer months, the City's ASR program enhances long-term water security by helping to reduce aquifer declines in the area.

Note to reviewers: Please add additional detail or make corrections.

Implementation Phases

Develop Long-term agreement with the City: The next step is to develop a long-term agreement for the City to rely on groundwater when flows are low in Mill Creek. CTUIR and the City are currently in discussions to accomplish this.

Identify and assesses other opportunities to source switch between groundwater and surface water: The Implementation WG noted that there are many agricultural water users that have access to both deep basalt groundwater and surface water and there may be opportunities to work with these water users to time water use in a way that benefits streamflows and maintains agricultural water supply. An assessment of opportunities would be needed to identify those users who might be potential candidates and to work with them to gauge interest in source substitutions that benefit streamflow.

Lead entities and roles:

City of Walla Walla: Municipal water supplier relying on basalt groundwater and surface water rights from Mill Creek

Confederated Tribes of the Umatilla Indian Reservation: Worked with the City to develop the source substitution program to use less surface water during critical streamflow periods

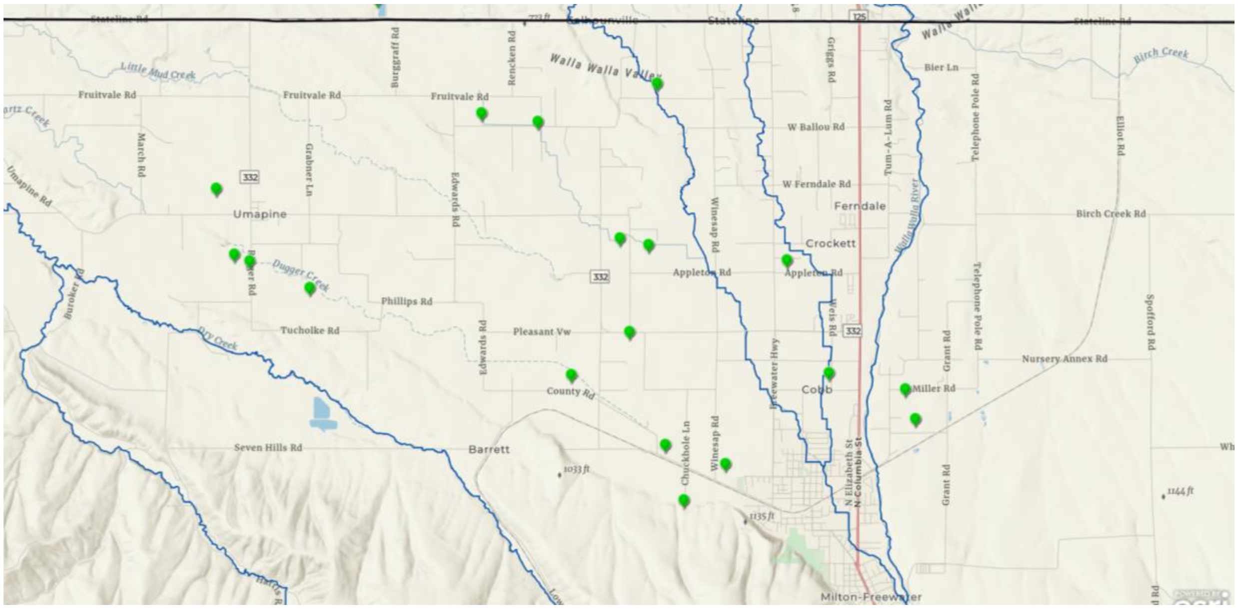
Washington Department of Ecology: Regulatory oversight for any water right changes and accompanying ASR permit (related to strategy 1.13)

Washington Water Trust: Worked with the City to develop the source substitution program to use less surface water during critical streamflow periods

Strategy 1.05: Improve and expand managed aquifer recharge (MAR)

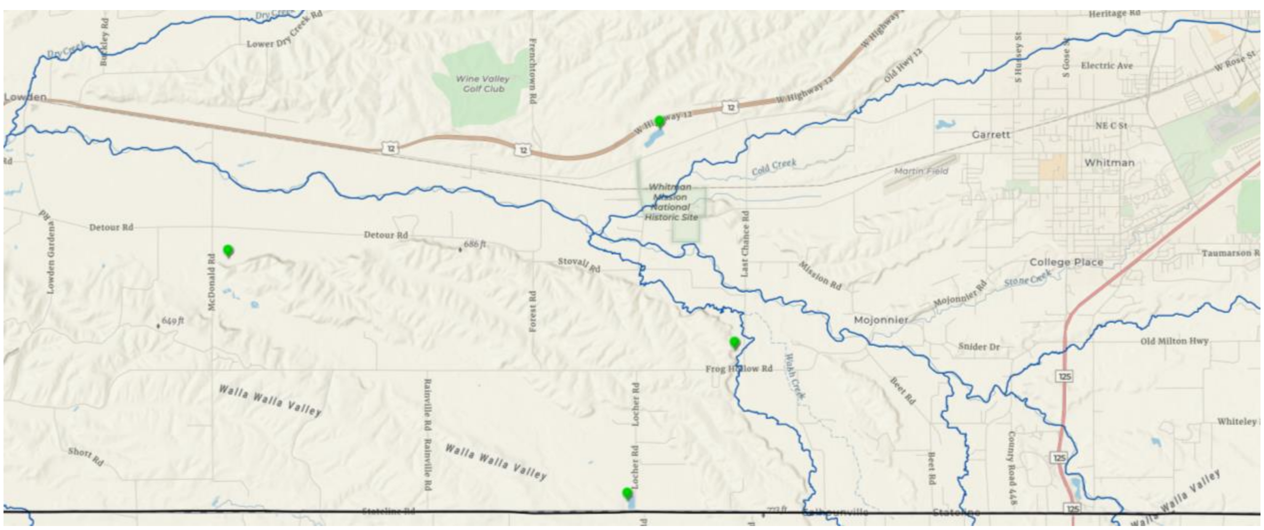
MAR has been implemented in the Eastside area of Milton-Freewater, the Little Walla Walla River subbasin and west of the Little Walla Walla River. The WWBWC, Hudson Bay District Improvement Company (HBDIC) and local landowners have worked cooperatively since the early 2000s to construct MAR sites. WWBWC has been the primary MAR implementor in the Walla Walla Basin and currently operates 17 sites in Oregon (Figure 5). These sites were installed beginning in the 2000s, and their recharge water is conveyed from the Walla Walla River during late fall through spring. In 2017-2019, approximately 14,700 acre-feet (AF) of water was recharged via 14 of these sites. Conveyance seepage is part of this total recharge amount. During the 2020–2021 season, 8,200 AF was infiltrated via the 17 sites. On the basin scale, this recharged water replenishes the alluvial aquifer—a process that occurred naturally and broadly across the WWR alluvial fan prior to land development and river channelization of the 20th Century.

Figure 5. Location of MAR sites in the Oregon portion of the Walla Walla River basin.



On the Washington side of the Basin, four MAR sites have been conceptualized or constructed, with coordination by WWBWC, irrigation districts, local landowners, and WWCCD (Figure 6).

Figure 6. Location of MAR sites in Washington portion of Walla Walla River basin.



The water source for most of these recharge projects is the Walla Walla River, conveyed via a network of diversion canals and pipelines. Mill Creek is used as a water source for one of the recharge sites (Stiller/Schwenke pond). Water is recharged to the alluvial aquifer using infiltration basins and galleries. The alluvial aquifer supplies rural-domestic and agricultural water users and is connected with surface water. In Oregon, water is provided to the 17 MAR sites under Limited License 1848 (LL-1848), which was issued by OWRD to WWBWC on January 4, 2021. It is important to note that these sites are not operated under water rights but have instead been using a limited license that has been extended many times. Sites were previously operated under LL-1621 from 2016 to 2021 and LL-1433 from 2012 to 2016. Limited License 1848 authorizes the use of 45 cfs of Walla Walla River water for aquifer recharge at 15 sites in Umatilla County. The period of use for LL-1848 is November 1 through May 15 of each year through 2024. Importantly, any use of winter water needs to be compatible with bi-state flow study needs. As a condition of use under LL-1848, diversion is limited to times when minimum streamflows are met in the Tumalum Reach of the Walla Walla River, between the Little Walla Walla River diversion and Nursery Bridge Dam. Minimum streamflows in this reach are 64 cfs in November, 95 cfs in December and January and 150 cfs from February through May 15. Diversion of Walla Walla River water for aquifer recharge is not allowed under LL-1848 if flows past Nursery Bridge Dam are less than these amounts (Walla Walla Basin Watershed Council 2023).

There is strong interest in resuming recharge at the Stiller Pond site in Washington. Ecology has recently established updated monitoring protocols that removed costly PCB monitoring (Ecology, 5/2021) and a water right for 4.5 cfs, 991 AF/y, and a period of use from 12/1 to 5/31 (Ecology, 8/2021) for the recharge water source. A Mill Creek diversion conveys the source water to Stiller Pond. Other idle sites in Washington are being assessed to determine the feasibility of restarting them. Like the Oregon sites, Stiller Pond requires long-term funding for operation, estimated to cost approximately $5K for the initial year and less in subsequent years (pers. comm., WWCCD, 9/20/21). Having a secure funding source would support lab analytical and labor costs for long-term monitoring. Additional cost savings could be realized if the lead entities for the Oregon and Washington sites were to coordinate field sampling schedules and use the same lab.

While MAR has been active in the Walla Walla Basin for 20 years it has been primarily opportunistic, and site selection has been driven by landowner willingness and access to surface water. The impact of MAR has generally been measured by increases in the water levels of alluvial wells near MAR sites. Questions remain about whether MAR can deliver streamflow benefits during critical low streamflow periods in addition to providing benefit for alluvial water users. The residence time of stored water is very brief, meaning any winter recharge likely does not provide low flow season benefit and there is currently no tracking where the water goes or who the beneficiaries are. The strategy language specifically says the goal is to "improve and expand MAR." Upcoming information from the USGS represents an opportunity to "improve" MAR by providing information on how and where to develop MAR sites to maximize streamflow benefits. It is important to note however, that even if sites could be developed that have streamflow benefits, there is not a legal pathway to protect increased surface flow from alluvial aquifer recharge. Depending on the location of MAR and any resulting streamflow increases, the increased streamflow could be diverted by a downstream water user before it has the chance to benefit aquatic and riparian species.

Note to reviewers: Please add additional detail or make corrections.

Implementation Phases

Complete the USGS study and use findings to improve and enhance MAR: The USGS study will greatly improve the Basin's understanding of its surface and groundwater resources. Findings from the USGS study should allow basin water managers to determine if establishing a MAR program with the objective of improving stream flow during critical low flow periods is a possibility. If USGS study data suggests that MAR can benefit stormflows by recharging the alluvial aquifer at specific times and locations to benefit streamflows than the basin could consider designing a strategic and scientifically based MAR program that would help meet streamflow objectives. The basin could also decide to focus a MAR program on benefiting out of stream water users or both streamflows and out of stream users. Once baseline questions can be answered about the fate of recharged water then the basin can tackle implementation questions of funding, water rights permitting and legal protectability.

Lead Entities and Roles

Walla Walla Basin Watershed Council: MAR implementor,

Oregon Water Resources Department: Legal and regulatory responsibility for water management in Oregon

Washington Department of Ecology: Legal and regulatory responsibility for water management in Washington

Walla Walla County Conservation District: Potential MAR implementor in Washington

Strategy 1.13: Expand and support Aquifer Storage and Recovery (ASR) to maintain groundwater quality and capacity

Aquifer storage and recovery (ASR) is a method of aquifer recharge designed to allow recovery of a large portion of the water placed within a relatively hydrologically isolated geological unit, like those that can be found in the Walla Walla Basin's basalt aquifer systems. The City of Walla Walla has been utilizing the basalt aquifer as an ASR facility since 1999. The project involves using surface water from the City's diversion supply and injecting it into wells within the basalt aquifer. Faulting within the aquifer provides discrete blocks that allow for recovery of that water later. The City uses the project to supplement water withdrawals from the Mill Creek diversion when flows are low or water quality is not within suitable parameters (Tetra Tech 2017).

As of 2016, the City of Walla Walla's water supply was 88% surface water, 12% groundwater from the basalt aquifer. The future projection for 2028 shifts the distribution of sources to 80% surface water and 20% groundwater (Frank Nicholson and Ki Bealey, 2020).

Under the City's ASR permit (permit R3-30526, issued June 2016 by Dept. of Ecology), up to 3,850 AF/year can be stored/injected. Under this permit, the City can recover 2,310 AF per year – 60% of the 3,850 AF/year currently permitted for storage/injection. The permit allows Mill Creek water to be diverted and injected from November 1 to April 15 each year. On an annual basis, volumes stored in the City's ASR Program vary wildly depending on climate and other factors. In 2019, volume was greatly reduced because the City relied on wells while renovations to the Water Treatment Plan were underway. In 2020, the City relied heavily on wells because the surface water transmission main was damaged during a flood. The City has been employing an ASR program since 1999 and has planned upgrades to several of its wells to allow for the expansion of ASR to improve water security, address groundwater level declines and to allow a decreased reliance on diversions from Mill Creek in the summer (City of Walla Walla 2018).

The City of Milton-Freewater has also been investigating the use of ASR with its existing basalt wells to store winter water diverted from the Walla Walla River in the basalt aquifer for use during the summer. Unlike the City of Walla Walla, the City of Milton-Freewater does not currently use its surface water right therefore establishing an ASR program for the City of Milton-Freewater with surface water as the source would require a new diversion of surface water. However, the City of Milton Freewater is growing, has the rights to use surface water and the City's current wells are in an area deemed by the Oregon Department of Water Resources as a Serious Water Management Problem Area (SWMPA).

Given this context, there have been a number of studies to examine the feasibility of establishing an ASR program for the City of Milton Freewater. The WWBWC completed a feasibility study in 2019 for the Milton-Freewater ASR project which determined that preventing future decreases in summer flows by implementing the ASR project is both needed and feasible (Walla Walla Basin Watershed Council 2019). The study found that diverting surface water for ASR in the winter (of 8.6 cfs) would provide significant benefit to fish habitat in the summer and would not impair hydrologic conditions nor fish habitat in winter. Relying on drinking water supplies obtained during winter when flows are abundant rather than relying on diversion during low-flow summer months would also increase the basin's resiliency to future climate change (Walla Walla Basin Watershed Council 2019). However, like MAR, any use of winter water needs to be compatible with bi-state flow study needs.

Note to reviewers: Please add additional detail or make corrections.

Implementation Phases

The Mill Creek Report (City of Walla Walla 2018) listed several recommended projects to upgrade and expand the City of Walla Walla's existing wells and infrastructure to increase flows in the summer for fish.

Upgrade three additional City of Walla Walla wells to ASR: Recommended projects include upgrading existing ASR well #6, or expanding use of ASR to other City wells (wells #5, #2, and #7), as well as constructing a solar farm to reduce operation costs of ASR wells (City of Walla Walla 2018). The City of Walla Walla is currently working on implementing the expansion of ASR to well #5 in basalt block 3. The City has received funding for design of the well, which is anticipated in 2024. Construction of the well is anticipated in 2025, and the City has acquired most of the funding (>$3 million) necessary to complete that. The City's plan is to add additional ASR wells after #5 is done – design for the next well will begin once construction begins on Well #5 (Frank Nicholson, City of Walla Walla, personal communication).

Apply for and secure new ASR permit from the Department of Ecology: As of July 2023, the City has received funding for the testing and reporting phases required to apply for a new ASR permit and had begun discussions on a new permit application with Ecology.

Establish Solar Farm to generate electricity for groundwater pumping: Building a solar farm near the current City of Walla Walla water treatment plant could help generate electricity to help with increased pumping requirements associated with ASR.

Assess the benefits and tradeoffs of developing ASR for the City of Milton Freewater: Further assess and discuss whether development of surface water as an ASR source is a preferred use of winter Walla Walla River water.

Lead Entities and Roles

City of Walla Walla: Implementor of ASR

Department of Ecology: Regulatory and permitting authority for ASR in WA.

City of Milton-Freewater: Potential future implementor of ASR

Oregon Water Resources Department: Regulatory and permitting authority for ASR in OR.

Possible Barriers to Implementation

This section discusses challenges that may arise in implementing each of the strategies discussed above. Possible barriers related to strategy 1.04 (water rights acquisitions) and 1.02 (support ongoing analyses of the Bi-State Flow Study) are discussed in separate memos X and Z.

Monitoring Flows and Aquifer Levels

The strategies discussed in this memo depend to varying degrees on having real-time information on streamflows and up-to-date information on aquifer levels and trends. A full discussion on the strategy to expand monitoring in the basin is provided in a separate memo (link or cross-ref to that memo). Streamflow and aquifer level information are critical for both planning and implementation of the strategies in this memo.

For strategy 1.08 (Decrease surface water diversions or substitute for basalt wells during low flow periods), the stream gaging network will be used to determine when flows drop to a point that would trigger the switch to basalt wells. Monitoring of the deep basalt aquifer in the specific location where pumping occurs will also be important to monitor the health of the aquifer over time in response to increased pumping.

MAR planning and implementation require understanding of streamflows, especially during the period of the year when flows would be diverted into the recharge basin, as well as a groundwater monitoring network that can be used to track when and where recharge is happening and how water from MAR is moving through the groundwater aquifer. Monitoring will also be required to determine if streamflows are increasing because of MAR. Planning and implementation of ASR also requires understanding of streamflows, especially during the period of the year when surface flows would be diverted into storage, as well as site/aquifer-specific monitoring wells to track how aquifer levels respond and to monitor levels over time.

Water Right Permitting

The strategies above generally require one or more water rights. MAR projects for example, require a water right to divert water to the recharge facility and another water right to store the water. ASR projects have the same requirement; they require a water right for diversion of surface water and a permit for the storage and recovery of water from the storage well. Each water right will involve a separate administrative process including detailed water availability analyses and injury reviews; either of both reviews as well as other parts of the water rights administrative process (for example, the chance for potentially affected water right holders to protest applications) could be barriers to implementing the strategies discussed in the memo.

The permit that the City of Walla Walla uses for their existing ASR wells has been a challenge – they intend on applying for a new permit for their planned expansion of ASR to City Well #5 rather than modifying their existing permit. The existing permit did consider the expansion of ASR into basalt block 3 (the block where Well #5 is located), but it would require restructuring or rewriting the permit, with certain requirements for additional analyses done by the City. In addition, there are issues with the quantities and percentage of injected water that the City is allowed to pull back out of the well. While the City is trying to store water through ASR, there is no way to legally restrict use of the stored water by other users. Through the permitting process for a new ASR permit, a more appropriate percentage can be determined. For these reasons, the City and Ecology agree that it would be easier and more streamlined to apply for a new permit rather than restructuring the existing one. However, it is uncertain how long the permit application process will take, ideally the permit can be issued in 6-8 months to complete depending on the materials provided from the City and on potential emerging water quality concerns.

Protecting Instream Water Rights and Ecological Flows

The strategies discussed here all require directing surface water from basin streams into either irrigation conveyance infrastructure or into ASR wells a conveyance (the Little Walla Walla River). Any new diversion of water has the potential to impact or legally injure existing water rights including instream flow rights in Oregon and Trust water rights in Washington. High winter flows play an important role in rivers and streams, helping to move and distribute sediment and filling shallow floodplain aquifers for example. These so-called *ecological* flows include channel forming flows and may not always be formally protected by water rights, but they are critical for instream habitat and aquatic and riparian species health. Protections for ecological and other instream flow needs must be considered when planning projects under strategies 1.03, 1.05 and 1.13.

Balancing Winter Flow Needs

All of the strategies discussed in this memo rely on the use of winter flow and it will be important to continue discussions on potentially competing winter flow needs especially once the USGS groundwater study is complete and more is known about surface and groundwater availability and connectivity in the Basin. There are tradeoffs with directing wintertime flow down the Little Walla Walla River or using more winter surface water for MAR or ASR. Directing more flow down the Little Walla Walla systems and into MAR sites helps wells in the shallow aquifer and streamflow in the short term but longer-term streamflow benefits have not been well documented. Basin managers and stakeholders would need to reach agreement on winter water uses before additional winter water can be used to supply new MAR, ASR projects or the Little Walla Walla River.

Challenges with Further Implementation of Managed Aquifer Recharge

Lastly there are multiple challenges specific to expanding and improving MAR including:

- **Lack of legal protection for flow resulting from MAR:** one of the potential reasons to implement MAR projects is to boost instream flow via shallow groundwater inputs to area streams. One challenge of using MAR for this purpose is that there is no legal pathway to protect the flows that result from a MAR project. If streamflow can be shown to increase via MAR, the flows can legally be diverted by other water rights holders, limiting the instream flow value of these projects.
- **Timing of flow benefits:** water for MAR projects is generally diverted in the winter or early spring. Due to the nature of the alluvial aquifer in much of the Walla Walla basin, water recharged via MAR in the winter or spring may quickly reach connected surface waters. Therefore, the benefits of MAR for summer baseflows, when instream flow is most needed, may be limited depending on site-specific aquifer and other hydrologic conditions.
- **Lack of long-term OR Water Rights:** Existing MAR projects in Oregon have been diverting water under limited licenses rather than water rights. These licenses cannot be renewed indefinitely and so a pathway to permanent water rights would need to be identified to make this strategy viable for the long-term.

Relationship to Other Strategies and Discussion of Contribution to Desired Future Conditions (DFCs)

This section discusses how the strategies described above relate to other Strategic Plan priorities and, more specifically, how implementing these strategies contributes to the set of Desired Future Conditions (DFCs) outlined in the Strategic Plan.

Relationship to Other Strategies

Table 11. Specific Strategy Contributions to DFCs.

Desired Future Condition	Connection with Strategies 1.03, 1.05, 1.08 and 1.13
Floodplains, Critical Species, Habitat, & Water Quality	
Achieve healthy, natural floodplain function	Some MAR projects, as well as the project to divert flows down the Little Walla Walla River support natural floodplain function
Meet TMDL targets	To the extent that instream flow is increased via the strategies in this memo, increased flow helps to meet TMDLs, especially temperature as more flow helps to dilute/mitigate pollutants

Desired Future Condition	Connection with Strategies 1.03, 1.05, 1.08 and 1.13
Water Supply, Streamflows, & Groundwater	
Stabilize aquifer levels to support water resources and water for people and farms	These DFCs are the primary purpose of the strategies discussed in this memo.
Enhance instream flows to meet instream flow targets for critical species	
Increased natural infiltration, acreage, and duration of inundation	
Land Use & Flood Control	
Reduce flood risk for people and cities	Strategies to increase recharge can be used to increase stormwater infiltration in urban areas and help mitigate flood risks.
Create climate resilience for basin water resources	Water supply strategies discussed here contribute to the reliability and climate resilience of municipal and other water supply in the basin.
Quality of Life	
Sustain and improve quality of life in the Walla Walla Valley by supporting community health with clean and reliable domestic water supply as well as opportunities for outdoor recreation and sustainable tourism	Strategies discussed here directly support community health with clean and reliable domestic water supply and improve instream flows to the benefit of outdoor recreation and tourism opportunities.
Monitoring and Metering	
Increase streamflow, habitat, and water use monitoring to support better water resource management and adaptive management	Strategies discussed here rely on a broad network of stream gages and monitoring wells; these strategies support this DFC because they can help catalyze funding and expansion of the basin's monitoring network

Future Work and Funding Needs

Table 12 below provides a list of specific projects, sponsors and funding needs for the strategies discussed in this memo additional projects may be added or funding amounts may be adjusted.

Table 12: Projects and Funding Needs Identified in Strategic Planning Process

Strategy	Streamflows, Groundwater, and Water Supply Action	Sponsor	Funding Needed ($)
1.03	Funding for staffing and monitoring at WWRID	OWRD, WWRID	$10,000

Strategy	Streamflows, Groundwater, and Water Supply Action	Sponsor	Funding Needed ($)
1.04	Water Right Acquisition Project Development and Implementation	WWT	$280,000
1.04	Water Right Acquisition Funding	WWT	$120,000
1.05	MAR site monitoring	WWCCD, WWBWC	$20,000
1.05	O&M of 17 existing MAR sites in Oregon	WWBWC	$10,000
1.08	City of Walla Walla Solar Farm: planning and assessment phase	City of Walla Walla, CTUIR, WWT	$100,000
1.08	City of Walla Walla Solar Farm: construction phase	City of Walla Walla, CTUIR, WWT	$2,400,000
1.13	Long-term transition of City wells to ASR	City of Walla Walla	$7,000,000
1.13	Milton-Freewater ASR Development	City of Milton-Freewater	TBD
		Total:	**$9,940,000**

Note to reviewers: Please add additional detail on gaps/ budget needs for implementation

Future Considerations and Potential Next Steps

To be drafted once feedback is incorporated from the Implementation Work Group

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Appendix A – Water Right Acquisition Memo

DRAFT TECHNICAL MEMORANDUM

To: Department of Ecology, CTUIR, Oregon Water Resources Department and the Walla Walla 2050 Implementation Work Group

From: Amanda Cronin and Davíd Pilz, AMP Insights

Date: November 2021

Subject: High-level Scoping for Water Rights Acquisition the Walla Walla Basin

1. Background

Restoring stream flows has long been identified as a restoration priority in the Walla Walla Basin and is referenced in the following key Basin Planning documents:

- *Walla Walla Watershed Plan* (HDR Engineers, Michael, Barber, WSU, and Steward and Associates, Inc 2005)
- *Walla Walla Subbasin Plan* (Northwest Power and Conservation Council 2004)
- *Snake River Salmon Recovery Plan for Southeast Washington* (SRSRB 2011)
- *The Lower Walla Walla River Geomorphic Assessment and Action Plan* (Tetra Tech 2014)
- *Lower Mill Creek Final Habitat and Passage Assessment and Strategic Action Plan* (Tetra Tech 2017)

There are many factors that contribute in varying degrees to inadequate flows in the hydrograph including naturally low flows, snow melt timing, groundwater use, and out of stream surface water use. Irrigation is the largest water use in the Walla Walla Basin and the primary contributing factor to low stream flows. Given the out-sized impact of irrigation diversions on streamflow, water right acquisition of senior out of stream water rights can be a cost-effective method to improve instream flow through voluntary, market-based projects. It is important to note that while the vast majority of water right acquisitions are likely to be with agricultural water users, municipal water use is also a significant use in the Mill Creek Subbasin and efforts are ongoing to engage the City in water transactions (see Section 4.2).

Previous planning documents for the Walla Walla Basin did not fully detail how instream flow improvements should and could be accomplished. In some cases, "water right acquisition" was mentioned as a strategy but with few details. The intent of this memo is to provide additional specifics on how, where, and when water transactions can be used in the Walla Walla Basin to help accomplish instream flow goals.

The Walla Walla Water 2050 Strategic Plan was completed in June of 2021 and included 60 strategies to manage water resources to meet multiple benefits that were prioritized into three tiers. Tier 1 included 23 strategies, one of which was to "Work to acquire senior water rights from willing sellers basin-wide and transfer water rights instream". This memo delivers a further exploration of water acquisition for instream flow and is organized into six sections. Sections 1 and 2 provide background, context and detail on work completed to date. Section 3 offers a detailed description of the Strategy including the phases of water right acquisition, potential implementation barriers and relationships with other strategies in the 2050 Strategic Plan. Irrigation diversions are discussed at the subbasin level in Section 4. Section 5 covers potential contributions to instream flows as well as the contribution to the Desired Future Conditions articulated in the 2050 Plan. Section 6 covers the exiting capacity for this work and future implementation and budget needs and funding sources, while Section 7 offers potential considerations for next steps.

2. Introduction

Water acquisition for instream flow benefit has emerged in the last 25 years as a cost-effective tool for increasing streamflow. Environmental water transactions (EWTs), of which water acquisition is one category, have gained traction as one of few means to improve stream flow by transferring water rights that were formerly used out of stream to instream use (Szepticki et al. 2018). In the twenty-five years since the first EWTs were piloted, success stories have emerged across the West where water acquisitions have provided significant streamflow for salmonids and other aquatic species. For example, in the Teanaway River in the Yakima Basin, Washington Water Trust has secured 8.25 cfs of a 12 cfs target flow which amounts to 68 % of base flow in the river during the summertime. In the Deschutes Basin, the Deschutes River Conservancy annually restores as much as 250 cfs of streamflow in the Middle Deschutes River and is actively rewatering important Deschutes tributaries like Whychus Creek and the Crooked River.

Practitioners have worked since the early 2000s to acquire irrigation water rights and transfer them to instream flow in the Walla Walla Basin. Efforts to date have focused on paying water right holders not to irrigate and to leave water instream for fish and aquatic health. Transactions have taken the form of short and long-term leases as well as a handful of permanent water right purchases. Non-profit organizations have spearheaded most of the water right acquisition work for instream flow with different entities operating in Oregon and Washington. In Oregon, the Oregon Water Trust began work in the Walla Walla Basin in the late 1990s and this work was continued by The Freshwater Trust (after Oregon Water Trust merged with Oregon Trout to form The Freshwater Trust). On the Washington side of the Basin, the Washington Water Trust has lead water acquisition efforts after some early direct outreach by the Department of Ecology. The Walla Walla Watershed Management Partnership explored water acquisition but did not complete any instream flow leases or purchases during its tenure from 2009-2021. The Confederated Tribes of the Umatilla Indian Reservation are also involved in many aspects of water right acquisition particularly as project evaluator and project funder through an accord with Bonneville Power Administration. CTUIR has also funded numerous assessments that address instream flows and the impact of water right diversions (Tetra Tech 2014; 2017; Stillwater Sciences 2013).

Past accomplishments

To date, sixty water transactions have been completed in the Walla Walla Basin with a total of forty-two leases and 7 permanent purchases. There has been 6 cfs of water permanently transferred instream via water rights acquisition across the basin. Of this 6 cfs, approximately 1.5 cfs were acquired in Oregon and 4.5 cfs in WA. Table **13** details water acquisition efforts to date. Active projects are highlighted while expired leases or donations are in white. It is important to note that there have been more dedications of conserved water in Oregon and trust water in Washington resulting from irrigation efficiency savings however the focus of this strategy is on water acquired through water right acquisitions. One exception in Table **13** is the sole conserved water right agreement that was negotiated on the Oregon side of the Basin by the Freshwater Trust. There are also several irrigation efficiency trust water transactions on the Washington side of the Basin which are listed in Table **13** and included in the calculations for Table **14**.

Table 13: Completed Water Transactions in the Walla Walla Basin

State	Location	Project Type	Initial Year	Term	Max Rate (cfs)
Oregon	Couse Creek	Lease (Expired)	1997	11 year	2.2
	Couse Creek	Lease (Expired)	2011	5 year	0.76
	Couse Creek	Lease (Expired)	2011	5 year	2.2
	Couse Creek	Lease (Active)	2017	5 year	2.2
	Couse Creek	Lease (Active)	2017	5 year	0.83
	Walla Walla	Lease (Expired)	2001	1 year	1.26
	Walla Walla	Lease (Expired)	2001	1 year	2.19
	Walla Walla	Lease (Expired)	2004	1 year	1.7
	Walla Walla	Lease (Expired)	2005	1 year	0.66
	Walla Walla	Lease (Expired)	2005	2 year	0.32
	Walla Walla	Acquisition	2005	Permanent	0.027
	Walla Walla	Lease (Expired)	2006	1 year	0.61
	Walla Walla	Lease (Expired)	2007	2 year	0.19
	Walla Walla	Acquisition	2007	Permanent	0.7
	Walla Walla	Lease (Expired)	2007	1 year	0.14
	Walla Walla	Allocation of Conserved Water	2014	Permanent	0.42
	Walla Walla	Lease (Expired)	2016	1 year	1.52
	Walla Walla	Lease (Expired)	2017	1 year	1.59
	Walla Walla	Lease (Expired)	2018	1 year	1
	W Little Walla Walla	Acquisition	2007	Permanent	0.34
	Walla Walla -North Fork	Lease (Expired)	2003	1 year	2.21
	Walla Walla -North Fork	Lease (Expired)	2003	1 year	1.07
	Walla Walla -North Fork	Lease (Expired)	2003	1 year	1.1
	Walla Walla -North Fork	Lease (Expired)	2004	5 year	0.11
	Walla Walla -North Fork	Lease (Expired)	2004	5 year	0.46
	Walla Walla -North Fork	Lease (Expired)	2009	5 year	0.11
	Walla Walla -North Fork	Lease (Expired)	2009	5 year	0.46
	Walla Walla -North Fork	Lease (Expired)	2012	5 year	0.12
	Walla Walla -North Fork	Lease (Expired)	2014	1 year	0.11
	Walla Walla -North Fork	Lease (Expired)	2014	1 year	0.46
	Walla Walla -North Fork	Lease (Expired)	2015	5 year	0.11
	Walla Walla -North Fork	Lease (Expired)	2015	5 year	0.46
Washington	Mill Creek	Lease (Active)	2003	20 year	0.129
	Mill Creek	Acquisition	2014	Permanent	0.41
	Mill Creek	Donation (Expired)	2003	5 year	—
	Mill Creek	Lease (Expired)	2021	1 year	5.5
	Touchet	Acquisition	2003	Permanent	1.04
	Touchet	Acquisition	2003	Permanent	0.893
	Touchet	Lease (Expired)	2005	1 year	0.93
	Touchet	Lease (Expired)	2006	1 year	0.93
	Touchet	Lease (Expired)	2007	2 year	0.93
	Touchet	Lease (Expired)	2010	1 year	2.08
	Touchet	Lease (Expired)	2010	3 year	0.46
	Touchet	Lease (Expired)	2011	5 year	0.93
	Touchet	Lease (Expired)	2011	3 year	2.08
	Touchet	Lease (Active)	2016	10 Year	0.93
	Touchet	Lease (Expired)	2014	5 year	2.08
	Touchet	Donation	2008	—	—
	Touchet	Acquisition	2009	Permanent	2.2
	Touchet	Lease (Active)	2014	10 year	0.46
	Touchet	Lease (Active)	2019	5 year	2.08
	Touchet	Irrigation Efficiency Trust Water	2004	Permanent	1.81
	Touchet	Irrigation Efficiency Trust Water	2004	Permanent	2.52
	Walla Walla	Donation (Expired)	2005	1 year	—
	Walla Walla	Lease (Active)	2018	5 year	1.36
	Walla Walla	Irrigation Efficiency Trust Water	2001	Permanent	1.42
	Walla Walla	Irrigation Efficiency Trust Water	2007	Permanent	3.99
	Walla Walla	Irrigation Efficiency Trust Water	2010	Permanent	5.13
	Walla Walla	Irrigation Efficiency Trust Water	2010	Permanent	0.82
	Walla Walla	Irrigation Efficiency Trust Water	2010	Permanent	3.32

Table 14**: Distribution of Water Transactions by Tributary in the Walla Walla Basin**

Location	# of Projects	Max Rate (cfs)
Couse Creek	5	8.19
Mill Creek	4	6.039
Touchet	17	22.353
Walla Walla	21	28.367
W Little Walla Walla	1	0.34
Walla Walla -North Fork	12	6.78
Total	60	72.069

Note: This is a complete list of water acquisitions by tributary and includes some expired leases as noted in Table **13** above.

Implementation of water right acquisition projects has been bifurcated across state lines. In Washington, the Washington Water Trust (WWT) completed its first water right acquisition in the Basin on the Touchet River, in 2001. Since that time WWT has completed 5 total acquisitions with 7 active leases amounting to 2,085-acre feet (AF) of diverted water transferred instream and restoring about 15 cfs that is spread between the Walla Walla River, Mill Creek, and the Touchet. Currently, WWT has 9 active projects and 3 pending transactions. Oregon Water Trust (OWT, now the Freshwater Trust) completed its first transaction on Couse Creek in 1997. Beyond this transaction, The Freshwater Trust's (TFT) work focused on Walla Walla headwaters streams (North and South Fork Walla Walla River) and irrigation efficiency work with the large Oregon irrigation districts (Walla Walla River Irrigation District and Hudson Bay Irrigation District). TFT completed 3 small permanent instream transfers on the North Fork of the Walla Walla, and 28 leases ranging from a single season to 11 seasons. TFT also worked with the City of Milton-Freewater and several individual landowners to dedicate instream conserved water resulting from irrigation efficiency upgrades.

Transactions to date have included a mix of water right leases and purchases. Water right leases have generally been full-season leases where an irrigator agrees to forgo surface water diversion for an entire irrigation season, with lease terms varying from 1-20 years. Water right purchases have been completed on agricultural land that was previously irrigated and was transitioned to dryland farming after the transaction was completed. Other acquisition opportunities have resulted with water rights appurtenant to land that was transitioning from agricultural to rural residential/urban use.[1]

3. Detailed Description of Strategy

The strategy as described in the WWW2050 Strategic Plan is to "work to acquire senior water rights from willing sellers basin-wide and transfer water rights instream to help meet instream flows using various water acquisition tools such as leases, purchases, split season agreements,

[1] Consideration of the land use that occurs after a water transaction is important and, in some cases, weed management or native plant restoration could be part of a project if the land does not remain in irrigated or shifts to unirrigated cropland.

etc. Using the Washington State Trust Water Rights Program and Oregon Conserved Water Statute."

Lead entities, partners, and roles of each

Like other types of habitat restoration projects, water right acquisition for stream flow is based on collaborative partnerships involving multiple contributing partners. These roles can generally be described as the water right holder, the project implementor, the administrator, the funder, and key project partners and are detailed below.

Project Implementor: The project implementor is the entity that spearheads the project, which is often an NGO but can be a public agency as well. Responsibilities include identifying prospect water rights, outreach to water right holders, due diligence of the water right, securing funding for the project negotiation of the transaction, preparing, and shepherding the change application through the change process.

Water Right Holder: The water right holder enters the transaction with the project implementor on a voluntary basis and works with the project implementor to come to agreement on the terms of the transaction which may result in fallowing acreage and/or changes to the point of diversion (pod), crop type, or irrigation system. All or a portion of the water right held by the water right holders may be involved in the transaction.

Agency Administrator: Any legal change made to a water right must be reviewed and approved by the relevant state agency- either Oregon Water Resources Department (OWRD) or Washington Department of Ecology (Ecology). Generally, the project implementor prepares the change application and files it with the State. However, in Washington, Ecology has a backlog of water right change application and is often slow to process and make decisions. To help speed the process WWT (or their consultant) often prepares a draft record of Examination for review by Ecology.

Funder: There may be multiple funders for any particular EWT, and funding needs may include transaction costs associated with developing the deal, infrastructure costs, monitoring costs, and payment to the water right holder for participating.

Key Partners: Depending on the transaction, key partners might include other landowners (e.g., if the property is owned by a landowner other than the water right holder), CTUIR, and supporting agencies such as WA or OR Departments of Fish and Wildlife.

Phases of Instream Water Right Acquisition

Implementing water acquisitions can be time consuming. Because they rely on voluntary participation of active water users, timelines for individual transactions depend on those participants' comfort level and willingness to move forward. The basin does have some history of success implementing transactions; therefore, the pace of acquisitions may be faster in the Walla Walla than in a watershed with no such history. At a high level, water acquisitions include four phases:

1) Outreach and project solicitation
2) Due diligence and negotiation

3) Implementation (state agency water rights changes)
4) Monitoring and maintenance

Moving through these steps is generally much faster for temporary transactions than permanent transactions. Transactions based on capital projects like canal/ditch piping also take significantly longer than temporary transactions because they can only proceed at the (often slow) pace of the infrastructure work.

The simplest temporary transactions, like one to five-year full or split-season leases, can be completed in a matter of months if landowners are willing to move fast and administrative approvals through the state water agencies can be processed. Permanent transactions can take from one to multiple years depending on the complexity of the water rights involved and whether the state approval process proceeds without protests from other water users or the need for complex hydrological evaluations.

Outreach Strategies

One of the challenging aspects of instream water transactions is finding willing sellers. In the Walla Walla Basin there is no shortage of potential water users that could participate in water transactions, however it has been challenging to get the word out about opportunities for water transactions and encourage participation. There are a range of outreach strategies that have been used across the Columbia Basin and western US to attract willing sellers (discussed in more detail below and summarized in (Figure 7). Identifying potential transaction partners can happen through word of mouth, referrals from watershed partners like conservation districts who work directly with landowners, or through direct outreach. Figure 7 divides the water right acquisition outreach types into three buckets- individual contact, media and events.

The benefits of contacting interested parties individually is that the messaging can be tailered and can help develop trust through relationship building over time. However, this approach is time consuming and not necessary comprehensive. While the various media approachs listed in Figure 7 can help reach a broader array of interested sellers these approaches may feel impersonal and can lead to conveyance of incorrect information or even rumors. Events can be a very effective way of reaching interested water right holders. These may include water right workshops held in convenient locations or even cooperative events with other entities such as conservation district events or broader community events like fairs and watershed festivals. Events allow the practitioner to tailor the message to the audience, answer questions in real time and meet landowners face to face.

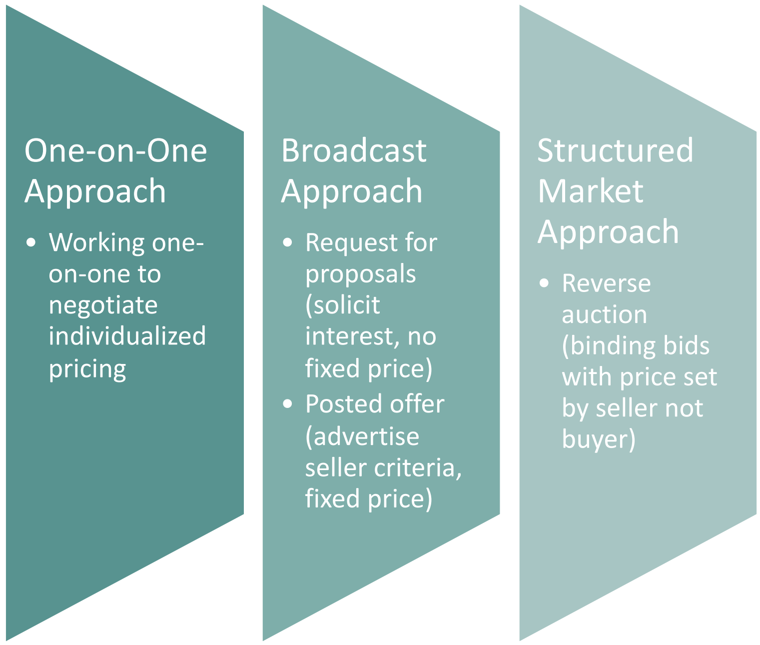
Figure 7: Outreach Strategies for Finding a Willing Seller

Negotiation Strategies

The strategies discussed in this section refer to various outreach and other mechanisms to find water users willing to work with the bank (Figure 8). Three basic strategies might be used individually or in concert for this purpose:

- One-on-one approaches
- Broadcast approaches
- Structured market approaches.

Figure 8: Negotiation Strategies



One-On-One Approaches: These approaches involve soliciting and negotiating deals with individual water users. Seeking water acquisitions through one-on-one outreach begins with identifying likely water user partners and conducting individual outreach as discussed above. One-on-one negotiation approaches are best suited to water transaction efforts involving a relatively small number of potential deals and where each deal may involve multiple and/or complex water rights. One-on-one negotiation is also appropriate for early phases of transaction program implementation when a community may not be ready for more public or structured approaches described below.

Complexity and scale of transactions also drive the amount of time needed to complete a project. For example, negotiating a complex transaction with an irrigation district that restores a significant amount of flow may take more time but also have more impact than a smaller scale lease with only one involved landowner/water right user. Furthermore, the individual nature of deals can also lead to some variations in price. While this is not necessarily a problem, there can be unease or anger if sophisticated or hard bargaining landowners end up being paid more and other landowners find out. This issue may work itself out over time as landowners informally compare prices and begin to converge around their asking price.

Broadcast Approaches: Broadcast approaches involve broad solicitations for water users to participate in transactions. Two broadcast approaches are common: posted offers and requests for proposals (RFPs). Both approaches can be less labor- and time-intensive than individual negotiations because a single communication can be broadcast to an entire community. Much of the time and resource commitment associated with these approaches occurs up-front in planning, rather than in negotiating with landowners. While this planning and set up may take time and resources, efficiencies mount with each irrigation season as the same basic template can be reused.

Posted offers involve broadcasting key deal terms to all water right holders in a geography and allowing interested parties to express interest if the terms are appealing. In most instances, the advertised parameters include the price paid per acre or per acre-foot, duration, and parcel size (if minimum or maximum acreage limitations and/or durations apply. Advertising deal terms can be achieved through a variety of pathways. It can be as simple as posting offers in irrigation district offices or newsletters or through periodic irrigation district communications such as newsletters. Phone, email and direct mail and local media (newspapers, newsletters, etc.) can also be effective depending on the audience.

Posted offer approaches offer the obvious efficiency of avoiding numerous negotiations and tracking many deals with different key terms. This approach is well suited to areas with homogenous water rights. For example, if all water rights are of equal priority, then only one price per unit needs to be offered. There may be some cases where different water right priorities or other factors, such as location in the watershed, might mitigate in favor of posting different level offers for different classes of water rights. If the number of different classes is not high, the posted offer approach can still be used.

One disadvantage of the posted offer approach is that it relies on landowners to approach practitioners and can result in some potential supply not being offered if the potentially interested landowners do not see the advertisements or are not inclined to approach on their own motivation. One way to combat this disadvantage is to combine some of the outreach that would be done for individual negotiations with the posted offer approach. In other words, the offer can be posted as noted above and a representative can spend additional time doing direct outreach to landowners they think might be interested or who they suspect might be reached by the posted offer advertisements.

Another disadvantage is the impersonal nature of broadcast approaches. This can invite the spread of incorrect information or outright misinformation. With broadcast approaches it can be difficult to correct misperceptions. Broadcast approaches are also only as good as the broadcast platform; if a newspaper or newsletter only reaches on a small portion of the intended audience, the response will be limited.

The RFP approach is the reverse of the posted offer approach and involves broadcasting an invitation to interested water right holders to submit proposals to lease or sell their water rights. As with the posted offer approach, some parameters for what types of offers are acceptable can be broadcast, for example, minimum seniority requirements or location preferences.

Structured Market Approaches: The final mechanism for soliciting transactions is through structured market approaches. The most common structured market approach is the reverse auction. Among all of the mechanisms discussed here, reverse auctions require the greatest amount of planning and careful implementation to ensure success. In a traditional auction, buyers, or bidders, compete to buy an item or unit of a commodity – the auction house solicits offers to *buy*, in other words. In a reverse auction, the entity running the auction solicits offers to *sell* or lease water rights. These offers take the form of a price per unit that the seller is willing to accept to sell or lease their water.

Reverse auctions can be run in many ways. The first option is to establish a reserve price. A reserve price is a threshold price above which offers will not be accepted. The reserve price can either be advertised or undisclosed depending on the goals of the auction. An advertised reserve price helps provide lessors/sellers with a price signal and may be appropriate in a market context where people might not know how much their water is worth. Advertised reserves may also have the effect of concentrating bids around the highest price buyer is willing to accept. On the other hand, keeping the reserve price secret keeps the market open to greater price variation and competition. Some bids may be above the reserve price and some below, but bids will be less likely to concentrate around the reserve price.

How and when the auction takes place can also vary. A reverse auction could theoretically be run like a traditional auction – taking place in public over the course of some number of hours. Given the nature of water markets however, reverse auctions for water rights are not run this way. Instead, reverse water right auction promoters choose a period of days or weeks during which they will accept bids, along with a specific, advertised date on which bid selection will be announced. Regardless of the specific way a reverse auction is implemented, education and communication/outreach are critical to success. Especially in communities unaccustomed to water marketing and auctions more specifically, considerable amounts of time are required to educate participants about how the auction will work and how/when/where they can participate.

As with posted offer approaches, reverse auctions are most suitable in areas where water rights are homogenous. If many different water right classes exist, differentiated for example by seniority, then the auction might need to set different reserve prices for each different class and/or include separate auction events for different classes. Reverse auctions are also most suitable for locations where potential participants are comfortable or experienced with water market activity. In locations with little history of water markets, reverse auctions can be intimidating and difficult to understand and navigate, not least because participants may not understand how to price their offers to lease or sell. Lastly, reverse auctions can create a sense of buzz or excitement especially since they have specific timelines for participation.

Summary Considerations for Outreach and Negotiation Strategies

Selecting the best outreach and negotiation strategies is as much art as science. Even with a single watershed like the Walla Walla, subtle differences between communities and sub watersheds means that one approach may not work for the entire watershed and that different strategies may need to be applied, for example, in the headwaters areas in Oregon compared to the rapidly urbanizing area of Mill Creek in Washington. Specific knowledge of the landowners, water users, and water rights in the region's sub watersheds will be critical in planning specific strategies. However, at a high level, several factors are broadly applicable to help shape outreach and negotiation:

- Consistency: communication, pricing, and transaction options need to be consistent across the watershed, even if multiple different outreach and negotiation approaches are used in different sub regions. The perception that a neighbor or fellow water user is getting a "better deal," or that certain landowners are being targeted while others are left alone, can complicate the already-difficult effort to solicit new water transactions partners. Developing and implementing a consistent strategy for communicating with landowners, pricing deals, and proposing transaction options is critical.

- Transparency: water users and landowners who sense that they are not being told all of the relevant details about individual transactions and the transaction effort as a whole quickly lose trust and will disengage with the transaction process or not engage in the first place. Erring on the side of providing too much rather than not enough detail can help promote transparency and increasing willingness to consider transactions. Two key areas where transparency is essential are around pricing and flow targets. Whenever possible, sharing pricing details of other similar transactions increases transparency; likewise, being as clear as possible about the total amount of water or acres being pursued for flow restoration helps landowners understand the larger picture and know that the purpose of transactions *is not* drying up all irrigated land in the region. As discussed in Section 5 there is still quite a bit of uncertainty around flow targets in the Walla Walla Basin.
- Inclusion: communications and outreach should strive to include the broadest range of landowners and potential transaction partners. Though when targeting water rights of specific classes (as exists on the WA side of the Walla Walla Basin) or priority dates it is also important to distinguish the types of water right that is sought for acquisition.
- Fairness: negotiating water deals with landowners should not be about getting the lowest price possible for water; while cost considerations are important and should be built into pricing strategies, the goal of negotiations should be to arrive at a fair, mutually beneficial price.
- Competition: as water markets and transactions programs grow, so too can competition; this can take the form of water users competing to have their deal funded considering limited acquisition funds and it can also take the form of competition for instream deals from farmers who would like to purchase or lease extra water for out-of-stream uses. Outreach and negotiation strategies need to be nimble to respond to evolving market conditions.
- Flexibility: finally, as noted above, a one-size-fits-all approach rarely works for a region as diverse as the Walla Walla watershed. The acquisition effort therefore needs to be flexible and anticipate providing different transaction opportunities for different types of water rights and water users (for example individual users versus irrigation districts and their patrons).

Implementation/Water Right Change Process and Contract Payment

Once a water acquisition contract is in place, implementation involves one of two basic sequences. For acquisitions that require water right changes (temporary, long-term, or permanent) – referred to as formal acquisitions – the first step after contracting is to develop and submit the required change application with Ecology or OWRD. Some acquisitions, called informal acquisitions, do not require water right change processes. For these projects, the contract outlines how water users will change their water management and what is required to trigger payment from the project developer.

Change applications for formal transactions can be time consuming. Application processes in both WA and OR for short-term leases can be completed in a few months while longer-term and permanent transactions can take nine months to one or more years. (One past permanent water right acquisition in the Walla Walla Basin required six years to complete approval of the change application.) The length of processing time depends on the complexity of the water rights involved in the transaction and whether any issues, such as non-use or potential injury to other water rights, come up during transaction review as well as availability of agency staff to review and process applications. WWT has addressed the backlog associated with trust water right applications by having their staff thoroughly prepare change applications which ideally require less review time from Ecology.

Contracts for formal transactions usually make payment to the landowner contingent on approval of water right changes. More specifically, both the timing of payment and the amount of payment can be tied to agency approval. First, payment will often not be made before approval. Second, payments are often based on the final volume of water approved for instream flow protection so final payment can vary slightly if the agency approves more or less water instream than initially anticipated.

Payment under contracts for informal transactions is often triggered by water management changes or by some other specific action. For example, if a transaction specifies a stream flow target that, when reached triggers a diversion shut off, payment could be made contingent upon proof that the diversion has been shut off as required in the contract. These types of transactions which are known as streamflow reduction agreements or agreements not to divert while discussed have not yet been implemented in the Walla Walla Basin.

Monitoring and measuring

There are various levels of monitoring of instream water transactions. Including compliance monitoring, streamflow monitoring, and in some cases fish and habitat monitoring (Aylward 2013). The levels and types of monitoring vary depending on the watershed, available resources, and the individual transaction. The Columbia Basin Water Transactions Program- the long-time funder of environmental water transactions in the Columbia Basin – developed and adopted a monitoring framework that includes a detailed rationale, framework, and protocols for monitoring environmental water transactions (McCoy and Holmes 2015). For instream water transactions in the Walla Walla Basin, two specific levels of monitoring are essential to maintaining contract compliance and enhance understanding of transaction outcomes.

On Farm Contract Compliance Monitoring

All instream flow water transactions include a contract. The most common contract forms are water right leases, purchases, forbearance agreements, bypass flow agreements and agreements not to divert. Each of these contains specific provision for changes in water use or management on-farm. Contract compliance generally involves a physical visit to the farm to confirm that the landowner is complying with the terms of the contract by fallowing acreage, ceasing irrigation in a particular location, and complying with any other requirements such as seasonality. In the past, environmental transactions in the Walla Walla Basin have been monitored with annual visits to each project site. These visits typically include taking photos at established monitoring sites, observing any existing diversion or groundwater pumps, and discussions with the landowner. Annual monitoring forms are compiled by the practitioner and filed with funders. Compliance monitoring ensures that the water right holder is fulfilling their contract responsibilities, however, it does not address what happens to water restored instream by the transaction.

Instream Flow Monitoring

Instream flow monitoring can be used to account for the water restored by environmental water transactions. This monitoring can utilize existing stream gauges, can involve installation of a temporary gauge or stage/recorder, or can be done using one or a series of instantaneous field measurements without a gauge/recorder in place. Streamflow measurements are generally conducted immediately downstream of the point of diversion and near the end of the secondary reach (the protected reach, or the reach below which return flows or other dynamics may alter the flow protected instream).

In Washington, the state's Department of Fish and Wildlife receives funding from Ecology and the CBWTP to monitor instream water transactions. The level of stream flow monitoring for transactions depends on the overall cost, agreement length, amount of water instream, and the number of water transactions in a particular area or reach of stream. As a result, WDFW does not perform stream flow monitoring on all reaches within the Walla Walla Basin.

The WDFW Water Team staff also collect temperature data and coordinate with local biologists and the area watermaster if there are flow concerns or trust water monitoring efforts are being conducted. In recent years WDFW has been conducting more random sampling and relied more on the numerous streamflow gages in the river and its tributaries to measure flow. Unfortunately, a number of these stream gages are being discontinued and will no longer be accessible for review. Currently WDFW's monitoring is focused on spot samples on the Touchet and virtual monitoring of the streamflow gauge at Cummins Road and they are communication with the Walla Walla Watermaster during irrigation season (Kohr, Jonathan 2021).

In Oregon, both compliance and flow monitoring were conducted by The Freshwater Trust/Oregon Water Trust in the past. However, it is not clear whether the organization is doing any monitoring today because TFT is no longer being funded by the CBWTP or anyone else to work in the Walla Walla. OWRD regulates flows in the Walla Walla and headwaters tributaries, including limited monitoring and regulation for instream water rights created periodically via leasing as well as water dedicated instream through permanent acquisitions and dedications of conserved water.

4. Potential Implementation barriers

While water right acquisition work is ongoing with some success, there are a number of barriers or challenges to implementation. These are discussed further below.

Landowner/ water right holder willingness

Finding willing sellers has long been one of the biggest challenges of environmental water transaction practitioners (Aylward 2013). Water right holders generally place tremendous cultural and economic value on their water rights and can be very reluctant to relinquish the ability to use their water rights in perpetuity. One additional consideration is that there are many water rights in the Basin that are held by irrigation districts and irrigation companies and in most cases, approval is needed from the individual irrigation ditch or company to make a change in water management or to the water right itself. This means that outreach to irrigation districts and companies is also an important aspect of instream water transactions.

Even given these limitations, in the time since the initial years of pilot EWTs in the Columbia Basin (staring in the mid-1990s and early 2000s), practitioners have field tested numerous outreach and negotiation approaches that have proven successful in generating interest and ultimately streamflow restoration projects. Outreach to willing landowners is a continuous process. With thousands of water rights holders in the Walla Walla Valley and land that continues to change hands (and with it the water rights), there are always potentially water right holders that may be interested in exploring EWTs.

Protection of instream water across the Oregon-Washington border

Protecting water saved or transferred instream has long been a challenge in the bi-state Walla Walla Basin. Since the 2000 Civil Penalty Settlement Agreement with USFWS which required the three largest Irrigation Districts to leave a minimum of 25 cfs of the available summer water in the Walla Walla River, legally protecting streamflows across the Oregon-Washington border has been an important topic of discussion. The challenge is that Washington law does not recognize Oregon water rights, so once the Walla Walla River or Mill Creek cross the state line, Washington begins its own accounting system. Thus, any water transferred instream in Oregon is considered natural flow to meet water rights in priority in Washington. Protection of instream flows across the border has been a topic of conversation at the Bi-State Flow Study Steering Committee and the Tri-Sovereigns have discussed potential legislative options to address the issue, though it remains one of the biggest policy hurdles in the Basin.

Capacity to implement instream water acquisition projects

Completing EWTs from start to finish requires considerable time and effort. While historically, staff time has been a limiting factor in implementing EWTs in the Basin, WWT has more staff time available that in any previous time (which may correlate to more completed transactions). This recent increase in staff capacity may be offset by a corresponding reduction in staffing on the Oregon side of the border, especially if WWT staff begin working in both states as is currently being contemplated.

Regulation of instream water by Ecology and OWRD

Distinct from the bi-state instream flow protection issue, is the challenge of enforcing existing instream water rights against downstream juniors. In Washington, instream water rights are known as trust water rights and can theoretically be regulated past junior appropriators' diversions. The same is true of instream water rights in Oregon (though instream rights are not called trust water in Oregon). However, the reality is that some trust water rights and instream rights may be too small to measure, streamflow gauging may be inadequate, and there is only one watermaster to cover the entire Walla Walla Basin in Oregon and one in Washington.

5. Relationship with other strategies

Walla Walla 2050 aims to advance a coordinated and strategic package of strategies for healthy water management into the future. The Strategic Plan identified 60 strategies of which 23 were ranked as Tier 1 strategies. However, implementation of this package of strategies is complex and understanding the relationships between strategies is a crucial part of achieving the goals of the 2050 Strategic Plan. This section provides a high-level framework for assessing the relationships between *Strategy 1.04 for Water Transactions for Streamflow* and the other Tier 1 strategies. Table 15 provides a quick snapshot of the relationship between the strategies and categorizes them as one of the following;

- *Directly complimentary-helps achieve the same goals*: full implementation of Strategy 1.04 will directly compliment another strategy by helping achieve the same desired future conditions.
- *Complimentary-but not directly related*: full implementation of Strategy 1.04 will compliment another strategy by helping achieve many of the same desired future conditions.
- *Potential conflict or complicating issues*: there is a possibility for the implementation of Strategy 1.04 to contradict or be out of sync with a potentially conflicting or complicating strategy.
- *Co-dependent strategy*: benefits of implementing Strategy 1.04 would be significantly reduced without full implementation of the co-dependent strategy.

One significant caveat to these categorizations, is that the relationships with other strategies depends on a thorough implementation of water right acquisition. Meaning that if only a small amount of water is transferred instream via water right acquisition it will not be particularly complimentary to floodplain acquisition or fish passage for example. Complimentary benefits are also highly place specific and for water right acquisition to have a complimentary benefit to restoring riparian habitat for example, they must occur in the same reach.

Table 15: Relationship with Other Strategies if Water Acquisition is Implemented at Scale

Relationship	Strategy Number	Strategy Name	Narrative Description
Directly complimentary - helps achieve the same goals	1.01	Reconnect floodplain and restore channel complexity Basin wide to reduce flood risk and improve habitat	Reconnecting floodplains slow high flows events and allows for infiltration of water in a wider area across the floodplain recharging the shallow aquifer which also supports streamflows
	1.02	Support the ongoing analyses of the Bi-State Flow Study and work toward a recommendation on implementation of the preferred alternative	The construction of a large infrastructure project such as a reservoir or pump exchange will help enhance streamflow through the mainstem Walla Walla while water acquisition has the potential to restore small amounts of flow in both tributaries and the mainstem.
	1.06	Improve fish passage and habitat conditions in weired and concrete channel sections of flood control project in Mill Creek	Improving fish passage through the Mill Creek Flood Control project compliments water acquisition efforts that improve stream flows by providing improved habitat quality and access to more habitat.
	1.09	Protect and improve fish passage at Nursery Bridge and implement levee setback projects upstream and downstream of Milton Freewater	Removing a fish passage barrier and implementing levee setback projects compliments water acquisition efforts that improves stream flows by providing improved habitat quality and access to quality habitat.
	1.18	Upgrade Dayton wastewater treatment plant to meet Ecology requirements and watershed community environmental goals	Improving water quality by filtering wastewater through wetlands for tertiary treatment compliments improvements made to streamflow via water acquisition by increasing overall water quality.
	1.2	Improve agricultural irrigation water use metering and reporting programs in WA and OR by installing telemetry and improving data use by agencies and water users	Accurate and reliable measurement of out of stream withdrawals as well as integration of metering data into water management is necessary to protect acquired instream water rights.
	1.21	Additional Bi-State coordination on groundwater regulation	Introducing a regulatory structure for groundwater will help protect both senior instream and out of stream water rights which are potentially impacted by groundwater withdrawals.
	1.23	Improve fish passage at Bennington Diversion Dam	Removing fish passage barriers compliments water acquisition efforts that improves stream flows by providing improved habitat quality and access to quality habitat.
Complimentary - but not directly related	1.1	Develop an overarching monitoring strategy and adaptive management plan for fish, habitat, and water to inform actions and evaluate effectiveness	An overarching monitoring strategy is needed to coordinate and adaptively mange all aspects of riparian ecology including streamflows.
	1.07	Restore and protect riparian habitat along tributaries, small streams, and the Walla Walla River Basin wide	Restoring riparian habitat helps improve overall water quality and instream habitat and is complimentary to water acquisition efforts that also continue positively to instream health. In addition there is potential to acquire water rights from formally irrigated land restored to riparian buffer.
	1.08	Decrease surface water diversions or substitute for basalt wells during low flow periods	Decreasing surface water use during low flow or critical fish periods helps maintain instream flows thus complimenting water acquisition for instream flows.
	1.13	Expand and support Aquifer Storage and Recovery (ASR) to maintain groundwater quality and capacity	Maintain deep groundwater supplies may help decrease reliance on surface water and shallow alluvial supplies for water users who conjunctively use surface and groundwater and thus relieving a small amount of pressure on surface water supplies.
	1.16	Increase coordination and enforcement of floodplain and riparian regulations and management between Counties and State water management entities	Improved coordination of floodplain and rip rain regulations to protect streamside buffers and in channel habitat from land management activity and thus improve riparian habitat while water acquisition works to improve instream habitat.
	1.17	Increase infiltration of stormwater rather than discharge to surface water bodies and improve coordination and management	Improving water quality by infiltrating stormwater rather than directly discharging to surface water compliments improvements made to streamflow via water acquisition by increasing overall water quality.
	1.19	Improve fish passage at Gose Street long term	Removing fish passage barriers compliments water acquisition efforts that improves stream flows by providing improved habitat quality and access to quality habitat.
	1.22	Implement conservation tillage and soil erosion BMPs to decrease nonpoint source pollution	Decreasing nonpoint source pollution through conservation farming practices will have a positive impact on water quality as will increasing stream flow through water acquisition.
Co-dependent strategy	1.11	Address legal implications of Bi-State surface water management and protection of instream flow across the state border and protection of instream flow within States	Finding a solution to protecting Oregon water rights in Washington from down stream diverters is critical to restoring flows in the mainstem Walla Walla and Mill Creek.
	1.12	Improve flow and timing of fish passage through the Hofer Dam fishway	Improving fish passage past Hofer Dam compliments water acquisition efforts that improves stream flows by providing improved habitat quality and access to more habitat.
	1.14	Improve coordination and response to drought management Basin-wide	Water acquisition efforts should be a tool of any drought management strategy.
	1.15	Expand and fund streamflow gages throughout the Basin	The ability to adequately measure and monitoring streamflow via gages that report virtually on a real-time basis is critical for managing and understanding the impact of water acquisition efforts.
Potential conflict or complicating issues	1.03	Direct additional winter flow down the Little Walla Walla River to support alluvial aquifer recharge and stream function	With finite amounts of surface water available there is potential competition for mainstem flows in both the main channel of the Walla Walla River and the Little Walla Walla branches of the river. In addition, there is potential for more flow down the Little Walla Walla to be diverted by unfulfilled water right holders so an assurance would needed to assure streamflow benefit.
	1.05	Improve and expand managed aquifer recharge (MAR)	Implementing aquifer recharge temporally and geographically in way that benefits streamflow could be complimentary to water acquisition however the strategy is complicated by the challenge of protecting inflows resulting from MAR projects from out of stream diverters.

6. Geographic Focal Areas for water right acquisition

Cultivating and completing successful water right acquisition projects requires a thorough understanding of both the instream flow need (Section 5) and historical and current agricultural water use. The following subsections describe what is known about actual irrigation diversions (rather than paper water right records) for the Walla Walla mainstem, Mill Creek and Touchet subbasins. This is not a complete list of diversions and only includes the most significant diversions and irrigation ditches per subbasin and in all cases, a detailed review of the individual water rights will be a prerequisite for exploring potential water transactions.

Walla Walla River and Little Walla Walla River

Along the Oregon portion of the mainstem Walla Walla, an analysis under the Bi-State Flow Study documented 63 surface water diversions (Walla Walla Watershed Flow Study Steering Committee 2019). The same study identified 119 surface water diversions from River Mile (RM) 5-45 along the Washington portion of the Walla Walla River.

While there are numerous small diversions along the mainstem Walla Walla in Oregon and Washington, as noted above, the bulk of the irrigation water is diverted by three major irrigation districts which are listed below.

- Walla Walla River Irrigation District: Main diversion at the "Frog" in Milton Freewater; also a small diversion at Nursery Bridge, 22,000 AFY; Serving ~ 3,500 acres
- Hudson Bay District Irrigation Company: Diversion at the "Frog" in Milton Freewater, 24,000 AFY; Serving ~ 8,000 acres
- Gardena Farms Irrigation District #13: Diversion at the Burlingame Dam of about 27,000 AFY; Serving ~ 7,000 acres, 81 landowners (McCarthy, Pat 2015).

The Watershed Plan lists other significant irrigation ditches in the lower Walla Walla as follows (HDR Engineers, Michael, Barber, WSU, and Steward and Associates, Inc, n).

- Lowden No. 2, Garden City: Consolidated in 2002
- Bergevin-Williams and Old Lowden: Consolidated in 2013 diversion is at RM 31; irrigation of 1,840 acres (Walla Walla County Conservation District 2013).

There are numerous small irrigation diversions from upper Walla Walla River tributaries and the North and South Forks of the Walla Walla River. These diversions serve small to mid-sized farms and are generally located towards the lower elevation areas of each tributary.

There are also a significant number of diversions along the Little Walla Walla River irrigating an estimated 6,500 irrigated acres (Wolcott 2010). Flow down the Little Walla Walla Branches is controlled by a manual headgate and varies from 5-130 cfs. The Little Walla Walla River diversions also present opportunities for water right acquisition in that there are an estimated 6,500 acres of irrigation occurring from the little Walla Walla and Spring Branches. Many of these serve small to mid-sized farms. Currently, fish are screened out of the top of the Little Walla Walla system at the headgate at the Frog. However, fish may access the Little Walla Walla branches via the lower end where the stream enters the mainstem Walla Walla. The Little Walla

Walla branches are known to contribute important cold water to the mainstem Walla Walla given the connectivity with cool groundwater. Thus, decreasing surface water diversions could potentially support flow in the Walla Walla River.

Mill Creek

While Mill Creek flows out of the Umatilla National Forest and eventually through the City of Walla Walla it does support several water right diversions for municipal and irrigation supply. The largest diversion from Mill Creek is the City of Walla Walla's municipal diversion which is on upper Mill Creek in Oregon where the City holds an Oregon water right to divert up to 28 CFS (the City also holds smaller water rights for power generation). In addition, Mill Creek supports irrigation diversions most of which are for small quantities of water. The Mill Creek Flood Control Project includes a managed headgate and dam near RM 10.5 which controls flow in Yellowhawk and Garrison Creek. Flow diverted down these two distributaries ranges from 10-30 cfs**.**

Mill Creek includes numerous tributaries and distributaries many of which support irrigation diversions. The Watershed Plan identified "34 pump and 3 gravity diversions on Yellowhawk Creek, as well as 27 pump and 7 gravity diversions on Garrison Creek. Cold Creek and Doan Creek, both tributaries to Mill Creek, were identified as having 5 pump and 1 gravity diversions and 4 pump and 1 gravity diversions respectively. On Cottonwood Creek the WDFW has identified 8 pump diversions and 1 gravity diversion while 7 pump diversions were identified on Russell Creek."(HDR Engineers, Michael, Barber, WSU, and Steward and Associates, Inc 2005). It is also important to note that the City of Walla Walla wastewater treatment facility delivers treated effluent to downstream irrigation users around College Place. Blalock Irrigation District receives about 5 CFS of City of Walla Walla effluent and Gose Irrigation District receives about 1 CFS (Nicholson, Frank 2021).

The following is a summary of the most significant diversions along Mill Creek including distributaries as documents in the Watershed Plan and the Lower Mill Creek Habitat and Passage Assessment Strategic Action Plan.

- City of Walla Walla diversion: ~ RM 24
- Blalock #3: This is the largest irrigation diversion along Mill Creek with a newly updated fish screen and diversion infrastructure which serves smaller commercial farms, hobby farms and residential areas in the College Place area. Outfall from the ditch serves Blalock Lake, the headwaters of Cold Creek.
- Bossini Ditch: There was a partial water right purchase of these water rights but the ditch with relatively senior water rights still serves a couple of small water users, within the City limits.
- Stiller Ditch: Lower Mill Creek near the mouth, ditch is now piped.
- Recreational Ditch /Ball Field/Schulke Ditch: Small ditch under 10 acres goes under the Mill Creek levee which may cause concerns for ACOE. Serves a about a dozen residential users(Tolleson 2021).
- Driving Range: No details available, further research needed
- Garrison and Yellowhawk Creek: Is controlled by a manual headgate and diversion spanning dam at RM 11.3. Water is diverted down Yellowhawk to supply senior water

right holders on Yellowhawk Creek. Mill Creek may go dry downstream of the Yellowhawk diversion until the return from Titus Creek

- Titus Creek: Titus Creek is a distributary of Mill Creek and branches at RM 14.5 flowing parallel to Mill Creek. Titus Creek serves the Walla Walla Community College and a few small diversions upstream of the Community College. Fish screens are in place on either end of Titus Creek to prevent fish kills in the Ditch. In recent years there were issues with heavy equipment in the Creek which was used to keep the diversion/distributary outlet flowing to meet downstream irrigation needs. Klicker's strawberries is a major user of Titus Creek water.
- Division Street Ditch: No details available, further research needed.

Below is a list of the most significant diversions supported by Yellowhawk Creek.

- Falbo Ditch (Yellowhawk Creek): 0.3 miles from Walla Walla High School at RM 6, listed as a partial fish passage barrier (Tetra Tech 2017)
- Campbell Ditch: Left bank of Yellowhawk at the Railroad crossing.
- Jones Ditch: Diversion at RM 11 near Rooks Park, outfall is to Yellowhawk Creek; fish screen installation completed by WWCCD with WDFW.

Touchet River

Irrigation diversion on the Touchet mostly consist of individual pumps and a few gravity-fed diversions though there is one major irrigation district and a handful of smaller ditches. The largest irrigation diversion on the Touchet is the Eastside and Westside Irrigation Company which divert at Hofer Dam at about RM 4. According to the Watershed Plan a WDFW report identified about 40 diversions and 4 gravity fed diversions on the lower Touchet below Waitsburg. Ecology currently regulates many small water users along the Touchet, primarily to serve the Eastside/Westside Irrigation District.

The Watershed Plan includes the following irrigation ditch information:

- Touchet Westside Irrigation District: serves about 1,975 acres and 40-50 water users (HDR Engineers, Michael, Barber, WSU, and Steward and Associates, Inc 2005). Irrigation occurs March 15-December 1 in the lower Touchet area.

There are also three smaller irrigation ditches located in the Waitsburg/Dayton area:

- Huntsville Ditch: (Small Ditch between Waitsburg and Dayton)
- West End Irrigation District and the Hearn Ditch (~ 230 acres of irrigation as estimated in the Watershed Plan but may be fewer acres in the Dayton area) The West End and the Hearn Ditches were consolidated in 2008. The diversion structure has two rotating fish screens, a weir, and two manually operated headgates. One headgate delivers water to the WDFW fish hatchery and the other provides water to the irrigation districts by way of a gravity feed pipeline. The existing dam is designed to provide fish passage of ESA listed species (Tolleson 2021).

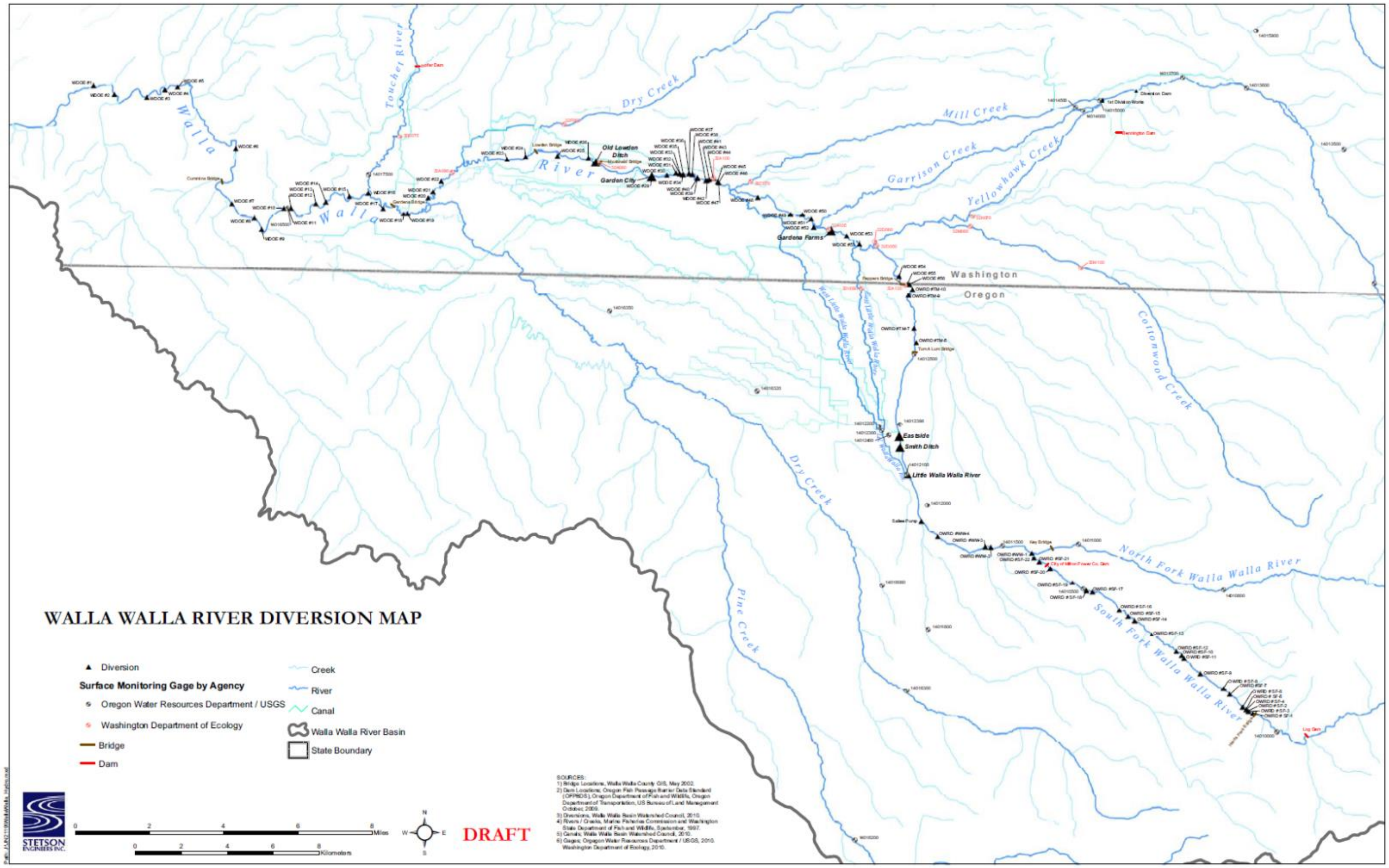
- East End Irrigation District (small number of acres Dayton area): Small group of individual water rights that use a common ditch. This diversion currently consists of an open channel from the Touchet River to a headgate located on the Touchet River levee. Water flow is controlled at the headgate, with a fish screen located in channel. The system beyond the headgate was changed from an open ditch to a gravity feed piped system approximately 5 years ago. The piped system has turnouts to each of the water users within the system (Tolleson 2021).

There are also diversions (many of which are noted to have been updated with fish screens) on the lower reaches of several Touchet tributaries. These are identified in the Watershed Plan as follows.

- North Fork of the Touchet- 9 diversions
- South Fork of the Touchet 4 diversions
- Wolf Fork five diversions
- Coppei Creek 4 diversions; City of Waitsburg municipal supply spring diversion is also located on the upper North Fork Coppei
- Whiskey Creek 1 diversion

The diversion information discussed in this section provides a summary of available information on existing diversions and a starting point for water acquisition practitioners to consider in evaluating transaction opportunities. The map below (Figure 9) produced by Stetson Engineering provides locational information for irrigation diversion in the mainstem Walla Walla and Mill Creek, unfortunately it does not include the Touchet Subbasin. Additional analysis of irrigation water right places of use, diversion locations, aerial photography, and NRCS and WSDA cropscape data is necessary to form a complete picture of irrigated agricultural in the Walla Walla Basin. Open ET may also be a useful tool for better understanding the current extent of irrigated agriculture.

Figure 9: Diversion Locations in the Walla Walla Basin



7. Estimated Impact/Benefit

The Strategic Plan analyzed the difference between target flows set in the 2013 Stillwater report and actual streamflow at various gauges (Cascadia Consulting 2021). While, the SPAC has not yet endorsed the Stillwater targets as working flow targets, they do provide one point of reference for understanding the seasonal, geographic, and magnitude of streamflow need. Generally, the biggest shortages occur in the lower reaches the Walla Walla River, Mill Creek and the Touchet in the summer season. The Walla Walla River at Detour Road does not meet flow targets from March-October with a deficit ranging from 29 to over 200 cfs. Mill Creek does not generally meet the Stillwater instream flow target at the Walla Walla gauge, with a deficit of streamflow ranging from 4-25 cfs during March-November. And in the Touchet River, low flow needs are greatest in the lower reaches May-October with needs ranging from 11-23 cfs.

These flow needs can be compared to high-level estimates of consumptive crop water use to estimate the number of acres that might be needed to participate in EWTs to meet flow targets. Water duty in the Walla Walla Basin varies from 3-6 AF per acre on water right certificates, with an average instantaneous rate limitation of 1 cfs per acre. Using the calculated monthly difference between 80% exceedance flow and the Stillwater flow targets, a first-cut analysis was conducted to assess the potential for fallowing of irrigated cropland to help address these gaps. Three gages were selected (i.e., Touchet at Cummins Road, Walla Walla at Detour Road and Mill Creek at Walla Walla) for this analysis — these three gages are lowest in the system for each respective reach prior to joining together. Net irrigation water requirement (NIWR) estimates by month were obtained for three prominent crops (spring grain, alfalfa, dry onions) and used to roughly estimate the number of acres that would need to be fallowed in each month for each crop type to address the flow target gaps previously identified (see Table 16).

Table 16: Monthly estimates of fallowing requirement in acres (by crop type)

Gage	Crop	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Touchet @ Cummins Rd. (32B075)	Spring grain								2,482	1,155	4,650		
	Alfalfa	19,398							3,650	1,242	1,805	2,244	3,538
WW @ E. Detour Rd. (32A100)	Spring grain							66,763	31,079	20,314	21,550		
	Alfalfa	105,439							45,700	21,855	8,363	10,062	13,805
Mill Creek @ WW (USGS 14015000)	Spring grain							17,931	10,047	6,545	9,450		
	Alfalfa	43,720							14,773	7,041	3,668	4,190	6,487
	Onion							64,076	11,238	6,291	3,323	4,425	122,224
Total	Spring grain							84,694	43,608	28,014	35,650		
	Alfalfa	168,558							64,123	30,139	13,836	16,496	23,831

	Months for which a flow gap was not identified for a specific gage
	Months for which a flow gap was identified for a specific gage
XXX	Estimates that are not achievable through fallowing
XXX	Maximum potential acreage for each crop/gage combination

Note that the light blue highlight in Table 4 identifies months in which flow gaps were identified for each respective gage and cells highlighted medium blue denote the month in which the maximum number of acres for each crop type occurs. To achieve streamflow targets in the summer low flow period from May-August in the Touchet fallowing the highest number of acres (highlighted) would achieve stream flow goals for that period.

In addition, note that acre estimates are not additive – for example, consider estimates for the Touchet at Cummins Road using spring grain. The maximum number of fallowed acres occurs in July (4,650). If these acres were fallowed for the entire irrigation season, these acres also would address the flow gaps identified in May and June at the same gage.

This analysis is a purely hypothetical exercise and is not intended to represent realistic flow restoration amounts that could be achieved through water right acquisition projects. Instead, the exercise is one way of thinking about the ability of water right acquisition to meet instream flow goals and underscores the importance of water acquisition as a complimentary but not sole solution to meeting instream flow targets. A key missing data point is the actual number of irrigated acres in each subbasin that could be compared to the acreage numbers in Table 4.

8. Discussion of Contribution to Desired Future Conditions

Strategy 1.04 to enhance streamflows through water right acquisition contributes to 7 out of the 15 Desired Future Conditions (DFCs) incorporated into the Walla Walla Strategic Plan (Cascadia Consulting 2021). Table 17 summarizes the DFCs that are most likely to have positive benefit as a result of enhancing instream flows through water right acquisition.

Table 17: Intersection of Water Right Acquisitions for Streamflows and Desired Future Conditions

Desired Future Condition	Water Acquisition for Instream Flows
Achieve healthy, natural floodplain function.	Water acquisition can help enhance low instream flows which are necessary for a healthy functional floodplain year round.
Increase river channel complexity and naturalize channelized streams.	Water acquisition to help enhance low flows is essential to healthy and complex in-channel habitat.
Meet TMDL targets	Water acquisition to help enhance low flows is critical to meeting TMDL temperature targets and other water quality parameters.
Meet recovery targets and treaty right fishing obligations for critical species (Bull Trout, Steelhead and Spring Chinook)	Water acquisition to help enhance low flows contributes to the necessary stream flows to support migratory, rearing and spawning of critical fish species.
Sustain and improve quality of life in the Walla Walla Valley	Keeping the rivers and creeks of the Walla Walla Valley flowing year round is a critical part of the asethetic, cultural and recreational value of the Walla Walla Basin.
Create climate resilience	Water acquisition to help enhance low flows helps create climate resilence for streams that that are expected to experience lower streamflows due to less snowpack and a chaging precipitation regime.
Enhance instream flows to meet instream flow targets for critical species.	Water acquisition helps meet minimum instream flow targets necessary for all life stages of critical species.

9. Future Work and Funding Needs

Existing Capacity for Instream Water Rights Acquisition

Currently, WWT is the primary implementor of water acquisitions in the Walla Walla Basin with a focus on water acquisitions that restore flow in Mill Creek, the Touchet River and the Walla Walla Mainstem on the Washington side of the Basin. However, WWT expects to expand their work into Oregon given that TFT is no longer active in flow restoration in the Oregon portion of the Basin. At present, WWT has 1.25 full time employee (FTE)'s devoted to water rights acquisition work in the Walla Walla Basin which is more staff capacity than previous years when about 0.5 FTE was devoted to working in the Basin.

Future Implementation and Budget Needs

The goal with this strategy is to increase the pace and scale of water right transactions to benefit streamflow. To that end additional staffing capacity will be needed to develop, negotiate, and manage these transactions. Given experience in Basins with similar opportunity for water transaction development 2-3 full-time water transaction practitioners would be adequate to grow the pace and impact of water acquisitions work in the Basin. As has been discussed extensively, identifying, cultivating, and implementing water transactions is a time and resource intensive process and having a small team of people working collaboratively to implement projects will allow for an increase in completed water transactions. In addition, these practitioners will need to have adequate funding to pay for acquired water rights. A significant portion of the funding needed to support water transaction practitioners and the costs of water acquisition projects has been secured by WWT, at least in the near-term, such that any new funding brought to these efforts would be matched by existing investments from the CBWTP, Ecology, and CTUIR. Additional budgeting will be needed to estimate detailed costs of increasing the scale and scope of a Walla Walla water acquisitions strategy. While WWT is expected to lead on-the-ground efforts to identify and negotiate transactions this work requires strong partnerships.

The Tri-Sovereigns (CTUIR, Ecology, and OWRD) will continue to play prominent roles in this work. Ecology's contribution to this strategy is twofold - as a funder and the regulatory agency for water resources in Washington. Ecology has funded investments in water acquisitions for the last twenty years and ideally will continue to support these investments in staff time and water costs. Ecology also maintains water right files and approves eligible water right changes. In the past in Washington, approval of water right change applications has been a logjam for pending water transactions. One solution is to have WWT draft change applications to shorten Ecology's review time. Or there may be other ways that Ecology could assure that quality water transactions can be reviewed and approved in a timely manner like dedication of more permit writers to the trust water right program. OWRD plays a similar regulatory role to Ecology but does not typically act as a funder of projects or transactions. OWRD's short-term lease process is quick but permanent transfers can take up to a year or more depending on complexities and issues. CTUIR also plays a critical role in this work as mentioned above as a funder, implementor, and project partner and technical reviewer.

Below is a preliminary, draft placeholder budget. This budget will need to be refined as planning continues to include better estimates of NGO time, agency staffing needs, and water costs as well as an estimate of how much water could be acquired at various funding and staffing levels. WWT expects to be able to fund staff time for 2.5 FTE over the next few years with support from the CBTWP and the Office of Columbia River. Both Ecology and CBTWP also support water right acquisitions costs. These existing funding sources for both staff time and water costs mean that portion of the budget in Table 18 is likely already secured, however a more detailed budget could be developed based on additional consultation with the Tri-Sovereigns and WWT to refine long-term budget needs.

Table 18: Preliminary Draft Budget Needs

Short-term 2 Year (2023-2025)	Budget
Staff time to develop water transactions 2.5 FTE (@$107k per position/yr)	$535,000.00
Water Aquisitions Costs $500,000k/year	$1,000,000.00
Subtotal	$1,535,000.00
Mid-term (2025-2030)	
Staff time to develop water transactions 2.5 FTE	$2,675,000.00
Water Aquisitions Costs $500,000k/year	$5,000,000.00
Total Budget for 8 Years	**$9,210,000.00**

Note: This is a very rough estimate of budget and will likely shift as a detailed budget is developed. Many of these costs may also already be covered under existing funding sources.

The most recent water right acquisitions in the Walla Walla Basin occurred in 2009 and 2014 for $500-$600/acre foot of consumptive use. Water right purchase costs are driven by many factors including, priority date, location, amount, timing, and the market for water from other out-of-stream water users either in basin or not in basin. Funders also play a role in determining water right transaction values and generally require buyers not to pay more than “fair market value;” however, there are number of ways to determine fair market value for water rights, unlike in the market for land that is more developed and closely regulated. The maturity of the water market in the Walla Walla Basin means that if transaction activity increases, prices may shift from historic prices likely (but not inevitably) upward.

10. General description of funding source(s)

Funding for water right acquisitions over the last 15-20 years has primarily come from two main sources-the CBWTP, which is administered by the National Fish and Wildlife Foundation and funded through the Bonneville Power Administration and, on the Washington side of the Basin, the Department of Ecology. CBWTP funds for water transaction work in the Basin have come through accord agreements with CTUIR. Over the years WWT, TFT and other non-profit organizations have secured additional funding from other private and public funding sources, but the two primary sources (CBWTP and Ecology) have contributed to the bulk of the funding to lease and buy water for instream flow. However, both the CBWTP and Ecology have recently indicated that funding for instream flow transactions in the Walla Walla may come with more strings attached and be more competitive for the implementing entities to receive. For example, while the bulk of the EWT transactions in the Walla Walla Basins to date have come in the form of water right leases these two major funders may be more reluctant to engage in water right leases in the future. While it is unclear exactly how changes in funding structure and priorities will impact work on the ground in the Walla Walla Basin, securing funding for this work will need to be a high priority if it is to continue to have increased impact on streamflows.

Availability of funding, especially for the costs of staff time to develop and shepherd EWTs from start to finish, is a critical determinant of the pace and scale of EWT success. More specifically, one of the unique aspects of instream water transactions is that significant effort is needed to identify cultivate and negotiate with potential water right holders and the process of legally transferring water rights instream can be complex and time-consuming. The steps needed to complete an instream water project are characterized as transaction costs. This means that it is crucial to have funders that understand and are willing to support what can be significant costs for outreach and relationship building that precede completion of water right acquisitions. Sometimes it takes years to close a water right acquisition which means that funding for the practitioner to continuingly develop a project over a number of years is essential. Additional transaction costs for water acquisition project involving infrastructure changes may also include feasibility studies, permitting, and engineering design and construction costs.

11. Future Considerations and Potential Next Steps

This scoping memo has summarized work to date on water right acquisition (including leasing) in the Walla Walla Basin and provided detailed background to consider for future implementation in the context of similar work conducted in other basins as well as the context of the WWW2050 Strategic Plan. Through the research for this memo as well as discussions with the Implementation Work Group several key considerations and potential next steps for future water right acquisition work have arisen that are summarized briefly below (in no particular order).

- **Irrigated acreage delineation and diversion mapping**: Despite all the research and analysis done to date in the Walla Walla Basin there is not a comprehensive understanding of the amount of irrigated agriculture in the Basin. A detailed review of aerial photography or an analysis using the Open ET platform would be helpful in establishing a current baseline for irrigated agriculture. In addition, this analysis should link to mapped water right records and active points of diversion. Specific knowledge of the landowners, water users, and water rights in the region's sub watersheds is critical to implementing a successful water right acquisition program.
- **Consideration and potential endorsement of flow targets:** The WWW2050 Strategic Plan relied on the flow targets developed in the 2013 Stillwater study, however there has not been a formal adoption of these targets. In the future, the Tri-Sovereigns and Basin stakeholder may want to consider endorsing these flow targets or even consider interim short- or medium-term flow targets to provide for minimum flows for critical species.

Targets provide WWT and others concrete goals, mileposts to gauge progress, and also help water users understand the potential extent of water acquisitions applicability.

- **Increase outreach to identify willing sellers:** To realize the potential of water right acquisition, additional efforts will be needed to identify and develop new water right acquisition projects across the Basin. Finding willing sellers has been one of the primary limiting factors yet there remains significant opportunity to work with the hundreds of water users in the Basin. More outreach will require more project practitioner time on the ground a greater understanding of water use in the Basin (ideally gleaned from the analyses in bullet 1) and perhaps trying new outreach strategies as described in this memo. Outreach and project development with the largest water users in the Basin such as irrigation districts and the City of Walla Walla may yield projects with a larger impact. That said, there are numerous small water users in the Basin many of which irrigate lawns with surface water and there may also be opportunity to work these types of users as well. Another future consideration for water right acquisition is the potential integration of water right acquisition to meet multiple benefits- this concept could be explored as a way to meet both instream and out of stream needs under Phase II of this work.
- **Water acquisition alone will not solve instream flow challenges:** Given the significant impact of irrigation diversions on streamflow, water right acquisition of senior out of stream water rights can be a cost-effective method to improve instream flow through voluntary, market-based projects. If water acquisition projects can be developed, they are complementary to other strategies in the Basin such as fish passage improvements and floodplain and riparian restoration. However, water acquisition alone cannot address the Basin's instream flow challenges and a large-scale infrastructure fix will still be necessary, especially to reach flow goals on the mainstem Walla Walla River.
- **Protection of instream water across the Oregon-Washington border:** Addressing instream flow in the Basin also requires finding a solution to protecting flow across the Washington-Oregon State border to ensure that water saved in Oregon can benefit stream flows in Washington. This will require leadership from the Tri-Sovereigns especially the two states.

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