Final Draft

WEST LITTLE WALLA WALLA RIVER HABITAT ASSESSMENT

LITTLE WALLA WALLA RIVER GROUP

For

WALLA WALLA BASIN WATERSHED COUNCIL

OCTOBER 2012

ACKNOWLEDGEMENT

The Group wishes to express its appreciation to the Walla Walla Basin Watershed Council (WWBWC) for sponsoring this assessment and especially to Will Lewis, WWBWC employee, for his participation in on-the-ground observation of West Little Walla Walla River habitat conditions. We especially thank landowners who were helpful in pointing out aspects that were important to the assessment.

CONTENTS

1. Summary 1

2. Background 2

3. Objectives 2

4. Findings 2
   4.1 Barriers 2
   4.2 Diversion Screening 3
   4.3 Instream Habitat Conditions 3

      4.3.1 Stream Flow
         4.3.1.1 Recent flow 3
         4.3.1.2 Historic flow 5
      4.3.2 Stream Morphology 7
      4.3.3 Water Temperature 7
      4.3.4 Substrate Siltation 9
      4.3.5 Aquatic Invertebrates 9
      4.3.6 Aquatic Weed Growth & Phreatophytes 9
   4.4 Riparian Habitat Conditions

5. Habitat Restoration Priorities 11

   5.1 Flow 11
   5.2 Barriers 12
   5.3 Screening 12
   5.4 Riparian Protection 13
   5.5 Weed Control 13

Tables

1. Unscreened Diversions 3
2. Comparison of Average Monthly Flow 5
3. Phreatophyte Water Use 9
4. Barrier Priority 12
5. Screening Priority 13
6. Riparian Restoration 13

Figures

1A. Recent WLWWR Flow at Station #222 4
1B. WLWWR Flow at Station #224 4
1C. WLWWR Flow at Station #227 4
1D. Historic Flow Stations at WWR & WLWWR 6
2. Recent Average WLWWR Water Temperature 8
3. CREP Plantings in the WLWWR Riparian Zone 10

Appendix 1 – Field Findings
Appendix 2 – Field Photos

WEST LITTLE WALLA WALLA RIVER (WLWWR) HABITAT ASSESMENT – 2012[1]

1.SUMMARY

Members of the Little Walla Walla River Group assessed the habitat of the West Little Walla Walla River (WLWWR) during July and August of 2012 to determine: (1) if significant changes have occurred since CTUIR's 2004 assessment, and (2) the location of habitat problems and a priority for habitat restoration actions.

Findings were that no appreciable habitat changes have occurred since 2004. Historic barriers and unscreened diversions are present along with a channel and stream banks choked with aquatic weeds, mostly reed canary grass and jewel weed along with submergents such as elodea and coontail..

The highest restoration priority is deemed to be flow augmentation in the WLWWR. This would improve habitat for fisheries, preserve riparian vegetation, and provide flow for exercising water rights in the "springs" portion of the watershed.

While flow augmentation is complimentary for both habitat restoration and consumptive water use, the two uses diverge when considering cover and water temperature Significant amounts of water could be saved from evapotranspiration if the stream's overstory was removed; however, this would reduce fish refuge and promote increased water temperature that would be inimical to salmonids.

Aquatic invertebrate populations are very low with the most frequent order being caddis flies. The aquatic weed duckweed appears to provide an important living space for caddis. Although the WLWWR channel has only moderate siltation, the concentration may be limiting to larger caddis flies and other typical cool-water invertebrates such as may flies, stone flies, and dipterans.

Stream siltation appears to provide the foothold for aquatic weeds. Siltation is present except where stream velocities expose the gravel/cobble substrate. Those latter locations appear adequate for steelhead spawning.

Riparian habitat is excellent for wildlife and for limiting water temperature of the WLWWR. Only a few hundred lateral feet would benefit from vegetative plantings. As one nears the stream bank, reed canary grass and jewel weed are the predominant plants. These non-native weeds restrict flow and exert a significant water demand in the form of evapotranspiration. An estimated 90 percent of the channel is so affected between Ferndale Road and the mouth of the WLWWR. The magnitude and lateral distance of these weeds may make their control physically and economically prohibitive.

From a fisheries standpoint, restoration priority for barrier removal and screening should be given to those furthest downstream with the highest barrier drop distance. Screening priority should favor diversions with the largest volume. Restoration priority for other habitat improvements, e.g., weed removal should be given to the stream zone between

[1] Field work for this assessment was done by members of the Little Walla Walla Group: Yancy Reser, Judith Johnson, Clare Sobetski, Bonnie Roemer, Will Lewis and R.H. Lewis, environmental consultant. The report was drafted by the latter.

Ferndale Road and Frog Hollow Road, the area retaining the most flow during normal years and the area with the most potential for salmonid spawning and rearing.

Given the existing habitat conditions and water law affecting the WLWWR, the Little Walla Walla River Group can have the most positive influence for restoration by forming a 501 (c)(3) organization to act as: (1) an advocate for actions that increase surface water flow and groundwater in the watershed, and (2) a citizens advisory group to entities that conduct and/or fund stream restoration activities, e.g., the Walla Walla Basin Watershed Council, Washington Department of Ecology, Washington Department of Fish and Wildlife, Walla Walla County Conservation District, Oregon Department of Fish and Wildlife, Umatilla County Soil and Water Conservation District, and the Confederated Tribes of the Umatilla Indian Reservation..

The name of the organization is recommended to be “Little Walla Walla River System Coalition”.

2. BACKGROUND

With support from the Walla Walla Basin Watershed Council (WWBWC), the Little Walla Walla River Group evaluated instream and riparian habitat conditions of the WLWWR from its confluence with the Walla Walla River in Washington upstream to the vicinity of Ferndale Road in Oregon during July and August of 2012. The purpose of the assessment was to determine habitat changes in the WLWWR system since the assessment made by CTUIR in 2004 and to determine appropriate habitat restoration actions.

Field visits to 44 properties were made after receiving permission from land owners for members of the Little Walla Walla River Group to walk the WLWWR riparian zone.

3. OBJECTIVES

Assessment objectives were to:

3.1 Determine the GPS location of current instream and riparian habitat problems,
3.2 Suggest priorities for habitat restoration actions, and
3.3 Suggest physical and other restoration activities to improve the habitat of the WLWWR.

4. FINDINGS

4.1 Barriers to Salmonid Migration

Several vertical drops of from 6 to 24 inches were observed at the same apparent locations that were reported in CTUIR’s 2004 study (see Table 3 and Appendix 1). Drops were caused by wood or concrete weirs placed for irrigation diversions. No natural barriers or potential barriers were observed. Three drops (at 46 00 009N, 118 26 041W; 45 59 931N, 118 25 856W; and 45 59 256N, 118 25 153W) are judged to be a significant barrier to adult steelhead migration. Drops greater than 6 inches are considered by the NMFS to be a barrier to juvenile steelhead in that they could prevent juveniles from returning to their rearing area if they were washed downstream during freshets. However, as mentioned below large flow fluctuations with attendant higher

water velocities that could wash juvenile fish downstream do not occur in managed[2] streams such as the WLWWR.

4.2 Irrigation Diversion Screening

Washington diversions from the WLWWR are screened. Oregon has several unscreened diversions in the study area as follows:

Table 1. Unscreened Diversions in the Oregon portion of the WLWWR

Location	Tax Lot #	Diversion Intake Type
45 58 900N 118-25-040W	202	Headgate with concrete flume
45 59 104 118 25 139	600	Pipe leading to concrete headgate
45 59 256 118 25 153	200	Headgate with concrete flume
45 59 451 118 25 422	200	Pipe leading to offstream headgate
45 59 511 118 25 429	700	Headgate on bank leading to ditch
45 59 574 118 25 432	1800	Pump in headbox built into bank
45 59 667 118 25 627	1500	Bank headgate leading to multiple users

4.3 Instream Habitat Conditions

4.3.1 Stream Flow

4.3.1.1 Recent Flow

As a managed branch of the Walla Walla River, the WLWWR has smaller annual flow fluctuations than unmanaged streams. Flow measurements by the WWBWC during years 2001-2010 are shown in Figures 1A, 1B, and 1C. Summer flow is typically within the range of <1 to 2 cfs respectively at Oregon tax lot # 902 and 0 cfs at the mouth where it rejoins the main stem Walla Walla River.. Existing water rights and management actions allow for withdrawal of more water than released from the upstream Oregon Little Walla Walla Rivers and accreted from springs. This results in 0 flow of the WLWWR in Washington from mid-summer to mid-autumn in most years (see water rights in Appendix 1). Late fall, winter, and early spring flows are adequate for migration of summer steelhead, but low summer flows limit the juvenile steelhead rearing habitat. Of the factors evaluated during this assessment, low summer flow is judged the most restrictive habitat problem. In addition to reduced area for fish rearing, lower flows result in lower velocities which allows for: (1) increased siltation that promotes increased instream aquatic weed growth, and (2) smothers aquatic insect food supplies for fishes.

[2] In this context, managed means flow control by physical means by an entity(s).

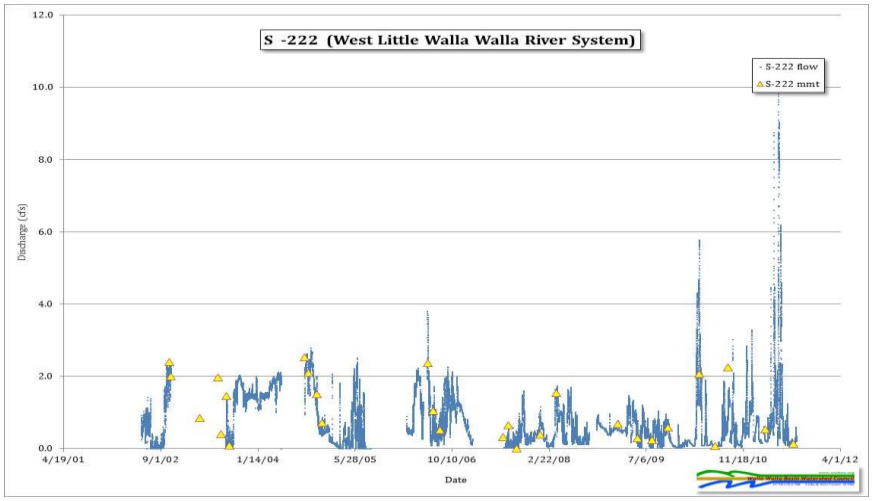

Figure 1A. Recent WLWWR Flow at Station #222 – Tax Lot #902

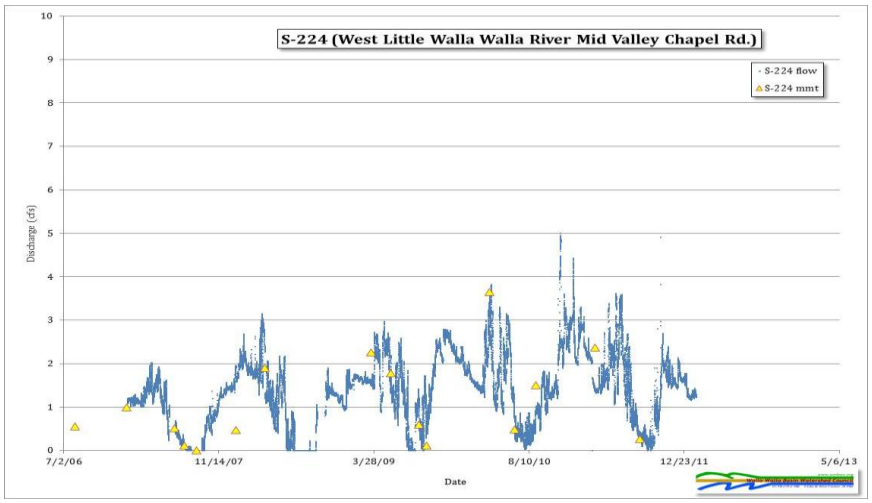

Figure 1B. Recent WLWWR Flow at Station #224 – Tax Lot #350609310004

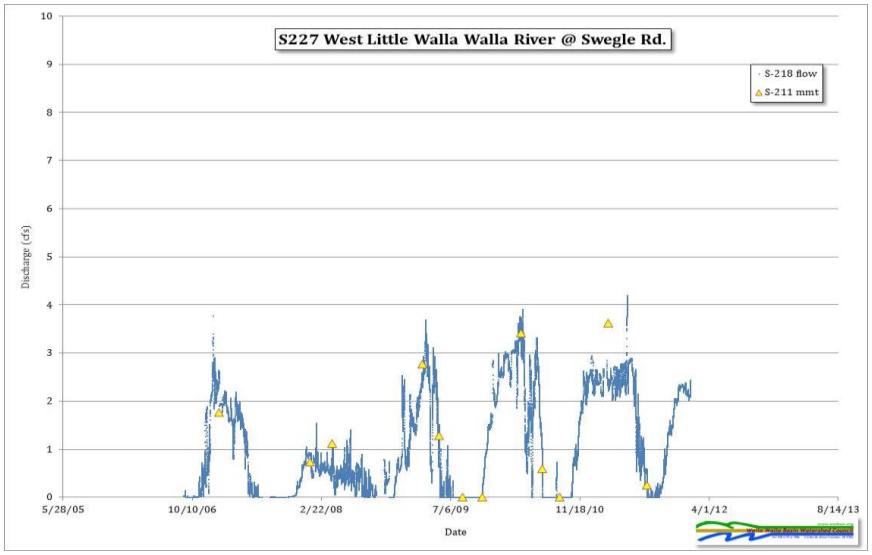

Figure 1C. Recent WLWWR Flow at Station #227 – Tax Lot #350605440002

4.3.1.2 Historic Flow

Available records verify that the entire LWWR system is a branch of the Walla Walla River as opposed to a "ditch" as it is sometimes referred to. As shown in Table 2, WLWWR flows at the ELWWR-WLWWR bifurcation averaged from 17 to 25 cfs during May through August in the consecutive years of 1920-1926. Flow at that location ranged from 5 to 8 cfs during the period 2005-2011 which is a reduction of some 50 percent of historic flows. This reduction is apparently due to water management reallocation of LWWR flows, not a flow reduction in the mainstem WWR which appears to have maintained an average flow of greater than 100 cfs from historic to recent times. The general location of flow measurement stations is shown on Figure 1D.

Table 2. Comparison of Monthly Average Historic and Recent Flows of WWR and WLWWR

Location	Year	Month				Reference
Mainstream WWR						
T5N R35E NE¼ Section 13 (¼ mile upstream from Milton, OR) USGS Station 1 and WWBWC Station 105		May	Jun	Jul	Aug	Hydrographic Survey of Walla Walla River. Oregon State Engineer. 1905-1906
	1906	229	184	135	101	
	1907	260	154	118	118	USGS Station 14010000 Data
	1908	220	160	140	120	
	1909	301	215	112	126	
	1910	232	143	109	102	
	1911	331	206	119	104	
	1912	390	253	132	112	
	1913	296	193	121	107	
	1914	234	133	104	98	
	1915	258	175	113	94	
	1916	368	321	150	105	
	Average	289	195	122	109	
Station 105 upstream from Milton	2012				116	WWBWC[3]
WLWWR (Ford Branch)						
T5N R35E NE¼ of NE¼ of Section 2 - Station 46	1906	37.1	12.8	19.7	20.6	Oregon State Engineer
	1920	21.7	24.9	19.5	17.9	Adjudication Survey of 1926
	1922		31	21.3	18.5	
	1924	22.5	22.2	15.8	16.4	
	1925	30.1	22.1	15.4	17.0	
	1926	27.0	20.8	12.9	17.1	
	Average	28	22	17	18	
	% WLWWR OF WWR FLOW	10	11	14	17	
Station 205 (Ford System)	2005	5	5			WWBWC
	2009		8	8	8	
Station 209 (West Ford)	2005	5	5			WWBWC
	2009			4	0	
Station 214 (East Ford)	2008		0	0		WWBWC
	2009		3	3	3	
	2010				2	
	2011		3	3	3	

[3] All WWBWC flows in this table are approximations.

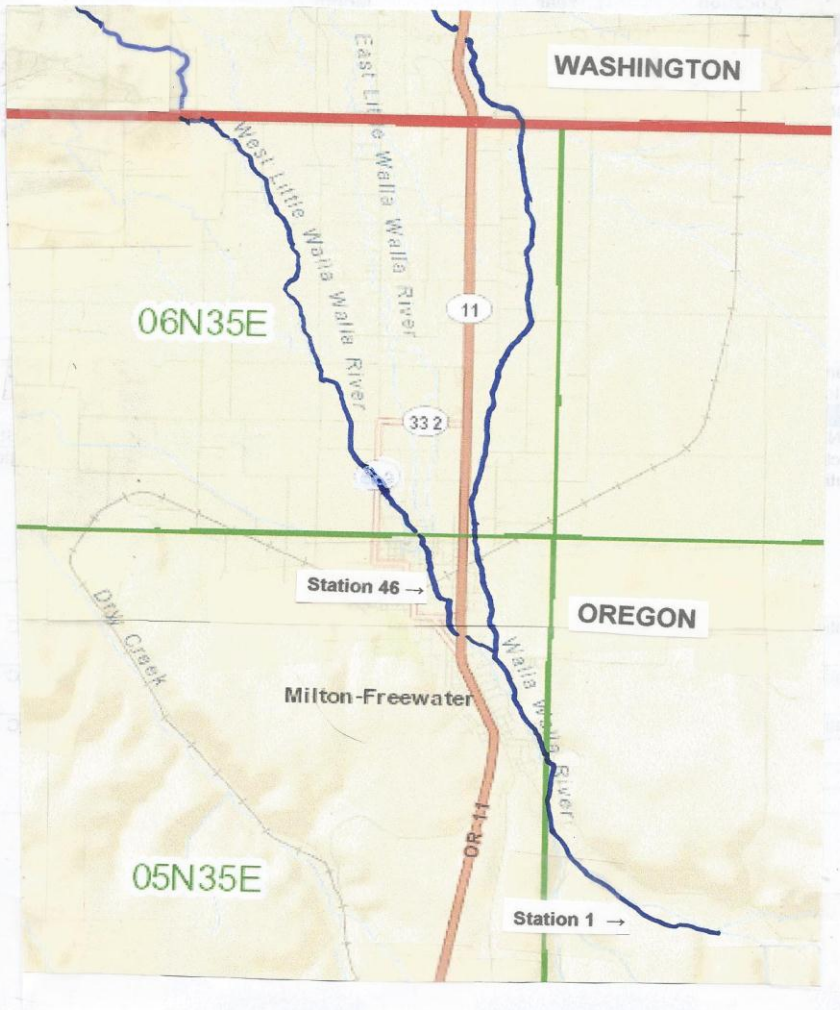

Figure 1D. Historic Flow Stations at Walla Walla River and West Little Walla Walla River

4.3.2 Stream Morphology

WLWWR consists of mostly glides and riffles ranging from 4 to 6 inches in depth with a few pools up to 1.5 ft. depth. Width is uniform averaging some 4 feet. The stream is not incised with only one exposed cut bank noted at 46 00 050N, 118 26 278W. Stream widening (from apparent livestock use) was noted at three locations: 45 59 689N, 118 25 619W; 46 00 050N, 118 26 278W; and 46 01 860N, 118 27 982W (see photos 11, 16, and 22).

Stream morphology in the project area is conducive to maintaining water temperature at levels tolerant for salmonid spawning and rearing if bank vegetation is maintained.

4.3.3 Water Temperature

Historic average monthly temperatures are shown in Figure 2 with critical months ranging from 57° to 68° F. in the project area[4]. Maximum daily temperatures during July and August reached 75° F. in the lower WLWWR. Current assessment temperatures were less than 61°F as taken around mid-day (see Appendix 1). Sustained temperatures that exceed 70° F. are not tolerated by salmonids. Maintenance of summer temperatures that are amenable to salmonid reproduction is largely dependent on flow and retaining vegetative cover on streambanks and in the riparian zone.

[4] WWBWC data (2003-2010 period).

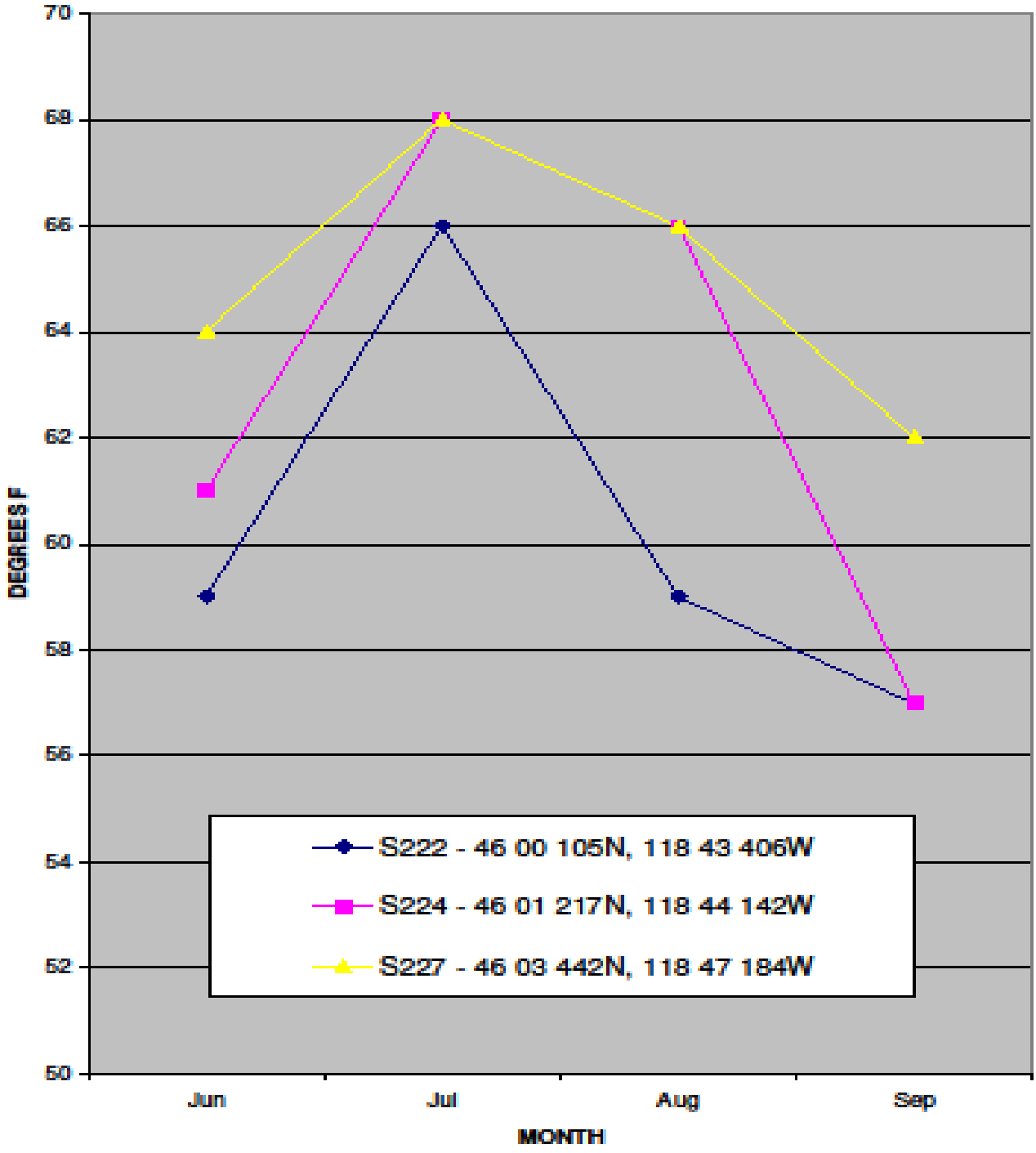

FIGURE 2. AVERAGE MONTHLY WATER TEMPERATURE - WLWWR

Note: S224 = 2003-2007; S224 = 2005-2009; S227 = 2006-2010.
Data from WWBWC.

4.3.4 Substrate Siltation

Siltation is moderate in most of the area observed (see Appendix 1) Cobble imbeddedness is minimal with only a light covering of silt except in areas of low velocities (≤1 cfs). Even so, an estimated 80 percent of the substrate is covered by intrusive aquatic weeds, mainly coontail and elodea which thrive in sediment and a nutrient-rich substrate.

4.3.5 Aquatic Invertebrates

The study area contained a surprisingly low population of benthic invertebrates with only small numbers of caddis flies (Order Ephemoptera) and snails being present. Normal cold-water orders, e.g., may flies, stone flies, and dipterans were absent. Case-building caddis were living more on aquatic weeds, e.g. duckweed, than on rocks on the substrate.

4.3.6 Aquatic Weed Growth and Streambank Phreatophytes

Aquatic weed growth in the channel and banks of the entire study reach is rampant. The amount of water consumed by instream aquatics is open to conjecture, but the literature concerning streambank phreatophyte evapotranspiration reports that cottonwoods, willows, and grasses consume from 3.1 to 4.2 acre feet of water per acre of vegetation. Of these three, cottonwood was found to be the largest water user and grasses the smallest user. Water use reported by the U.S. Dept. of Agriculture is shown in Table 2.

Table 3. Phreatophyte Water Use

Phreatophyte	Areal Coverage (Acres)	Evapotranspiration AF/Yr.	AF/Acre/Phreatophyte
Cottonwood	1337	5575	4.2
Willow	42	165	3.9
Grasses	84	263	3.1

4.4 Riparian Habitat Conditions

The WLWWR is heavily vegetated in an estimated 90 percent of the reach between the vicinity of Ferndale Road and the mouth of the stream in Washington. Some 2,000 lineal feet of the reach is planted and maintained in CREP on WA tax lots 350606120018 and 350608130001 (see Figure 3). Most frequent tree species are willow, cottonwood, alder, and aspen along with an assortment of other shade trees.

Figure 3. CREP Plantings in the WLWWR Riparian Zone

Streambanks are heavily infested with Reed Canary grass and the newly introduced Jewel grass. The former also is abundant as an instream emergent. Both of these species insulate the channel protecting it from direct sun light, but cause restricted stream flow and broadening of the channel as well as exert evapotranspiration losses to instream flows (see photo 14). An overstory of trees appeared to shade these species reducing their size and density.

5. HABITAT RESTORATION PRIORITIES[5]

5.1 Flow

Low summer flow is deemed the most limiting habitat factor in the WLWWR. Low flows reduce the amount of aquatic habitat, encourage instream weed growth because of low velocities, and are more subject to increase in water temperature than higher flows. Lower flows also provide less refuge and hiding areas for fishes and, of economic importance, reduce the amount of surface flow that infiltrates to ground water. Accordingly, the highest restoration priority for the WLWWR is increased summer flow.

Feasible ways to increase WLWWR summer flow are; (1) increase winter releases approximating historic flows from the Walla Walla River into the WLWWR to obtain more surface water infiltration to groundwater thus increasing summer flows in the WLWWR (see Table 2), (2) increase the number and area of groundwater recharge projects in the WLWWR watershed thus increasing the summer flow from springs, (3) purchase of water rights by water trust entities for instream purposes, and (4) reduce vegetative evapotranspiration in the streambank/riparian zone[6].

Of the these options the most effective from both implementation and cost aspects are believed to be increased winter flows from the Walla Walla Rivert and increased recharge. Reduction of evapotranspiration is a viable way to increase summer flow, but would be physically intrusive to the channel, is unpredictable in the amount of water saved, and would require annual maintenance to suppress streambank vegetation. Also, one of the most valuable habitat features of the WLWWR is its low summer temperature that is amenable for salmonid production. Removing enough vegetation to reduce significant evapotranspiration losses might allow for a rise in water temperature to a level intolerable for salmonids.

If streambank vegetation removal is implemented, what appears to offer the most water-saving result is replacement of Reed Canary and Jewel grass with native willow and a shrub such as red osier dogwood that competes with these grasses, and that are less water-demanding that other species such as cottonwood. Grass replacement should be done over time in order to retain a brush and/or tree canopy over the channel to prevent an increase in summer water temperature. Annual manual removal of the grass/forb assemblage after plantings of trees would need to be effected until canopy shading controls the grasses.

Instream aquatic weeds such as duckweed, coontail and elodea present different problems than streambank weeds (see photo 13 . Although the literature has scant references to the effect of these weeds on fish food (aquatic insects), the high percentage coverage of the substrate argues that the weeds limit fish spawning area and food supply. These weeds can also reduce flow and water velocity resulting in channel broadening which is conducive to increased water temperature. However, instream activities to remove these weeds – if the substrate is moved or removed -

[5] All priority locations under this section are subject to land owner approval of restoration actions. Properties with such approval have restoration priority.

[6] Restricting water consumption (i.e., domestic and irrigation use) is considered infeasible under present water law.

would require a permit from the Oregon Department of State Lands or the Washington Department of Natural Resources and permits from the WA Dept. of Ecology (WDOE) or the OR Deparment of Environmental Quality (ODEQ) an onerous procedure where a favorable outcome is uncertain. The preferred way to control instream aquatic weeds is to implement land-use procedures that limit erosion, siltation, and nutrient input to the stream.

5.2 Barriers

Secondary to restoring more instream habitat is removal of barriers to migrating salmonids. Eight barriers of significance were noted during the assessment. Prioritization of barrier removal seems best based on location and severity. Closest to the stream mouth argues for a higher priority[7] along with height of the barrier in relation to the pool depth below the barrier. If those criteria are used, the priority for barrier removal is:

Table 4. Barrier Priority

Priority	Tax Lot/Owner	GPS Location
1	902 – Regalado	46 00 009N, 118 26 041W
2	700 - Fortune	45 59 931N, 118 25 856W
3	200 - Ely	45 59 256N, 118 25 153W
4	200 - Ely	45 59 442N. 118 25 420W
5	1800 - Green	45 59 574N, 118 25 482W
6	1600 - Roemer	45 59 667N, 118 25 627W
7	1600 - Roemer	45 59 629N, 118 25 592W
8	600 - Eiffert	45 59 104N, 118 25 139W

The most cost-effective way to treat barriers in these locations appears to be placement of a roughened channel downstream from the barrier which can be left in place. As the WLWWR is not subject to high velocities, appropriate sized rock can be placed downstream from the barrier at intervals that result in a 0.5 foot increase in elevation until the barrier is reached. In the WLWWR situation, this method would allow passage of both adult and juvenile steelhead.

5.3 Screening

Priority for screening, which is believed to be third in importance for restoration actions, is assigned by: (1) diversion volume, i.e., higher the volume, the higher the priority, and (2) headgate versus pump diversion with the assumption that juvenile fish avoid pump suction moreso than passing through a headgate:

[7] The reasoning here is that the more lineal feet of available channel = more square feet of aquatic habitat = more fish.

Table 5. Screening Priority

Priority	Tax Lot/Owner	GPS Location
1	200 – Ely	45 59 256N, 118 25 153W
2	200 - Ely	45 59 442N, 118 25 420W
3	700 – WA Mutual Bank	45 59 511N, 118 25 429W
4	1600 – Roemer	45 59 667N, 118 25 627W
5	600 - Eiffert	45 59 104N, 118 25 139W
6	202 - Wallan	45 59 820N, 118-24-889W

5.4 Riparian Protection

Fourth in habitat restoration importance is believed to be channel protection in three WLWWR locations as shown in Table 5:

Table 6. Riparian Restoration

Priority	Location	Tax Lot/Owner	Problem	Recommended Action
1	46 01 860N 118 27 982W	350605210010 Franklin	Unfenced livestock pasture resulting in open widened channel with scant vegetation. Bank erosion into WLWWR.	• Place planting fabric 15 ft width on both side of channel. Plant native willow and red osier dogwood in fabric. • Fence both sides of stream leaving an open section for stock watering.
2	45 59 689N 118 25 619W	400 - Pratt	Feed lot encompasses the WLWWR	• Create new narrow (3-4ft) thalweg in channel with backhoe building up streambank with removed channel material. • Place planting fabric 15 ft width on both side of channel. Plant native willow and red osier dogwood in fabric. • Fence both sides of stream leaving an open section for stock watering.
3	46 00 050N 118 26 278W	200 - Renken	Left bank cut, eroded, and sloughing into the WLWWR	• Place 15 ft width planting fabric on left bank. • Plant native willow and red osier dogwood in fabric. • Fence left bank outside of fabric to prevent livestock access, but leave an open section for watering.

5.5 Weed Control

Prospects for weed control are dim. For submergent elodea and coontail, long term reduction of nutrients and silt scouring could be effective. There appear to be two approaches for emergent weed control including reed canary grass and jewel weed. A small scale remedy is goat grazing where the animals are confined in the riparian zone

by moveable fencing. As the understory is consumed the fencing is moved upstream or downstream. A second control could be herbicide use with chemicals approved for use near water[8]. Both of these approaches would be maintenance intensive and repetitive every year.

[8] The Oregon Department of Environmental Quality and Washington Department of Ecology require and issue a general permit for herbicide use near or over water. The Dept. of Agriculture regulates use of herbicide types.

WLWWR APPENDIX 1

GPS Coordinates, Date, & Time	Tax Lot	Owner(s) & OR DWR WP #	Owner Address	Problem & Details	Water Right Cert(s) & CFS	Water Right Holder	Aquatic Weeds, Benthos, & Substrate	Temp (°F)	Comment	Photo #
45 58 820N 118-24-889W 10 July & 12 Aug 2012	202	R. Wallan 1	85038 Winesap Rd.	No barrier; Unscreened headgate diversion. Dense riparian growth of willow & cottonwood	1734 – 0.14 1763 – 1.32 1786 – 0.4 56281 – 0.04 56515 – 0.28	A. Winn J. Haasch L. Williams J. Vermuel L. Eiffert		1000 hrs 10 July 12 Air = 83 H20 = 60.5 1200 hrs. 12 Aug 12 Air = 89.5 H20 = 60	End of irrigation district & start of spring portion of WLWWR	**1**
45 58 937N 118 25 029W 10 July 2012	300	Dave Miller 2	85090 Winesap Rd. M-F, OR	One screened pump diversion. Two culverts pose no barrier. Dense riparian growth	38869– 0.54	Dave Miller	Moderate Elodea. Cobble with light siltation, Tricoptera (3 families)			**2**
45 59 052N 118 25 104W 10 July 2012	401 (Miller) 600 (Eiffert)	Dave Miller (left bank) Lowell Eiffert (right bank) 3	85090 Winesap Rd. M-F, OR 55056 Birch Cr. Rd	Pump diversion screened. Dense riparian growth	1758 – 0.22 1767 - 0.25 1781 – 0.3 1786 - 0.32 20836 – 0.25	F.B. Clark H. Hirst J. Thompson L. Williams F. Parent				**3**
45 59 104N 118 25 139W 10 July 2012	600	L. Eiffert Adjoining property is Eddie Borroughs, Tax Lot 400 (ODWR un-numbered) ?	55056 Birch Cr. Rd	8 ft. barrier sill with 1 ft. drop. Unscreened diversion to the west. Barrier for rearing fish even at higher flows. Potential barrier for s-head adults. Dense riparian growth	1755 – 0.25 1759 - 1.61 1760 – 0.23 1762 – 0.29 1782 – 0.31	D. Babcock E. Chastain E. Chastain C. Davis L. Ulstrup	Trichoptera (2 families) snails, Planarium flatworm. Cobble substrate.			**4**

45 59 256N 118 25 153W 10 July 2012	200	Jim Ely 4	52985 Sunquist Rd.	Significant barrier sill for rearing & adult steelhead. 12-14 inch drop in mainstem.. One unscreened headgate & open diversion with another diversion from the 1st diversion that has been covered with plastic to stop flow. In addition there appears to be an underground pipe to an offstream pump (screened) at 45 59 271N & 118 25 121W.	1755 – 0.25 1759 – 1.61 1760 – 0.23 1762 - 0.29 1782 – 0.31 46631– 0.25 1768 -0.23	D. Babcock W. Chastain W. Chastain J. Walliser L. Ulstrup E. Parent E.P. Jensen	High density of Reed-Canary grass and jewel weed, an invasive species from the Mississippi drainage.	1100 hrs Air = 84 H20 = 61	Diversion just south of Sunquist Rd. crossing	**5**
45 59 442 118 25 420 10 July 2012	200	Jim Ely Hirst to the West 5	52985 Sunquist Rd.	Unscreened notched log diversion (6 inch drop) iwith unscreened headbox west of the WLWWR (two drops of 8 inches in headbox) See photos.	1768 – 0.23 1774 - 0.5 1775 – 0.23 1778 – 0.25 1785 – 0.14	E.P. Jensen F. Preas D. Riggle L. Simmons C. Watson	No benthic organisms found			**6**
45-59-511 118-25-429 12 July 2012	700	WA Mutual Bank 6		Headgate to unscreened diversion ditch paralleing Trolley Ln	1765 – 0.24 1771 – 1.0	G. Heilman E. Metsker E. Gibbs B. Pratt R. Dial	Moderate elodea growth		Gibbs, Pratt, & Deal got WR from Heilman & Metsker	**7**

45-59-545N 118-25-458W 12 July 2012	1801	J. Hauhn		No diversions. No instream problems			No riparian growth		<100 feet mainstem channel	
45 59 574N 118 25 432W 12 July 2012	1800	Jack Green 7	85477 Winesap Rd.	Barrier sill with a 1 ft drop. Iirrigation pump with a defective screen in a box downstream from the ditch.	1779 – 3.25 (3 cfs for power not used) 1783 – 0.12	A. Simmons N. Vaile	Dense grass and trees. Small population of Trichoptera		The ditch diversion to Beck is not used. Green doesn't have water rights here	**8**
45 59 600N 118 25 450W 12 July 2012	1700	M. Beck	52839 Sunquist Rd.	Unused ditch diversion running small amount of water west toward Beck's house. Origin from Green diversion WP 7.			100 yards of poor riparian on both banks.			
45 59 629N 118 25 592W 12 July 2012	1600	J. Roemer 8		Pump diversion sill 15 ft. wide with a 10 inch drop. Pump stilling basin is screened.	1784 – 0.12	C. Wagoner	Dense Elodea and coontail			**9**
45 59 667N 118 25 627W 12 July 2012	1600	J. Roemer (DWR spreadsheet lists E. Meisner 9		Barrier sill 1o ft. wide with a 10 inch fall. POD for a ditch with an unscreened head gate serving multiple users	1780 – 0.42 1776 -0.56	W. Smuckal A. Sayer	Dense Elodea in channel		Property has newly planted riparian with widened channel	**10**
45 59 689N 118 25 619W 12 July 2012 45 59 712N 118 25 626W	400	B. Pratt		No water use of mainstem, but channel widened and silted from livestock feed yard. Culvert restricts flow			Dense riparian except for 100 ft. feed yard area . Benthic inverts snails & small Trichoptera			**11**

45 59 745N 118 25 653W 12 July 2012	201	E. Gibbs	89558 Trolley Ln.	No diversions. Residential occupant didn't agree to field visit.			Dense riparian. One dead C-wood in channel, but no barrier.		Check stream length	
45 59 802N 118 25 687W 12 July 2012	1000	E. Meisner	SE 4th Ave. College Place, WA	No diversions. Culvert under road not a barrier.			Weed-choked mainstem channel with blackberry & Reed canary grass; overstory of alder		Good cobble substrate light siltation	**14**
45 59 910N 118 25 807W 12 July 2012	500	A. Knopf 10	5448 Stateline Rd.	No diversion found.	1770 – 0.26	C. Knopf	Weed-choked mainstem channel		Channel substrate moderate siltation	
45 59 931N 118 25 856W 12 Sep 2012 45 59 931N 118 25 917W 25 Aug 2012	700	M. Fortune 11a	52698 Stateline Rd. .	Two Sites: (1) No functional diversion, but obsolete concrete weir with a 14 inch drop. (2) Screened pump station with moveable weir board. No drop.	1766 – 0.3	J. Hendrickson	Excellent riparian habitat with native trees and shrubs	1330 hrs. Air = 65 H20 = 57	Substrate heavily silted downstream from weir at site 1.	**15** **16**
46 00 000N 118 26 101W	800	S. Samitore 11b	52692 Stateline Rd.	No diversions found. Source is Fortune.			Canary grass choked channel			
46 00 009N 118 26 041W 12 July 2012	902 901	J. Regalado 12	52646 Stateline Rd.	Sill with 1.5 -2 ft. drop. Pump with screened intake.	1756 – 0.23 1757 – 0.13	J. Binford G. Calhoon				**17**
12 July 2012	900	D. Key	53862 WW River Rd/	No channel problems. No diversions found			Grass riparian; no trees, Elodea			

46 00 050N 118 26 278W 12 July 2012	200	R. Renken	52494 Stateline Rd.	No functional diversions, but old concrete dam structure with an 8 inch drop located at the boundary between tax lots 200 & 300.			Right bank well vegetated; left bank pasture with eroded sloughing banks. Needs plantings			**18** **19**
46 00 134N 118 26 373W 12 Aug 2012	350616120006	Dorothy Morris	6048 Stateline Rd	No diversions or barriers.	Well		Dense vegetation throughout. Very light popula-tion of small caddis	Air – 80 H20 = 60 1130 hrs.	Light siltation	
46 00 200N 118 26 286W 12 Aug 2012	350616120005	Ken Cowden	1322 valley Chapel Rd	No diversions or barriers.	-		200 ft. reach of open horse pasture; widened channel; no trees/shrubs. See photo.			**20**
46 00 170N 118 26 235W 12 Aug 2012	350616120016	William Napier	1230 Valley Chapel Rd	No diversions or barriers	Spring		Riparian zone trees shrubs. Some bare			
46 00 325N 118 26 251W 23 July 2012	350606120018	John Knowles	1117 Valley Chapel Rd.	No diversions or barriers	Spring Branch		Entire 150 ft. riparian zone mature CREP			
46 00 409N 118 26 251W 23 July 2012	350608130001	Brent Knowles	1044 Valley Chapel Rd.	One screened irrigation pump appeared to be from well adjacent to WLWWR.	0.05	F. Knowles	Both banks well vegetated w/ mature CREP. Very light population of small caddis	Air = 78 H20 = 58 0818 hrs.	Light siltation. Excellent 5 ft. wide culvert	
23 July 2012	350609340019	Ken Maiden	972 Valley Chapel Rd.	Screened pump diversion	341 - 0.26	J. Sanders	Both banks vegetated			
46 00 528N 118 26 320W 23 July 2012	350609340018	Brian Maiden	796 Valley Chapel Rd.	No diversion found	471 - 0.26 473 - 0.02	D. Bowers H. Gordon	Both banks vegetated		Good culvert	

46 00 606N 118 26 415W 23 July 2012	350609420018	W. Schmierer	690 Valley Chapel Rd.	Screened pump diversion. Stream bank adjacent to residence recently cleared and sparse tree plantings. Channel widened to ± 10 ft. Needs planting of native trees, e.g., willows, aspen, cottonwood	341 - 0.26	W. Schmierer	Moderate Elodea and Azolla growth.	Air = 79* H20 = 59 1000 hrs	Light siltation	
23 July 2012	350609420019	Upper Col. Mission	636 Valley Chapel Rd.	No diversions or barriers	-	-	Both banks vegetated			
46 00 722N 118 26 482W 23 July 2012	350609310004	Dean Bowers	474 Valley Chapel rd.	Three weirs installed with from 6" to 10" drops to increase velocity for steelhead spawning" Weirs did settle out silt.	469 - 0.53	F. Sams			Water diversion inactive for some years due to low flow. Water right exercised downstream	
					472 - 1.04	E. Kornemann				
					474 - 0.18	R. Follette				
					476 - 0.16	G. Hart				
46 00 722N 118 26 702W 23 July 2012	350609240014	Daryl Hopson	428 Valley Chapel Rd.	Dual culverts in mainstem WLWWR no barrier. No surface diversion observed	471 - 0.26	D. Hopson	Riparian zone has excellent vegetation, but channel weed choked	Air = 77 H20 = 58 0830 hrs.		
46 00 822N 118 26 813W 23 July 2012	350609230013	Daryl Hopson	428 Valley Chapel Rd.	Fence/debris across channel which could become a barrier at low flows	well	-	Riparian zone has excellent vegetation, but channel weed choked			

46 01 378n\N 118 27 079W 23 July 2012	350609220028	W. Bennington	984 Frog Hollow Rd.	No surface diversion observed.	1935 - 0.35	J. Daniel	Riparian zone has excellent vegetation, but channel weed choked			
46 00 906N 118 27 110W 23 July 2012	350608110006	Randal Gordon	?	No surface diversions observed. Three beaver dams in place, but not a salmonid spawning barrier.	well		Dense CREP trees, shrubs, & rye grass. Heavily silted channel	Air = 77 H20 = 58 1020 hrs.	Heavily shaded area around residence has reduced Reed Canary density.	
46 01 098N 118 27 162W 23 July 2012		Brent Knowles	1044 Valley Chapel Rd.	One well/pump pumping west. One screened pump diversion pumping east	wells	-	Dense CREP growth. Channel heavily weeded with Reed Canary and Jewel weed			
	350605440002	Yancey Reser	2073 Last Chance Rd.	Screened pump diversion. No barriers	0098 - 0.7	Y. Reser				
46 01 378N 118 27 079W 15 Aug 2012	350604330007	D. Bennington		No diversions. No barriers	well	-	Riparian zone well vegetated. Light population of small caddis (case builders) on rocks and clinging to duckweed. Schools of shiner or dace ≤ 0.5 in.	Air = 85 H2O = 62 1000 hrs.		
	350604320008	Yancey Reser	2073 Last Chance Rd.	No diversions. No barriers.	-	-				
	350605410004	Greg Knowles		No diversions. No barriers.	-	-				
	350605130003	Yancey Reser	2073 Last Chance Rd.	No diversions. No barriers.	well	-				

46 01 694N 118 27 682W	350605240005	Yancey Reser	2073 Last Chance Rd.	Pump diversion w/ no-turn rotating screen;	864 - 0.2 478 - 0.4	F. Lansing A. Rimpler	Well vegetated channel with native willow.		See photo of preferred type riparian.	**22**
	350731510018	Yancey Reser	541 Stovall Rd.		well	-				
	350605210007	Joe Chvatal	569 Stovall Rd.	No diversions or barriers noted	477 - 0.51	M. McDonald				
	350605210009	Hanson Trust	909 Stovall Rd.	No diversion. Appeared to be pumping from well.	775 – 0.42	M. McDonald				
46 01 970N 118 27 999W	350605220007	Thad Franklin	1069 Stovall Rd.	Well almost within channel pumping to pasture to the north and east.	478 - ?	A. Rimpler			These surface water rights are believed non-extant because of lack of water in most years.	
46 01 970N 118 27 999W	350605220007	Thad Franklin	1069 Stovall Rd.	Well almost within channel pumping to pasture to the north and east.	478 - ?	A. Rimpler			These surface water rights are believed non-extant because of lack of water in most years.	
46 01 860N 118 27 982W	350605210010	Thad Franklin	1069 Stovall Rd.	No diversions or barriers noted	-	-	Some 700 ft of channel w/ scant vegetation and widening from livestock use.		WLWWR dry except for pools See photos of riparian zone.	**23**

	350605220008	Thad Franklin	1069 Stovall Rd.	No diversions or barriers noted.	709 – 0.52	H. Peterson	Extreme channel widening at livestock crossing.		This water right believed non-extant.	**24**
46 01 970N 118 27 999W	350605220007	Thad Franklin	1069 Stovall Rd.	Well almost within channel pumping to pasture to the north and east.	478 - ? 868 - 0.1 869 - 0.08 872 - 0.1 709 - 0.52 593 - 0.7 768 - 0.16	A. Rimpler H. McGuire H. Peterson G. Green H. Peterson H. Vosberg H. Vosberg			These surface water rights are believed non-extant because of lack of water in most years.	
46 02 094N 118 28 429W	350731510019	Arlene Dryden	1222 Stovall Rd.	No diversions or barriers noted.						
46 02 151W, 118 28 598W	350731510021	State of WA		Appropriate sized culvert in channel.	-	-	Channel choked reed canary grass. Rye grass riparian.			**25**
46 02 163N 118 28 690W 25 Aug 2012	350731510029	James Martin	1444 Stovall Rd.	No barriers or diversions	952 -1.5	L. Dicus	Dense riparian with weeds.		This water right believed non-extant.	
43 02 118N 118 28 665W 25 Aug 2012	350731510027	James Daniel	1500 Stovall Rd.	No barriers or diversions	-	-	Tree/grass riparian			**26**
46 02 175N 118 28 782W 25 Aug 2012	350731510025	Anand Rao	1624 Stovall Rd.	No barriers or diversions	-	-	Dense riparian			
46 02 232N 118 28 899W 25 Aug 2012	350731510023	Chris Bowen	1716 Stovall Rd.	No barriers or diversions					WLWWR flowing at about ¼ cfs.	**27**
25 Aug 1012	350731510031	State of WA		No inspection. . A WA Dept. of Fish and Wildlife concurs that no barrier/diversions are present.	-	-				