Upper Yakima Basin Tributary Flow Supplementation

June 15, 2016

Kittitas Reclamation District (KRD)

Washington State Department of Ecology

Yakima Basin Integrated Plan

Washington Department of Fish and Wildlife

Roza Irrigation District

Kittitas Reclamation District Stream Supplementation

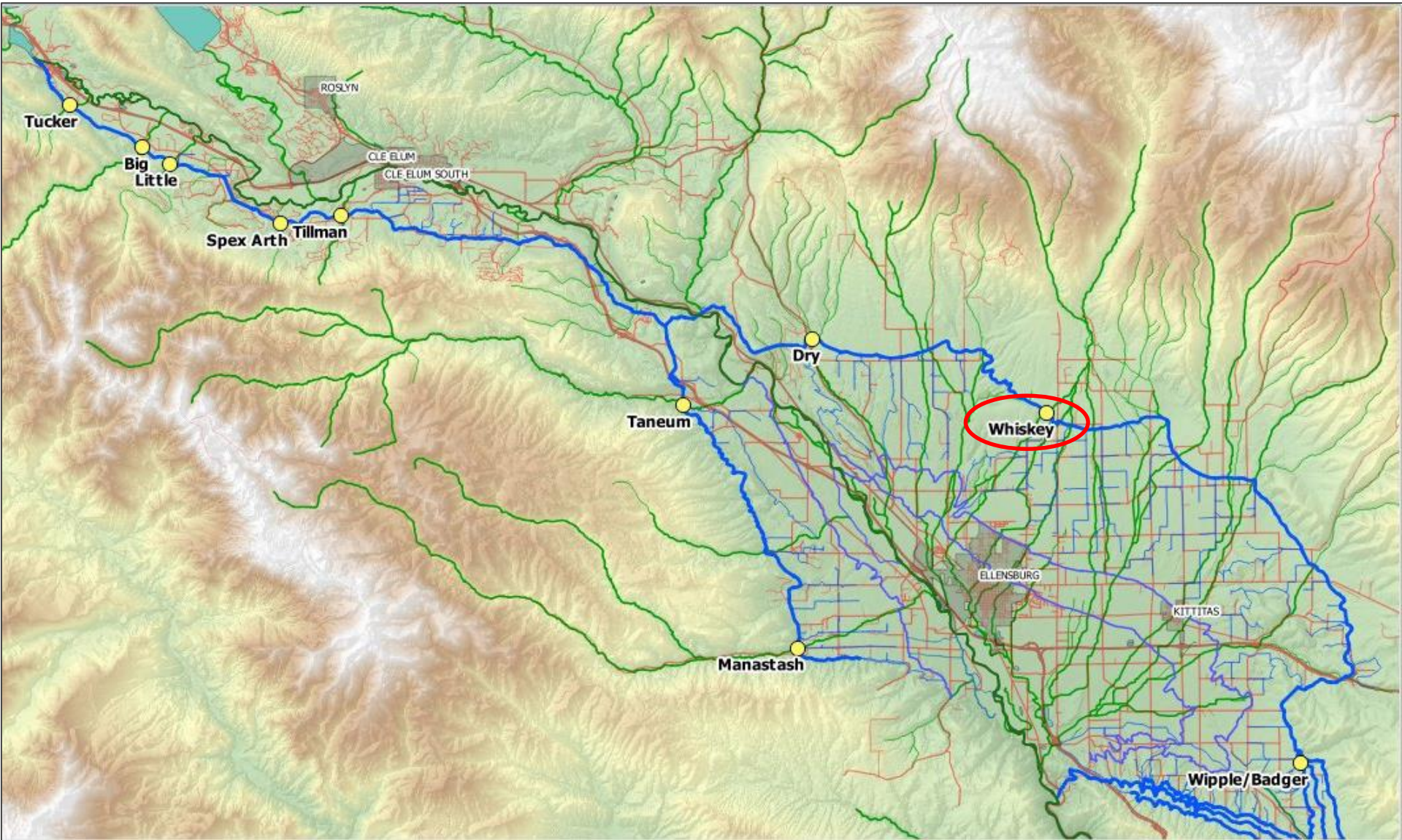
- KRD canals cross multiple streams throughout Kittitas County
- Recent agreements allow KRD to augment streamflow during drought conditions
  - *Agreement parties: KRD, Washington State Dept. of Ecology and the US Bureau of Reclamation;*
  - *WDFW and Yakama Nation are also consulted*
- Water delivery through irrigation season, roughly April-October, subject to canal operations and instream flow benefits
- Actual stream flow managed by Ecology

Kittitas Reclamation District Stream Supplementation

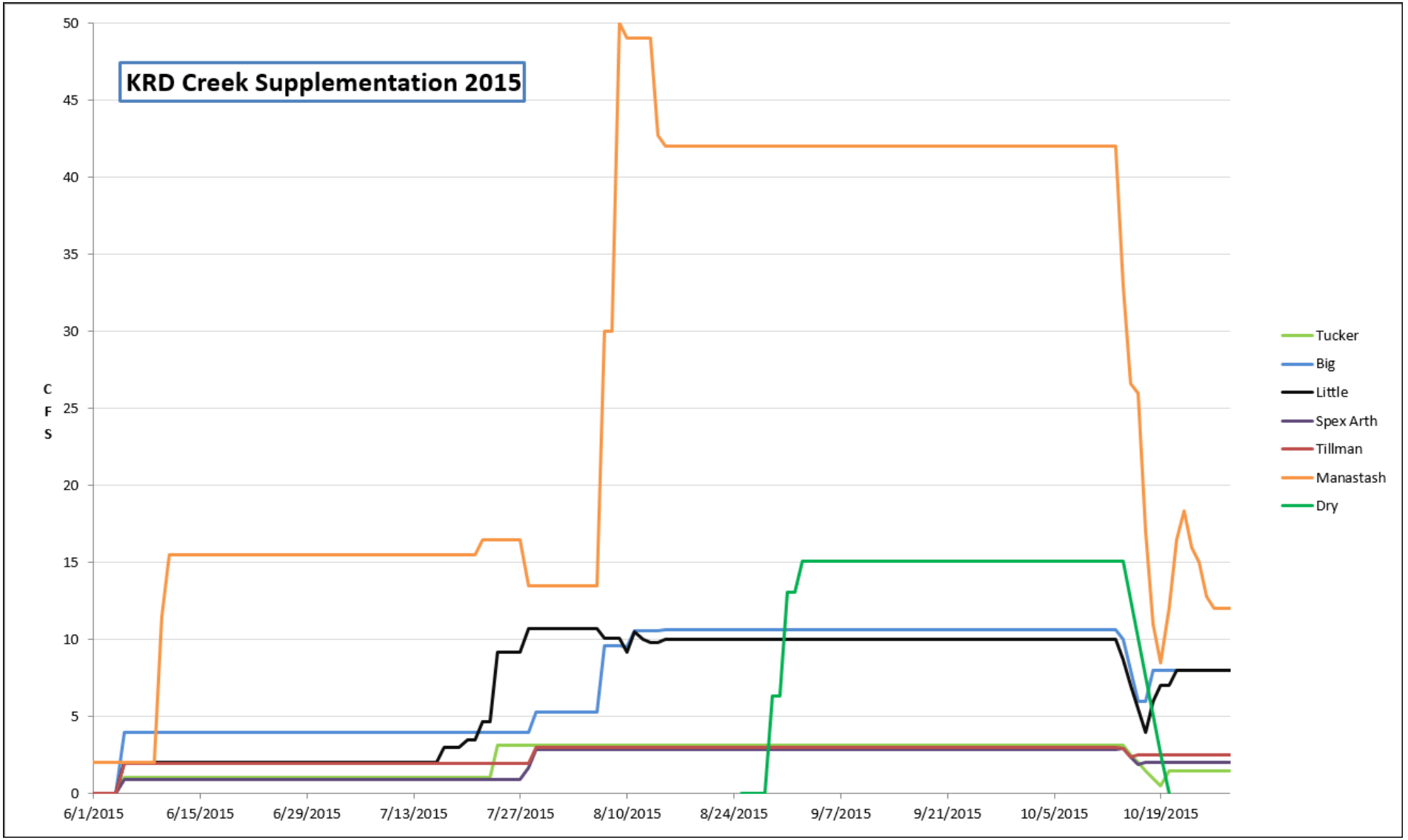
- Existing agreements enhanced flow in past droughts
  - Manastash Creek
  - Taneum Creek
  - Wipple Wasteway/Badger Creek

- Six streams added in 2015
  - Tucker Creek - 3 cfs
  - Big Creek – 11 cfs
  - Little Creek – 10 cfs
  - Spex Arth Creek - 3 cfs
  - Tillman Creek - 3 cfs
  - Dry Creek – 15 cfs

KRD Supplementation Locations (Current and Potential)



Delivered flows varied during summer as needs identified and natural flows diminished



Tucker Creek - 3 CFS

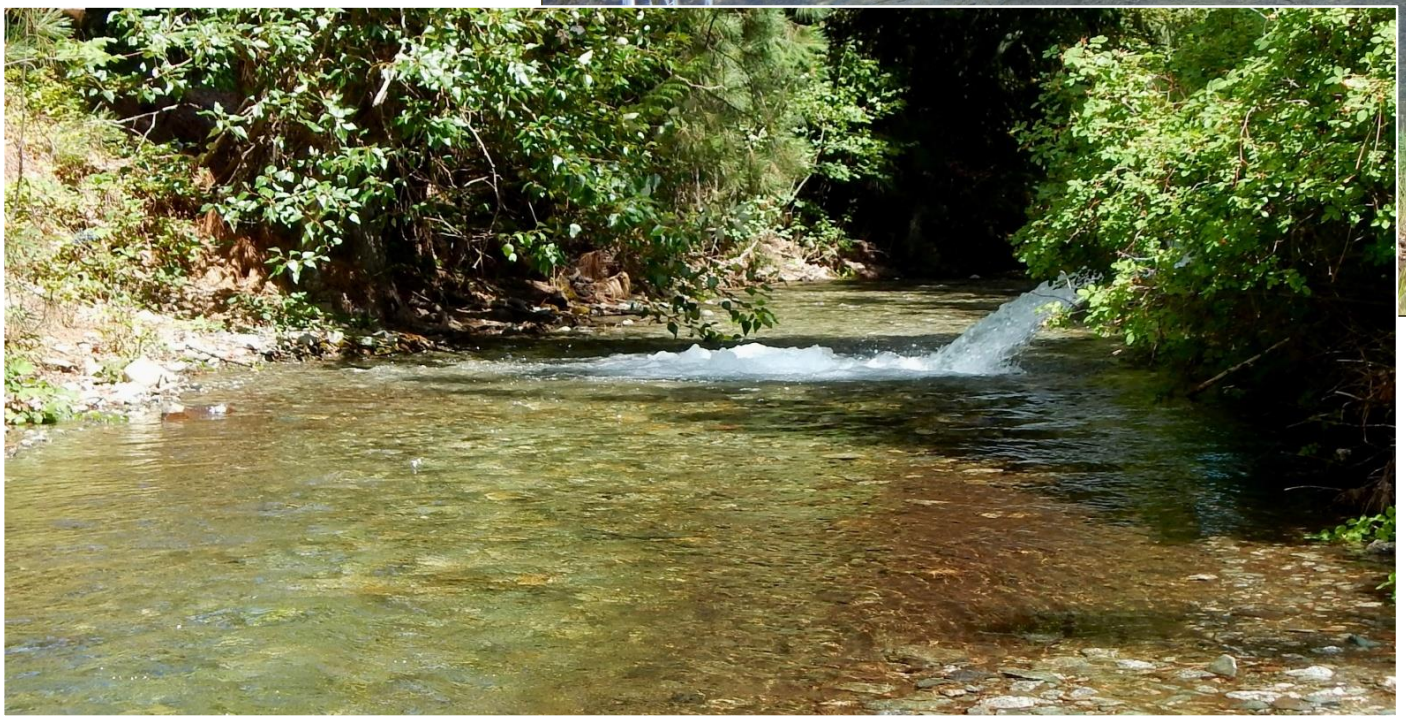
Spex Arth Creek - 3 CFS

Tillman Creek - 3 CFS

Multiple Delivery Routes Available and Utilized

Little Creek

Little Creek -
6 CFS through
MB6.1 lateral



Little Creek - 2.6 CFS from KRD canal

Little Creek - 4.9 CFS from KRD flow canal

Little Creek - 9.2 CFS from KRD canal

Little Creek
Recharged Near I-90

Big Creek Delivery at the Main Canal – 5 CFS
(Tom Iseman, Mark Limbaugh, and Urban Eberhart)

Big Creek - Additional 6 CFS via MB4.9 lateral and pipe

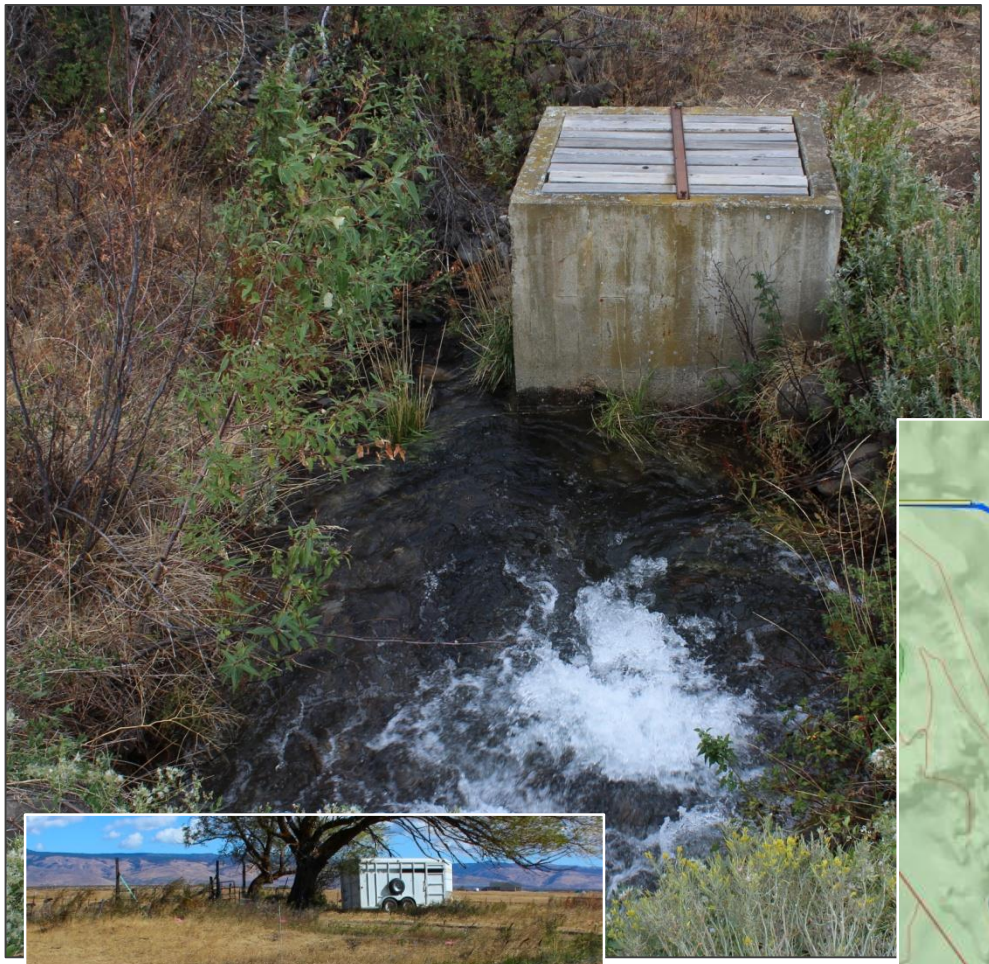
Ecology blocks added to maintain supplementation water at low canal flows

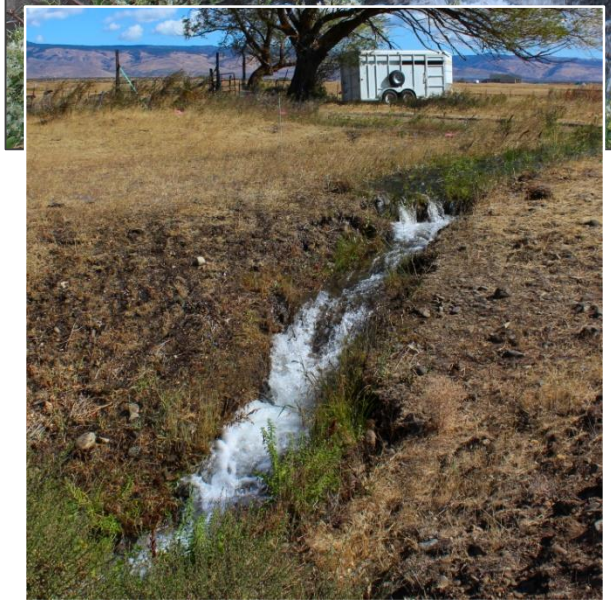
Manastash Creek - Cove Road before/after supplementation

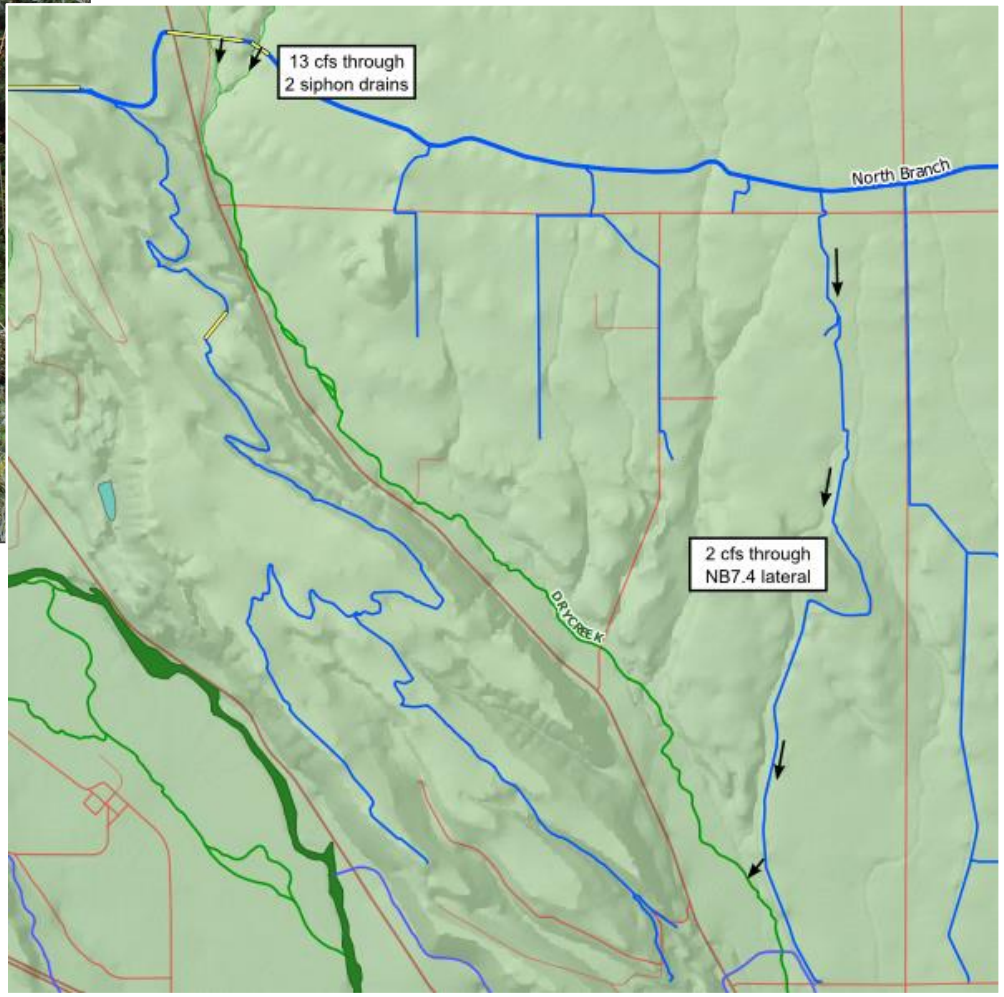
Manastash Creek - 2.1 miles downstream of supplementation

Manastash Creek 40+ cfs via SB13.6 pipeline to MWDA diversion, and through the South Branch spill

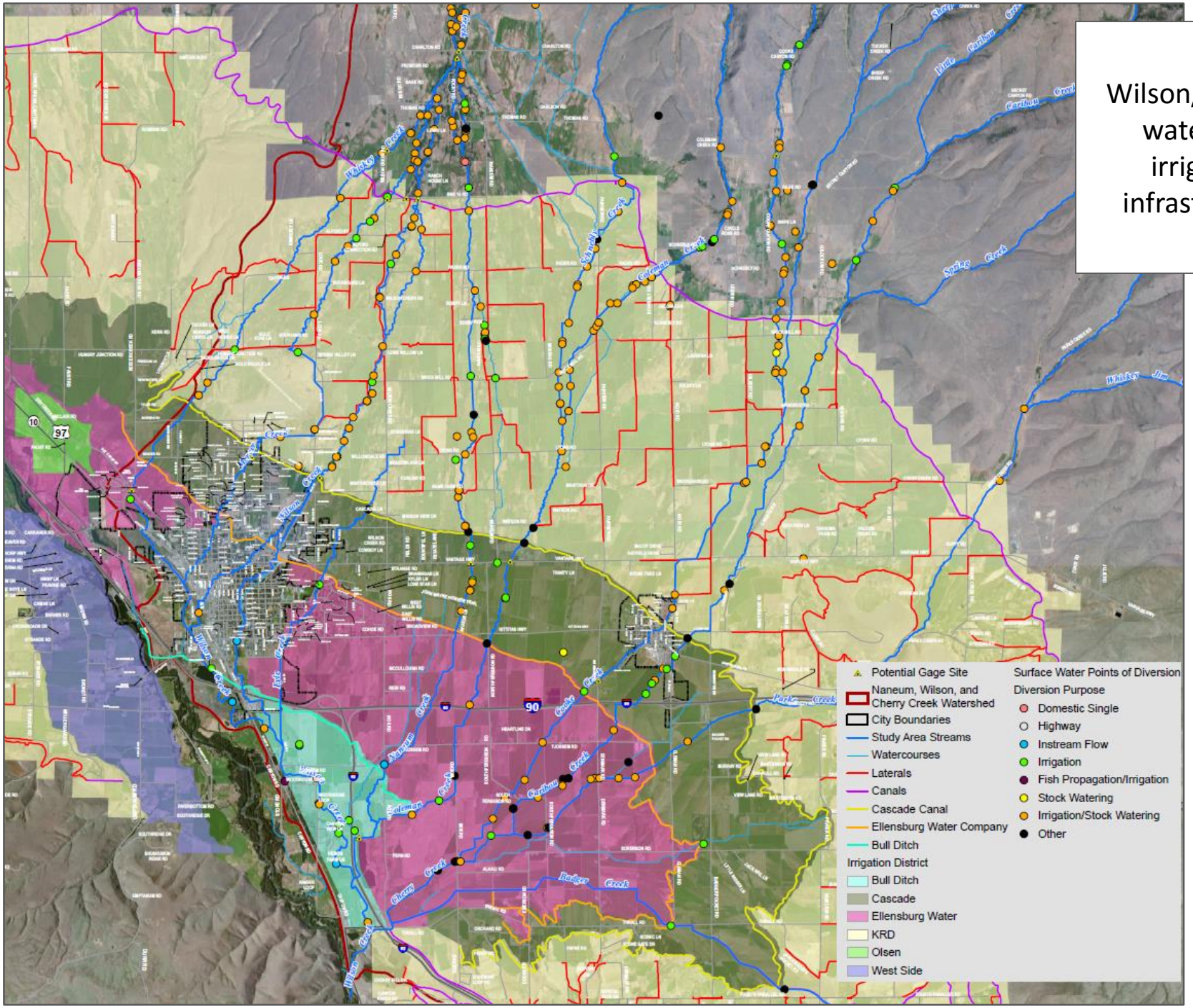
Dry Creek supplementation via siphon drains and a lateral spill



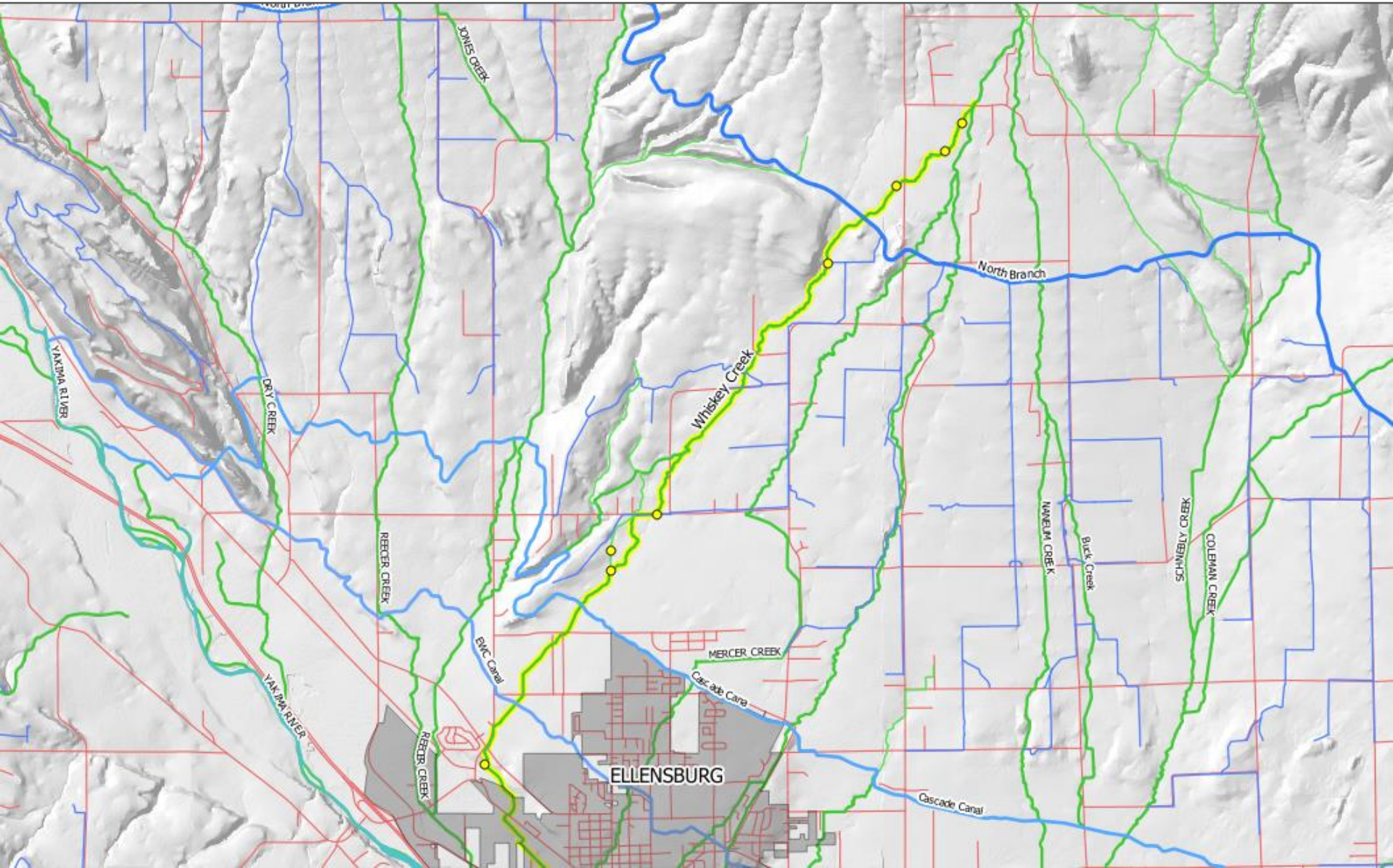




Dry Creek at Clarke Road


Wilson/Naneum watershed irrigation infrastructure
Potential Gage Site
Naneum, Wilson, and Cherry Creek Watershed
City Boundaries
Study Area Streams
Watercourses
Laterals
Canals
Cascade Canal
Ellensburg Water Company
Bull Ditch
Irrigation District
Bull Ditch
Cascade
Ellensburg Water
KRD
Olsen
West Side
Surface Water Points of Diversion
Diversion Purpose
Domestic Single
Highway
Instream Flow
Irrigation
Fish Propagation/Irrigation
Stock Watering
Irrigation/Stock Watering
Other

Whiskey Creek less complicated path to upper watershed habitat



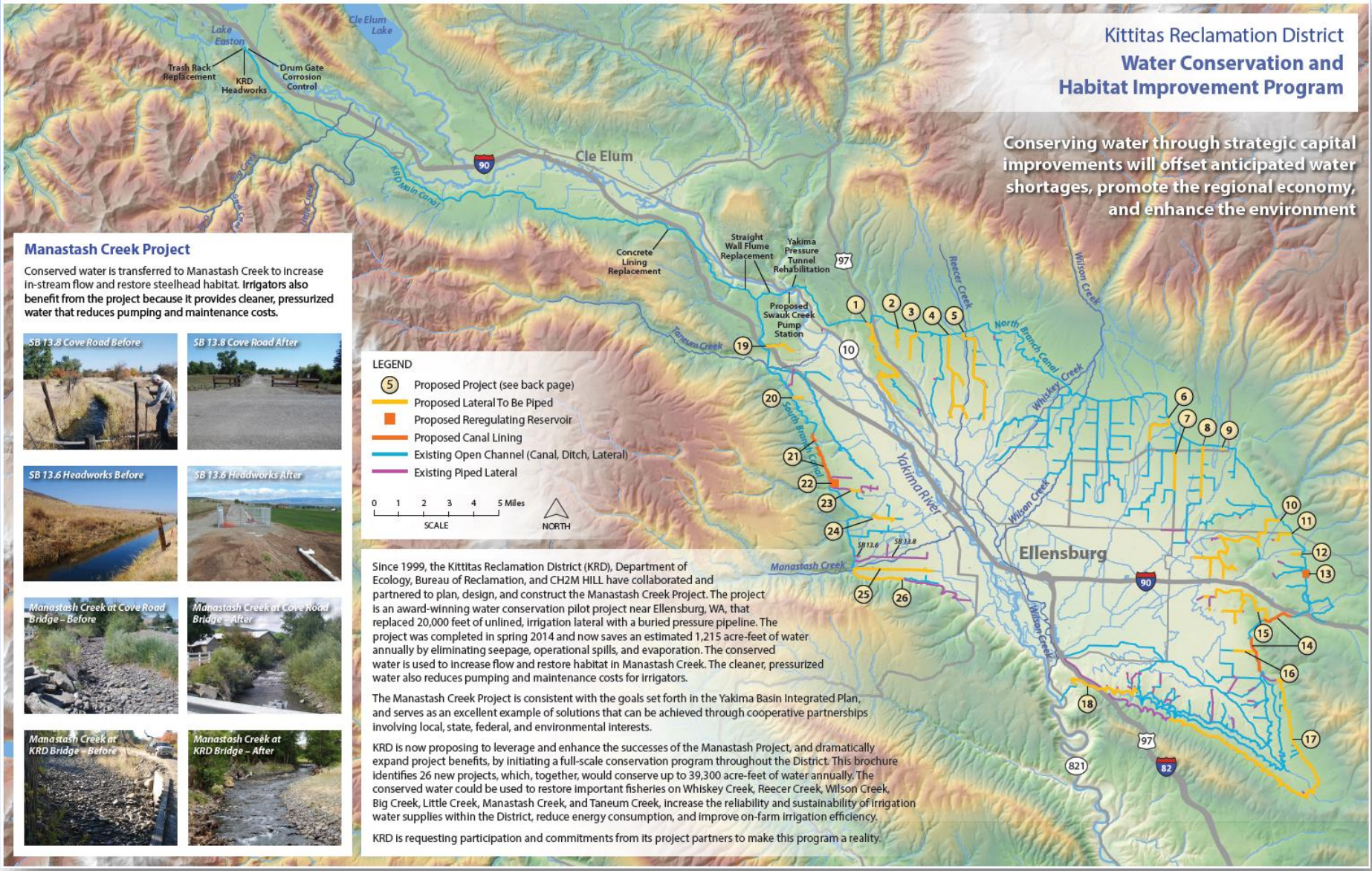
Kittitas Reclamation District

Water Conservation and Habitat Improvement Program

Conserving water through strategic capital improvements will offset anticipated water shortages, promote the regional economy, and enhance the environment

Manastash Creek Project

Conserved water is transferred to Manastash Creek to increase in-stream flow and restore steelhead habitat. **Irrigators also benefit from the project because it provides cleaner, pressurized water that reduces pumping and maintenance costs.**



Since 1999, the Kittitas Reclamation District (KRD), Department of Ecology, Bureau of Reclamation, and CH2M HILL have collaborated and partnered to plan, design, and construct the Manastash Creek Project. The project is an award-winning water conservation pilot project near Ellensburg, WA, that replaced 20,000 feet of unlined, irrigation lateral with a buried pressure pipeline. The project was completed in spring 2014 and now saves an estimated 1,215 acre-feet of water annually by eliminating seepage, operational spills, and evaporation. The conserved water is used to increase flow and restore habitat in Manastash Creek. The cleaner, pressurized water also reduces pumping and maintenance costs for irrigators.

The Manastash Creek Project is consistent with the goals set forth in the Yakima Basin Integrated Plan, and serves as an excellent example of solutions that can be achieved through cooperative partnerships involving local, state, federal, and environmental interests.

KRD is now proposing to leverage and enhance the successes of the Manastash Project, and dramatically expand project benefits, by initiating a full-scale conservation program throughout the District. This brochure identifies 26 new projects, which, together, would conserve up to 39,300 acre-feet of water annually. The conserved water could be used to restore important fisheries on Whiskey Creek, Reecer Creek, Wilson Creek, Big Creek, Little Creek, Manastash Creek, and Taneum Creek, increase the reliability and sustainability of irrigation water supplies within the District, reduce energy consumption, and improve on-farm irrigation efficiency.

KRD is requesting participation and commitments from its project partners to make this program a reality.





Kittitas Reclamation District
Water Conservation and Habitat Improvement Program

Prioritized Water Conservation Projects Benefits and Costs

ID No.	Facility Name	New Pipe or Canal Lining (LF)	Pipe Diameters (In)	Reservoir Capacity (AF)	Estimated Peak Water Savings (CFS)	Estimated Annual Water Savings (AF)	2015 Cost (Millions)	Cost per AF Saved
Reservoirs and canal lining								
14	North Branch Canal lining between Johnson Siphon and Wippel Pumping Plant	17,109	—	—	9.5	2,700	$5.2	1,930
21	South Branch Canal Lining from Swede Tunnel to Robinson Canyon	13,862	—	—	7.1	2,000	$3.2	1,600
13	New North Branch Reregulating Reservoir	—	—	250	14.5	4,100	$10.6	2,570
22	New South Branch Reregulating Reservoir	—	—	110	7.0	2,000	$8.1	4,050
Canals to be replaced by pipelines								
17	Pump Ditch	76,200	42, 30, and 24	—	15.5	4,400	$26.8	6,090
8	Lateral NB 22.0	10,730	42 and 36	—	13.4	3,800	$4.3	1,130
10	Lateral NB 26.7 Sub Laterals 1.7, 3.1, 4.4, 4.61 Sub Sub Lateral 4.4-0.4	40,790	36 to 8	—	11.1	3,200	$10.3	3,220
18	Turbine Ditch	21,600	30 and 24	—	8.4	2,400	$6.0	2,500
15	Lateral NB 33.5 Sub Laterals 2.0, 3.0 Sub Sub Lateral 2.0-1.8	35,040	30 to 6	—	7.6	2,200	$7.4	3,360
5	Lateral NB 8.3	22,100	30 and 14	—	7.2	2,100	$5.3	2,520
7	Sub Lateral NB 20.8-0.8	8,060	24	—	5.0	1,400	$2.2	1,570
6	Lateral NB 20.2	8,590	24 and 20	—	4.8	1,400	$2.2	1,570
4	Lateral NB 7.7 Sub Laterals 1.59, 2.9R	26,600	24 to 8	—	4.5	1,300	$5.1	3,920
1	Lateral NB 4.1	33,200	20 to12	—	3.2	900	$6.3	7,000
3	Lateral NB 6.4	6,890	20 and 14	—	3.1	900	$1.3	1,440
11	Lateral NB 27.5	5,330	18 and 12	—	2.4	700	$1.0	1,430
26	SB Extension	12,390	30	—	2.2	600	$3.8	6,330
25	Lateral SB 14.3	16,495	24 to 12	—	2.1	600	$3.7	6,170
16	Lateral NB 35.1	4,420	16 and 14	—	1.8	500	$0.9	1,800
2	Lateral NB 5.8	4,860	14 and 10	—	1.5	400	$0.8	2,000
23	Lateral SB 9.9	2,360	24 and 14	—	1.5	400	$0.8	2,000
9	Lateral NB 22.8	660	12	—	1.2	300	$0.3	1,000
20	Lateral SB 4.8	2,540	20 and 16	—	1.2	300	$0.7	2,330
24	Lateral SB 11.7	6,200	18 and 14	—	1.1	300	$1.3	4,330
12	Lateral NB 28.6	2,100	12	—	0.8	200	$0.5	2,500
19	Lateral SB 1.7	7,210	16	—	0.8	200	$1.4	7,000
				TOTALS	138.5	39,300	$119.5	$3,040 Overall Average

Note: All costs and water savings are preliminary and subject to refinement during conceptual and preliminary design.

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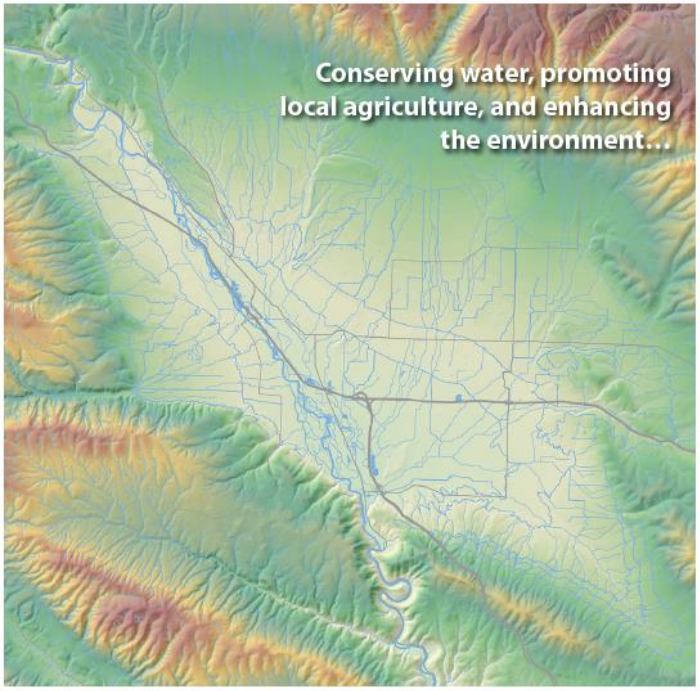



DEPARTMENT OF ECOLOGY State of Washington

KITTITAS RECLAMATION DISTRICT

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION

KITTITAS COUNTY CONSERVATION DISTRICT

CH2MHILL

YAKIMA BASIN
BUILDING A FUTURE FOR WATER, WILDLIFE & WORKING LANDS