

Kittitas Reclamation District Water Conservation Measures



	List of major water conservation measures already implemented	
Main Canal pumpback	Pump Ditch Flume replacement	SB9.9 Pipeline
Turbine Ditch tailend lining	Aqualastic crack sealant Main and SB Canals	Skyhook Pipeline
SB13.8 pipeline	Concrete lining of South Branch near I-90	Pump Ditch pipeline



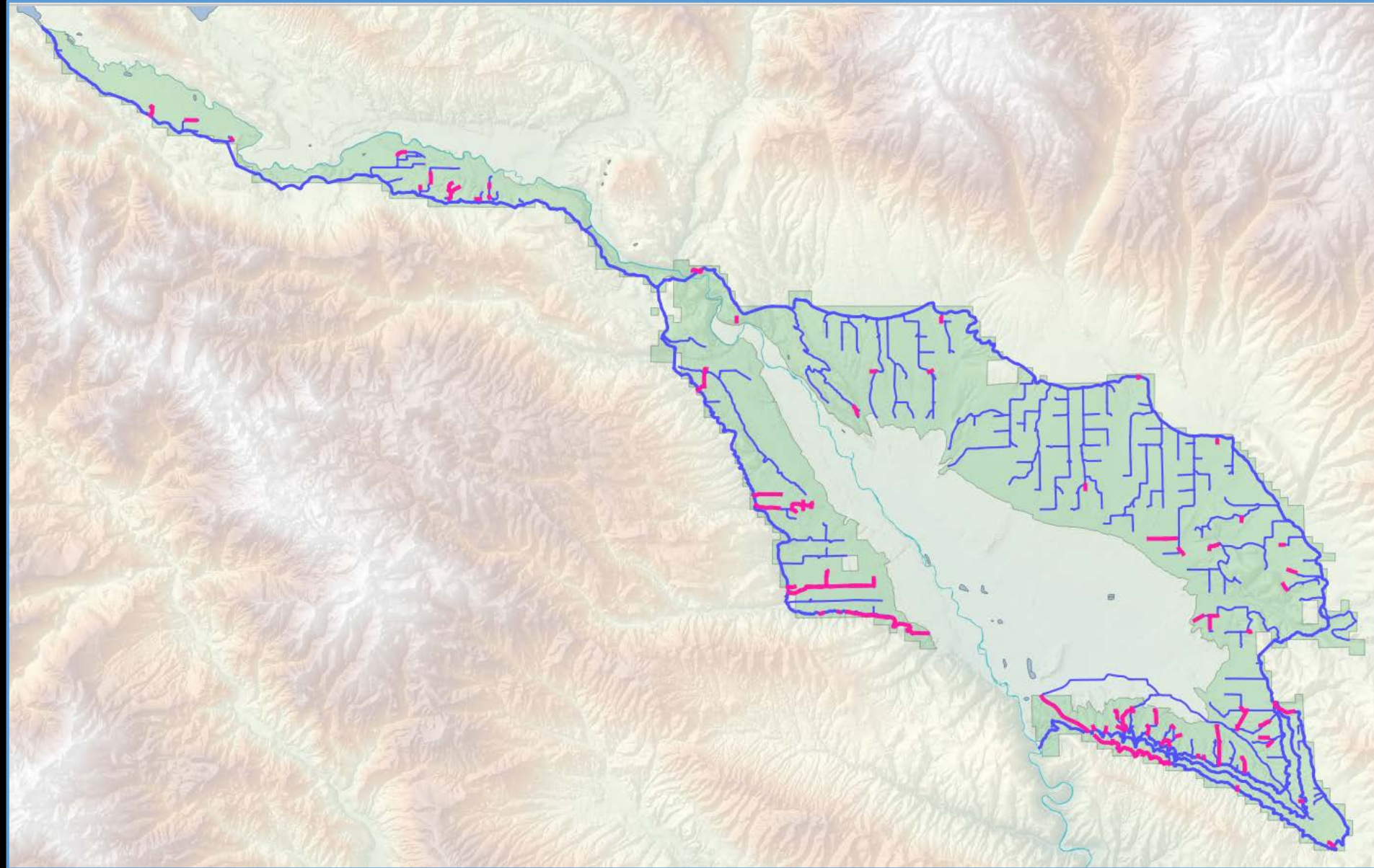
Aqualastic crack sealant
of concrete lined
sections of canal



Pipelines



KRD has piped
32.1 miles of
canals and
laterals (pink)



Proposed Water Conservation Projects

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.

SB 13.8 Cove Road Before



SB 13.8 Cove Road After



SB 13.6 Headworks Before



SB 13.6 Headworks After



Manastash Creek at Cove Road Bridge - Before



Manastash Creek at Cove Road Bridge - After



Manastash Creek at KRD Bridge - Before



Manastash Creek at KRD Bridge - After



LEGEND

- 5 Proposed Project (see back page)
- Proposed Lateral To Be Piped
- Proposed Reregulating Reservoir
- Proposed Canal Lining
- Existing Open Channel (Canal, Ditch, Lateral)
- Existing Piped Lateral

0 1 2 3 4 5 Miles
SCALE



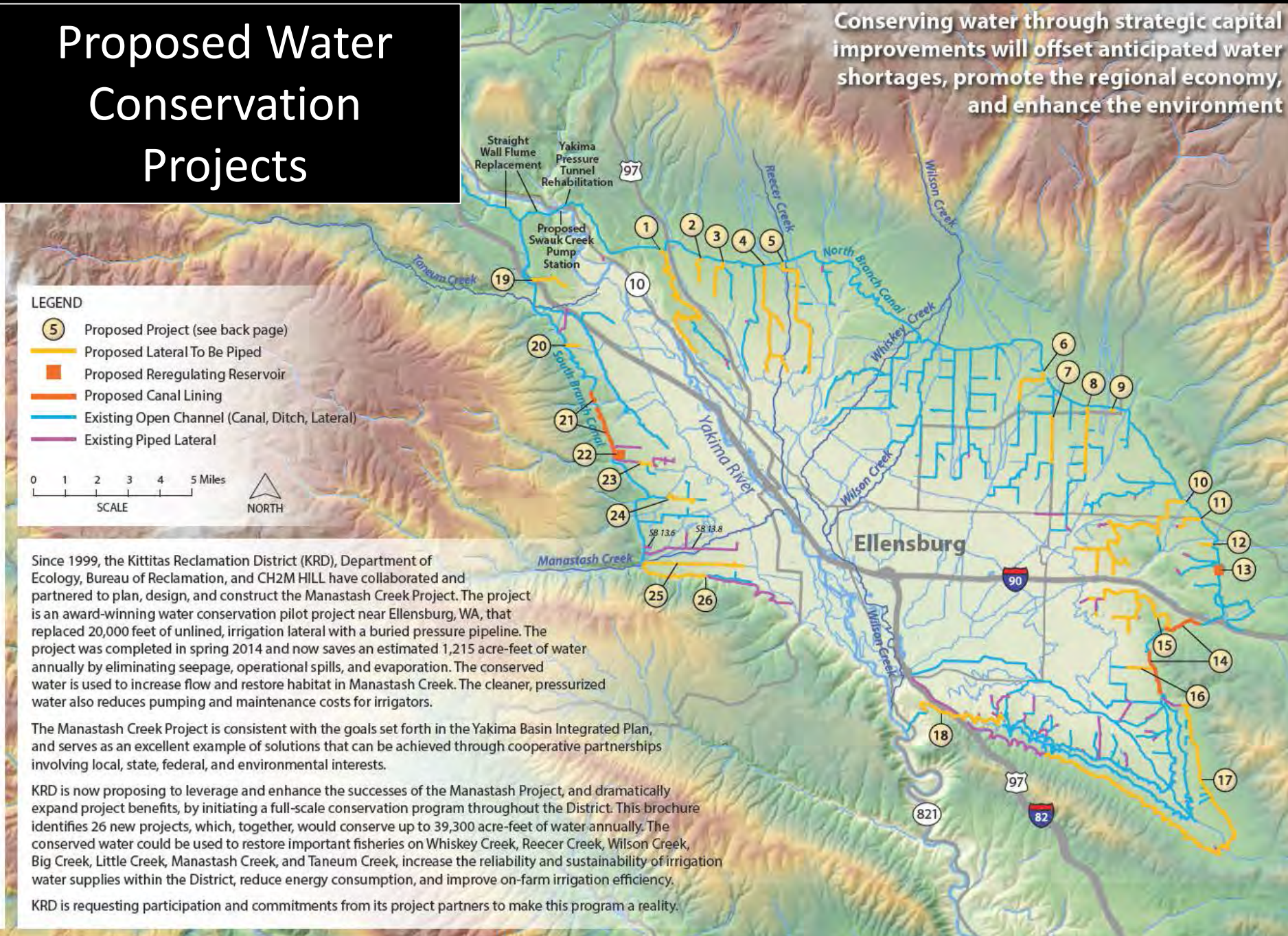
Since 1999, the Kittitas Reclamation District (KRD), Department of Ecology, Bureau of Reclamation, and CH2M HILL have collaborated and partnered to plan, design, and construct the Manastash Creek Project. The project is an award-winning water conservation pilot project near Ellensburg, WA, that replaced 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.

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



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 to 12	—	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	4,300
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
TOTAL					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.

Proposed
Conservation
Savings



Roza Water Conservation Projects Since 1983

- ✓ \$28.7 Million In total improvement costs (nearly all Roza funds).
- ✓ 34,000 acre feet conserved annually, via:
 - 280 miles of canal piped
 - 6.7 miles of canal lined or sealed
 - 31 automated check structures (to operate the canal at lower flows)
 - 2 Re-regulation reservoirs (to capture operational spills)
- ✓ \$38.5 million in Roza funded improvements over the next 15 years to complete the lateral canal enclosure program to conserve 10,000 additional acre feet.
- ✓ \$4.5 million (Roza funds) for the on-going Wasteway 5 Re-regulation reservoir project to conserve an additional 8,800 acre feet.
- ✓ \$100M+ of grower funded on-farm efficiency and conservation measures (ponds, drip lines, sprinkler conversions, etc.)

Water Conservation Examples

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
WAPATO IRRIGATION PROJECT



Power Point Prepared by Yakama Nation Engineering



Canal Lining

2013 to Present

WIP Funded

Unit 1 West Branch

- Lined 2,100 feet of canal to increase water supply by ~620ac-ft/yr
- ~\$420k

Unit 2 West Branch

- Lined 1,750 feet of canal to increase water supply by ~610ac-ft/yr
- ~\$350k



Unit 2 West Branch
Gravel Lens Now
Covered by Liner



Unit 1 West Branch
Liner Installation



Unit 1 West Branch
Liner w/Earth, Fabric & Rip Rap Cover

Lateral 4-414C Pipeline

Completed 2015
IP and WIP Funded

Replaced Earthen Canal Serving 476ac

- 6,650 feet of PVC pipe (15-30")
- Flowmeters installed at six turnouts
- Increases water supply by ~840ac-ft/yr
- ~\$570k



Satus East Lateral E73 Pipeline

To Be Completed 2016

IP and WIP Funded

Replaces Earthen Canal Serving 240ac

- 6,600 feet of PVC pipe (15-27")
- Flowmeters installed at nine turnouts
- Increases water supply by ~780ac-ft/yr
- ~\$600k



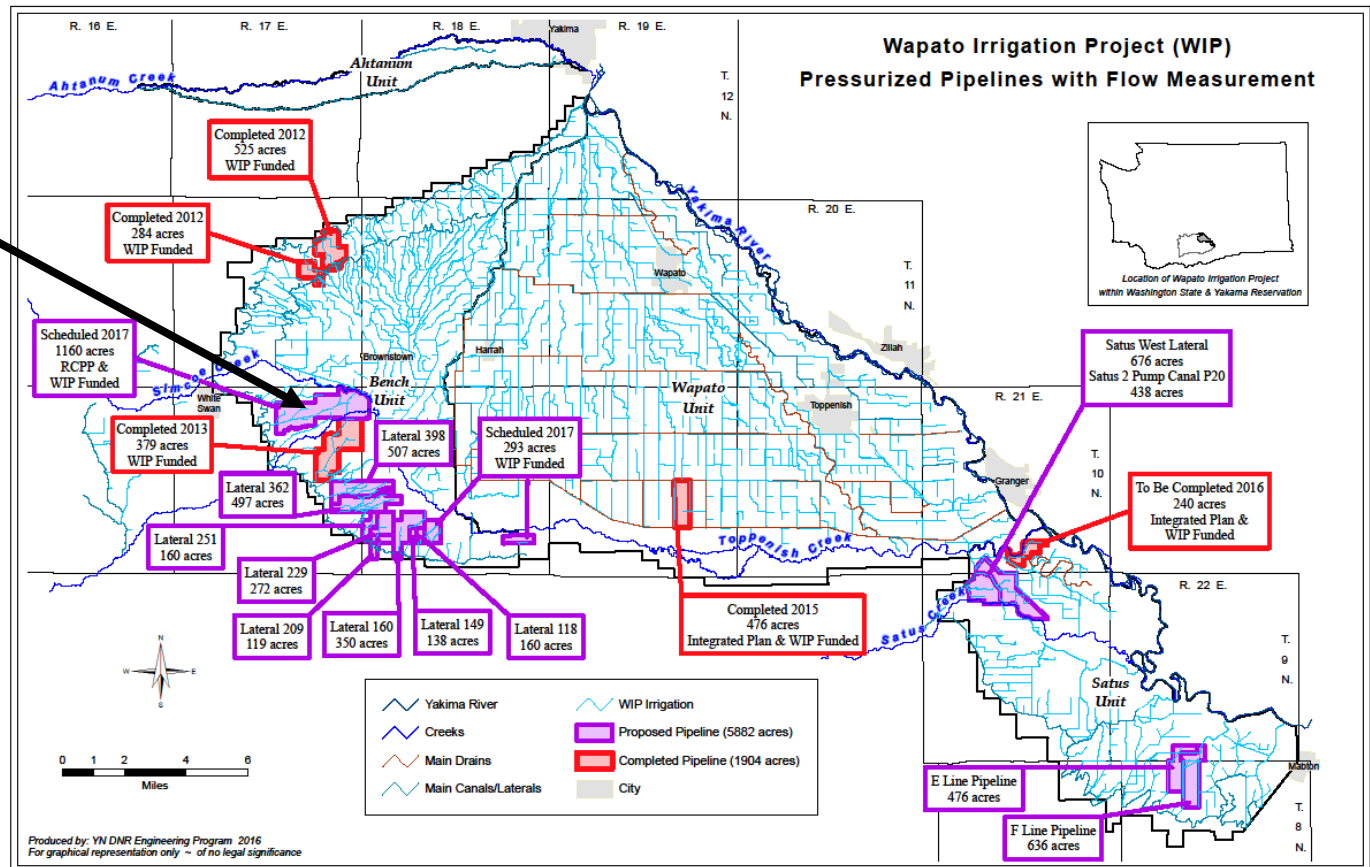
Unit 2 L672 Pipeline

To Be Completed 2017
RCPP and WIP Funded

Replaces Failing Concrete Pipelines Serving 1,160ac

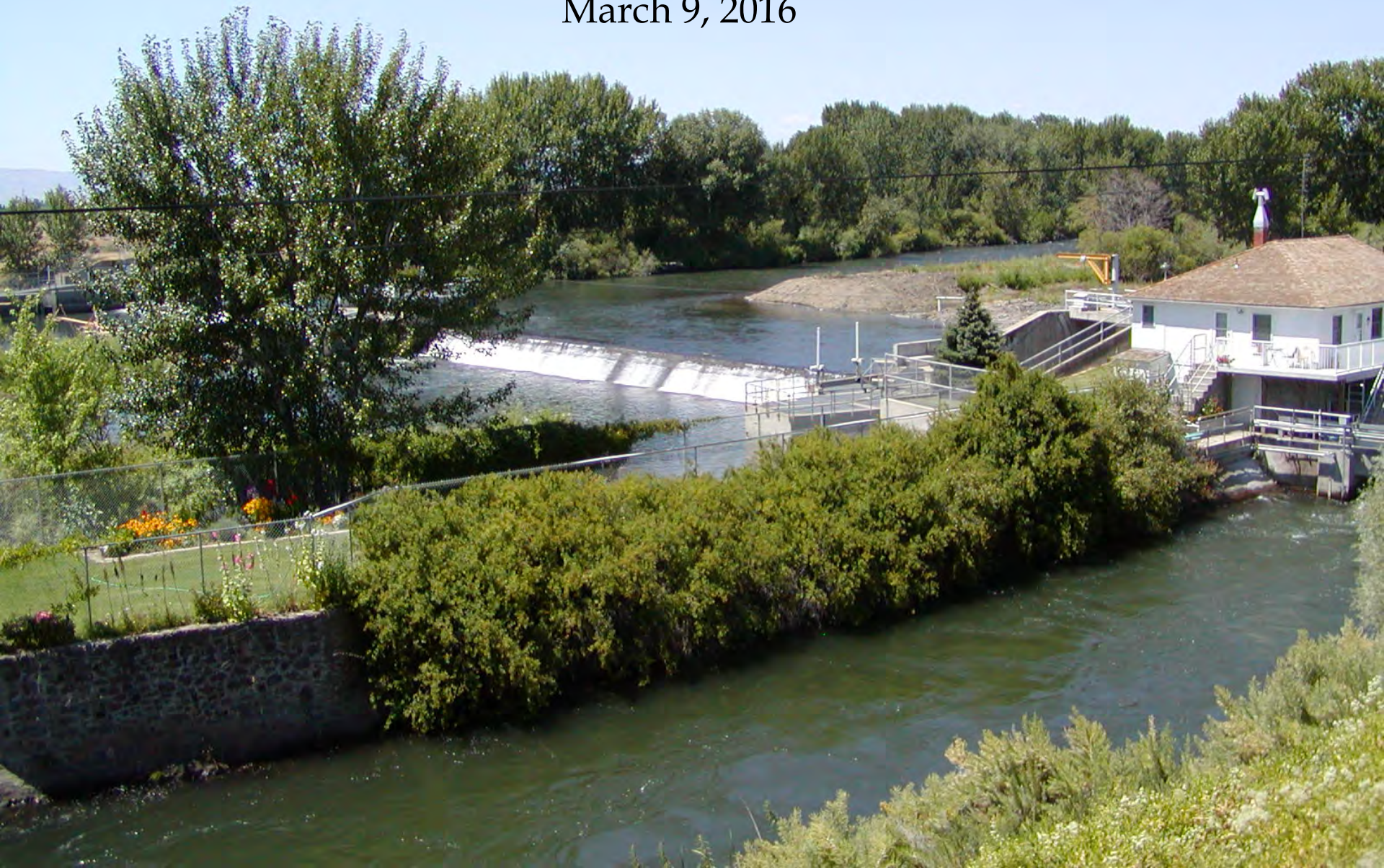
- 26,360 feet of PVC pipe (4-36")
- Flowmeters installed at 20 turnouts
- Increases water supply by ~720ac-ft/yr
- ~\$1,800k

L672



Sunnyside Division Water Conservation

March 9, 2016





SUNNYSIDE CONSERVATION PROJECT – PHASE I

SUNNYSIDE CANAL IMPROVEMENT PROJECT (SCIP)



300 ACRE FEET – 500 ACRE FEET



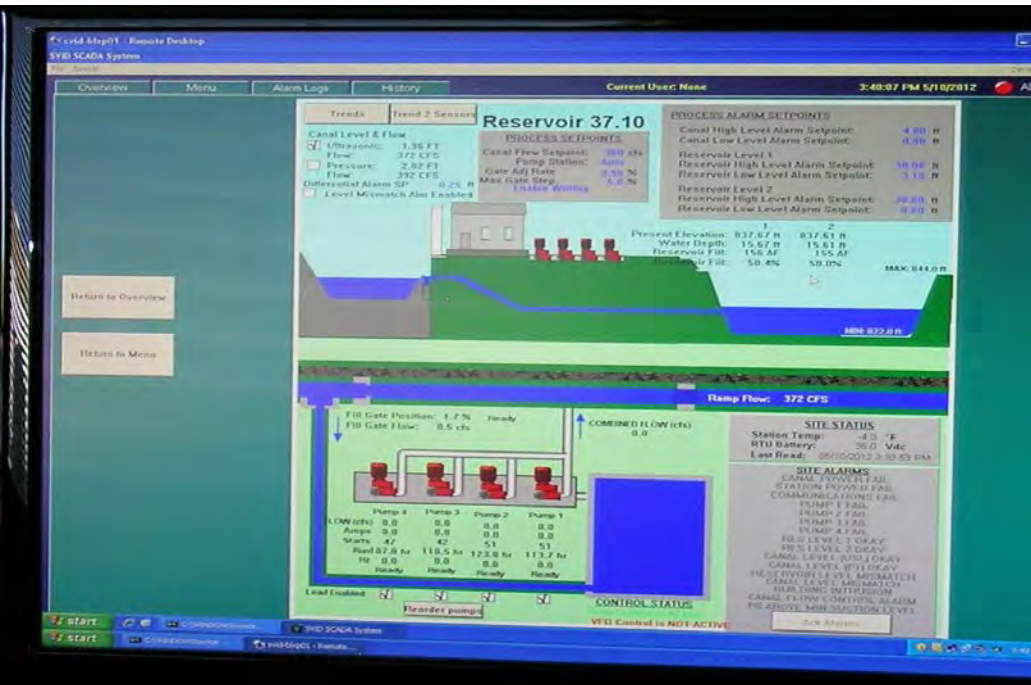
An aerial photograph showing a large, irregularly shaped reservoir under construction. The reservoir is filled with dark blue water, and its surrounding embankments are made of light-colored, graded earth. The landscape is a patchwork of green agricultural fields, some of which are planted in rows of crops. A white structure, likely part of a wind turbine, is visible in the upper left corner. The sky is clear and blue.

Construction of 3 Re-regulation Reservoirs

CONSTRUCTION OF 30 AUTOMATED CHECK STRUCTURES.



SYSTEM CONTROL AND DATA ACQUISITION (SCADA)



11/15/2006

CONSERVATION PROJECT - PHASE 2



ENCLOSED LATERAL IMPROVEMENT PROJECTS (ELIPS)



CONVERTING TO MODERN ON-FARM MEASURING DEVICES





**SINCE 2004 WATER CONSERVATION PROJECTS
HAVE RESULTED IN A DIVERSION REDUCTION
OF OVER 35,000 ACRE FEET OF WATER**

WATER CONSERVATION / INCREASED SUPPLY

Kennewick Irrigation District Water Conservation Projects



Canal Lining

- 74 miles of canal total
 - 38.82 miles earthen canal
 - 12.56 miles concrete lining
 - 5.45 miles EPDM lining
 - 11.78 miles HDPE lining
 - 5.54 miles PVC lining
- 400 miles of distribution mains (pipes)

Canal Lining

- Lining is an integral part of KID's capital plan
- Recent grants for lining received by KID
 - 2013 WaterSMART: Water and Efficiency Grant
 - 2011 Water SMART: Water and Efficiency Grant
 - 2011 Field Services Grant
 - 2009 Seepage Reduction project
 - 2007 Technology Grant (SCADA)
- Application in for 2016 WaterSMART grant for lining of additional 7.2 miles of canal

Canal Lining



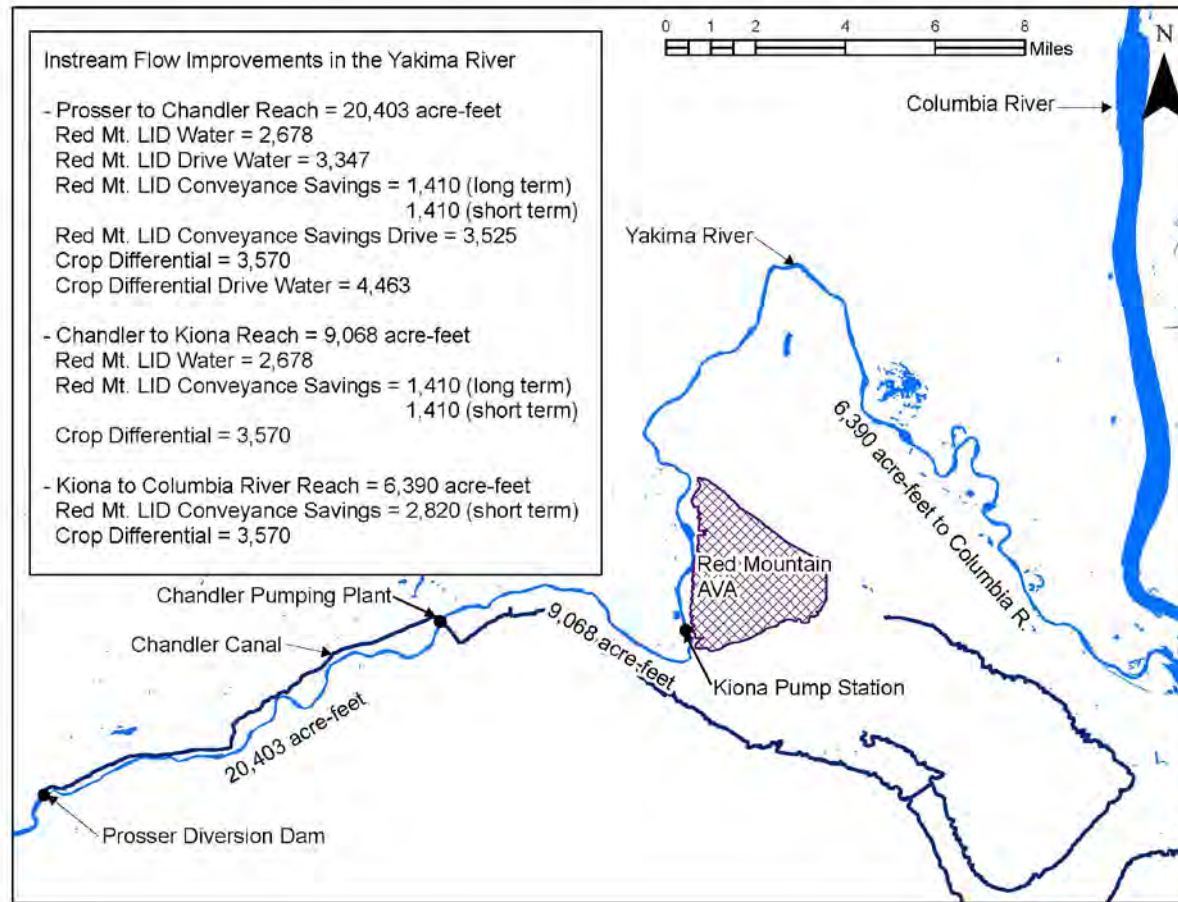
Canal Lining



Red Mountain / Kiona Pump Station

- Collaboration between KID and many parties (OCR, YN, WDFW, USBR, etc)
- Moves portion of KID diversion from Prosser to Kiona (18 river miles)
- Water saved from delivery system improvements and land use changes
 - 1,785 acres of vineyards in Red Mountain AVA
 - Up to 20,403 acre-feet of instream flow benefit, depending on the reach
- Instream benefits for 47 miles of lower Yakima River

Red Mountain / Kiona Pump Station



Red Mountain / Kiona Pump Station

