

Enhanced Water Conservation Alternative Yakima River Basin Water Storage Feasibility Study

Presented by:

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Purpose of Enhanced Water Conservation Alternative

- Is an alternative being considered in the Yakima River Basin Water Storage Feasibility Study – a joint Reclamation/Ecology study to determine the feasibility and acceptability of additional water storage
- Was developed to determine what an aggressive program of water conservation could accomplish for meeting water supply needs in the Yakima basin without a new storage reservoir

Description of Enhanced Water Conservation Alternative

- Includes conservation measures for:
 - Irrigation Districts
 - On-farm
 - Municipal, commercial and industrial water users
- More conservation measures than those to be implemented in YRBWEP

Yakima River Basin Water Enhancement Program (YRBWEP)

- Congressionally authorized
 - Purpose is to alleviate water shortage in the Yakima River basin
 - Title XII authorized Phase II – Basin Conservation Program
- Water conservation measures
 - 2/3 water conserved goes to instream flow, 1/3 to irrig. entity
 - Federal cost ceiling is \$115 million in 2007 dollars
 - 2/3 to be federally funded, 1/3 state and local entity funded
 - On-going

Yakima River Basin Water Enhancement Program (YRBWEP)

- Projects anticipated to be funded
 - Within seven irrigation districts (Kittitas, Roza, Union Gap, Wapato, Sunnyside, Benton, Naches-Selah)
- Conserved water estimated to be 157,200 acre-feet
- Instream flow benefit estimated to be 84,700 acre-feet, irrigation water supply benefit estimated to be 42,500 acre-feet
- Named “No-action” alternative in Yakima River Basin Water Storage Feasibility Study

Type of Water Conservation Measures in Enhanced Water Conservation Alternative

- Irrigation District Infrastructure
 - Lining or piping canals
 - Automation
 - Reregulation reservoirs
 - Improving water measurement/accounting
 - Pump exchange projects
- On-farm conservation and irrigation efficiency improvements
- Municipal, commercial and industrial
 - Infrastructure improvements
 - Household conservation
 - Changes in industrial/commercial practices
 - Reclaimed water use

Enhanced Water Conservation Alternative

- How were projects identified?
 - Projects listed in irrigation district water conservation plans (Wapato, Sunnyside, Kiona, Columbia, Kennewick, Naches-Selah, & South Naches) and discussions with irrigation districts
 - KCCD and NYCD identified projects
 - Water system plans from municipal suppliers (Yakima, Ellensburg, Grandview and Sunnyside) contained projects

Enhanced Water Conservation Alternative

- Lining Projects
 - Install concrete or cement lining on major distribution canals that do not have lining or to replace leaking lining
 - Saves water by reducing infiltration losses
 - Estimated water savings 60,800 afy
- Piping Projects
 - Install pipe to replace open ditches or leaking piped systems
 - Saves water by reducing infiltration and evaporation losses and reduces return flow
 - Estimated water savings 33,700 afy

Enhanced Water Conservation Alternative

- Re-regulation Reservoir Projects
 - Construct small reservoirs to assist in water management by storing or releasing water when demand fluctuations occur
 - Saves water by reducing operational spills
 - Estimated water savings 700 afy
- On-farm Conservation Projects
 - Saves water by reducing on-farm water use
 - Estimated water savings 52,600 afy

Enhanced Water Conservation Alternative

- Pump Exchange Projects
 - Pump water from Columbia River instead of diverting from Yakima River
 - No water conservation overall, but does reduce amount of water used in Yakima River basin
 - Estimated water savings 64,500 afy
- Water Management Projects
 - Saves water due to better water management and less waste
 - Estimated water savings 17,000 afy

Enhanced Water Conservation Alternative

- Municipal water conservation
 - Estimates of water savings range from 2% to 31% of total demand in current water system plans
 - Average water savings greater than 10%
 - Additional water savings, up to 20% of total water demand is possible
 - A reduction of future increases in demand from 82,000 afy to 45,300 afy is possible with 20% conservation savings

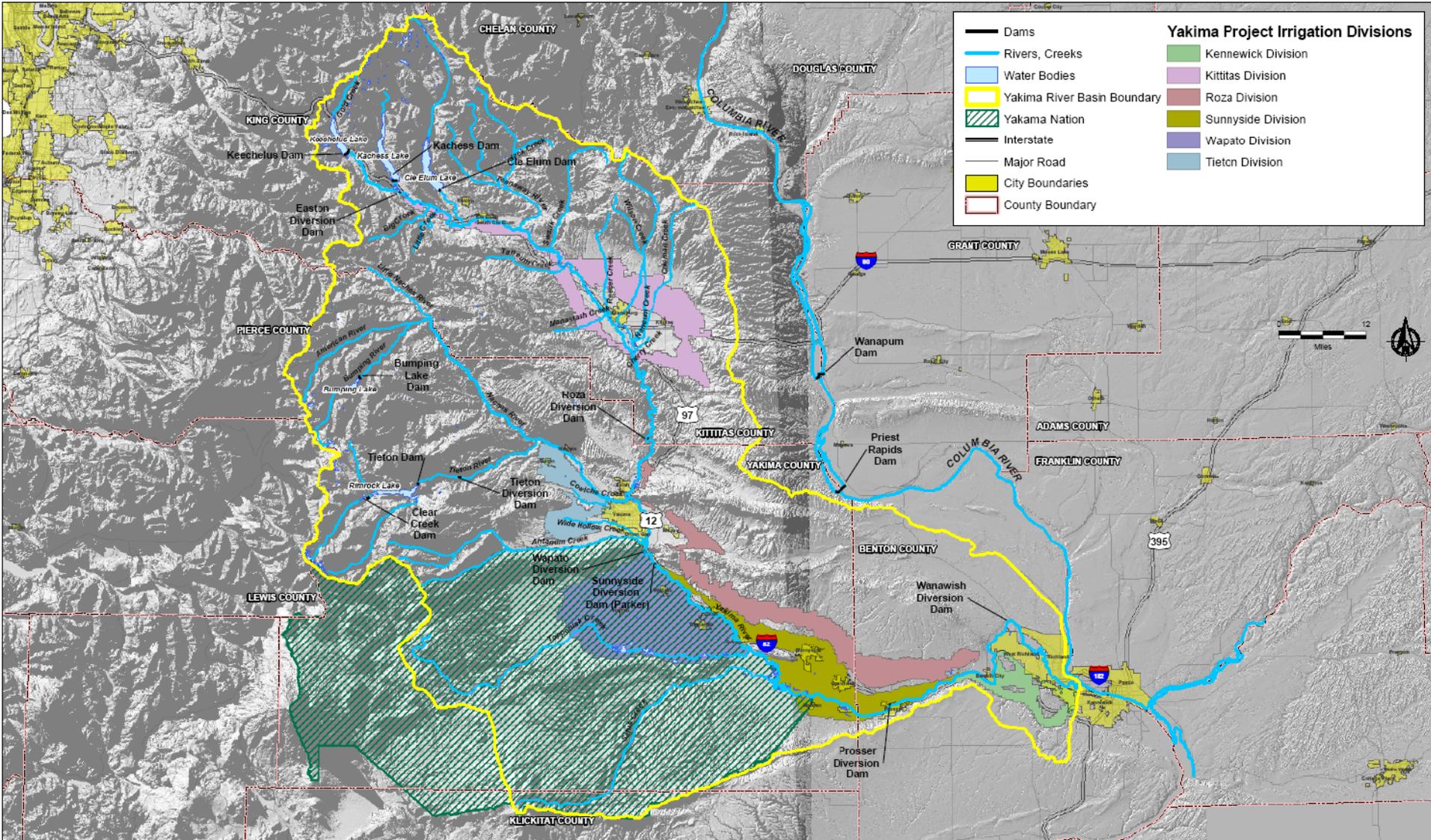
Enhanced Water Conservation Alternative

- Total water savings for enhanced water conservation is 229,200 afy for irrigation district and on-farm improvements
- Estimated implementation cost is \$405M
- Cost per acre-foot is \$1,770

Effects of Enhanced Water Conservation Alternative

- Conservation projects reduce non-consumptive use of water (seepage & return flow) and do not result in a direct increase in water supply for the basin
- The Yakima Project reservoirs have a limited capability to store and manage the conserved water
- Challenge is balancing reduced seepage and return flow with potential effects on downstream water users
- Best location for conservation may be in Roza, Sunnyside and Wapato divisions

Yakima River Basin



Effects of Enhanced Water Conservation Alternative

- To determine the effect on streamflow and water supply, Reclamation performed hydrologic modeling using the RiverWare model
- RiverWare determined the impact on:
 - Total Water Supply Available (TWSA)
 - Irrigation proration percentage in dry years
 - Instream flows in the Yakima and Naches Rivers
 - Reservoir carryover storage
- Analyses were performed to compare the Enhanced Water Conservation Alternative to current conditions and with YRBWEP implemented

Effects of Enhanced Water Conservation Alternative

Hydrologic Indicator	Alternative		
	Current Operation	No Action (YRBWEP)	Enhanced Water Conservation
	Average for Water Years 1981-2005 (maf)		
April 1 TWSA	2.82	2.84	2.86
April-September Flow Volume at Parker gage	0.51	0.62	0.66
April-September Diversion Volume upstream of Parker gage	2.02	1.91	1.85
September 30 Reservoir Contents	0.27	0.30	0.32
April-September Flow Volume at the Mouth	0.85	0.86	0.95
Irrigation Delivery Volume	1.47	1.46	1.44
	Water Year 1994 (maf and percent)		
Irrigation Delivery Volume Shortage (million acre-feet)	0.40	0.38	0.34
Irrigation Proration Level	28%	27%	28%

Effect of Enhanced Water Conservation Alternative

Alternative	April 1 TWSA (maf)				
	1992	1993	1994	2001	2005
Current Operation	2.123	2.094	1.754	1.803	1.762
No Action Alternative (YRBWEP)	2.159	2.110	1.750	1.857	1.845
Enhanced Water Conservation	2.218	2.136	1.762	1.911	1.860
Difference between Enhanced Water Conservation and Current Operation	+0.095	+0.042	+0.008	+0.108	+0.098
Difference between Enhanced Water Conservation and No Action	+0.059	+0.026	+0.012	+0.054	+0.015

Effect of Enhanced Water Conservation Alternative

- TWSA increased in average years
- TWSA increased in most drought years
- Very little benefit in third year of drought (1994)
- Irrigation delivery shortfall reduced as less water is needed to operate irrigation systems and greater % is delivered to farmers

Effects of Enhanced Water Conservation Alternative – Instream Flow

Flow volume downstream from the Parker gage for April-September and July-September average for period of record (1981-2005)

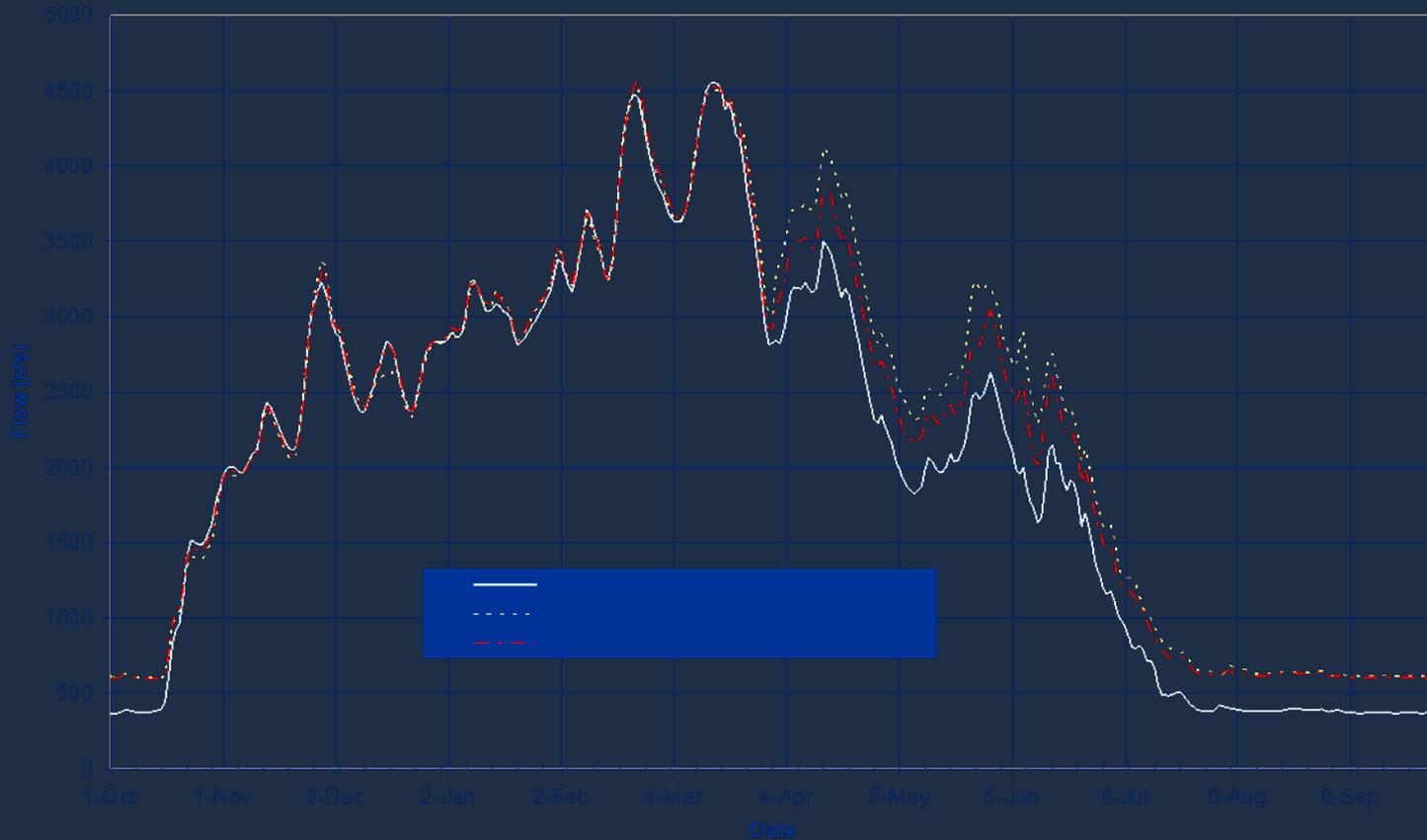
Alternative	Flow volume downstream from the Parker gage (maf)	
	April-September	July-September
Current Operation	0.51	0.09
No Action Alternative	0.62	0.13
Enhanced Water Conservation Alternative	0.66	0.14

Effects of Enhanced Water Conservation Alternative – Reservoir Storage

Yakima Project reservoir system total contents for the period of record 1981-2005

Alternative	Total Reservoir Storage in Yakima Project, maf		
	March 31	June 30	September 30
Current Operation	0.60 (56% Full)	0.91 (85% Full)	0.27 (25% Full)
No Action Alternative	0.62 (58% Full)	0.92 (86% Full)	0.30 (28% Full)
Enhanced Water Conservation	0.64 (60% Full)	0.93 (88% Full)	0.32 (30% Full)

Effect of Enhanced Water Conservation Alternative – Flow at Parker



Effect of Enhanced Water Conservation Alternative – Flow at Umtanum Gage



Whats Going On Now?

- Ecology is issuing a new EIS with an alternative called “Integrated Water Resource Management” that contains a number of strategies for improving water supply and fisheries. Enhanced water conservation will become one of the strategies in Ecology’s tool kit to enhance water resources in the Yakima River basin. The others will include ground water storage, water markets, new reservoirs, fish habitat enhancements and fish passage.

Enhanced Water Conservation Alternative

- Differences compared to YRBWEP
 - Implementation
 - YRBWEP measures will be implemented
 - EWCA measures includes other conservation projects as well as municipal, industrial, and commercial conservation projects
 - Conserved Water Use
 - YRBWEP has 2/3 conserved water to instream flows, 1/3 retained by implementing entity
 - EWCA assumes conserved water will become part of TWSA to be managed by Reclamation for all water users
 - Funding
 - YRBWEP projects are 2/3 federal, 1/6 State, 1/6 implementing entity
 - EWCA projects are no federal, 2/3 State, 1/3 implementing entity