Water for Irrigation Streams & Economy

Bear Creek and Little Butte Creek Watersheds

March 2012

WISE project goals for Bear and Little Butte Watersheds

- Increase summer stream flows
- Improve water quality
- Improve water temperature
- Improve the irrigation systems with no undue financial burden on the Districts

Possible Sources of Additional Water

- Conserved Water
  - Piped/lined irrigation canals
- Increased reservoir storage capacity
  - Howard Prairie
  - Agate
  - New storage
- Pumped water
  - Regional Water Reclamation Facility
  - Lost Creek Reservoir via Rogue River
    - Also looked at in 1980's

WISE Project Area

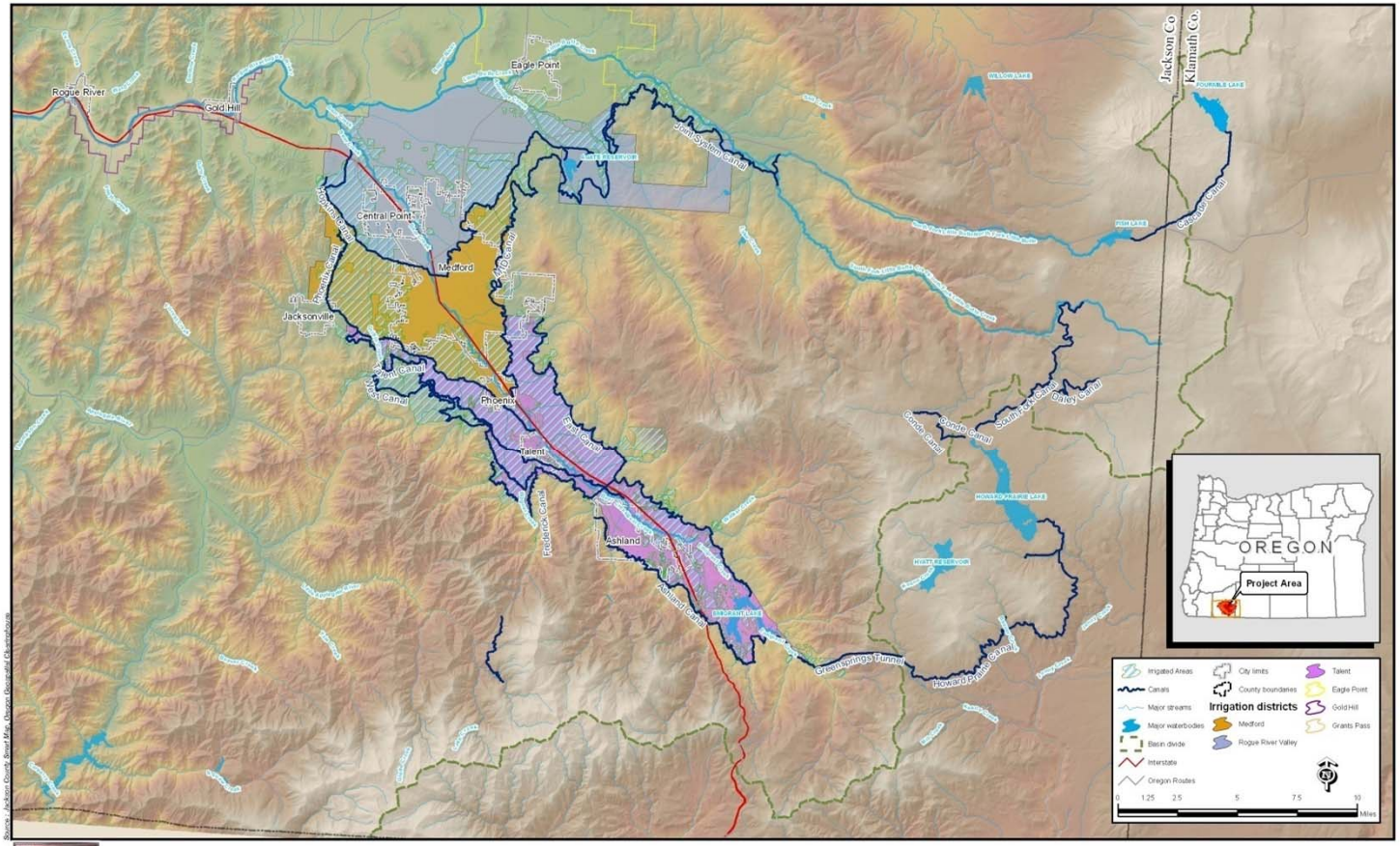

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FIGURE 1-1
WISE Study Area and Land Use Features
WISE Preliminary Feasibility Study | City of Medford

Purpose and Need

The purpose of the WISE Project is to improve water quality and quantity in the Little Butte Creek and Bear Creek watersheds for irrigation, aquatic habitat, and other uses in an economically and environmentally feasible manner. Specific goals of the WISE project are to:

- Improve efficiency of water deliveries to the Medford, Rogue River Valley, and Talent irrigation districts.
- Improve irrigation water supply reliability for the Medford, Rogue River Valley, and Talent irrigation districts.
- Improve water conservation through both system-wide and on-farm irrigation improvements.
- Improve instream water quantity, water quality, and water reliability for native anadromous salmonids.
- Improve aesthetics and recreation values of reservoirs, streams, and rivers.
- Improve water quality at the Robert Duff Water Treatment Facility intake by improving water quality in Little Butte Creek.
- Incorporate the most cost-effective solution to reliably reuse effluent from the Regional Water Reclamation Facility's future discharge permit requirements in the WISE Project.

Purpose and Need cont.

The WISE Project is needed because the Little Butte Creek and Bear Creek watersheds suffer from unreliable irrigation water supplies during drought years and degraded water quantity and quality for native anadromous salmonids and other uses during low flow periods. Several factors contribute to the need for improved surface water conditions in the watersheds:

- Aging and increasingly inefficient water delivery infrastructure results in high water losses to irrigation districts and water users.
- Full appropriation, if not over-appropriation, of water in Bear Creek and Little Butte Creek threatens the reliability of irrigation water supply.
- Degraded water quality and low flows are detrimental to anadromous salmonids and other species.
- Increasing stream and river withdrawals and decreasing reservoir levels adversely affect aesthetic recreation values of reservoirs, streams, and rivers.

Revised Goals

- Improve efficiency of water deliveries to the Medford, Rogue River Valley, and Talent irrigation districts.
- Improve irrigation water supply reliability for the Medford, Rogue River Valley, and Talent irrigation districts.
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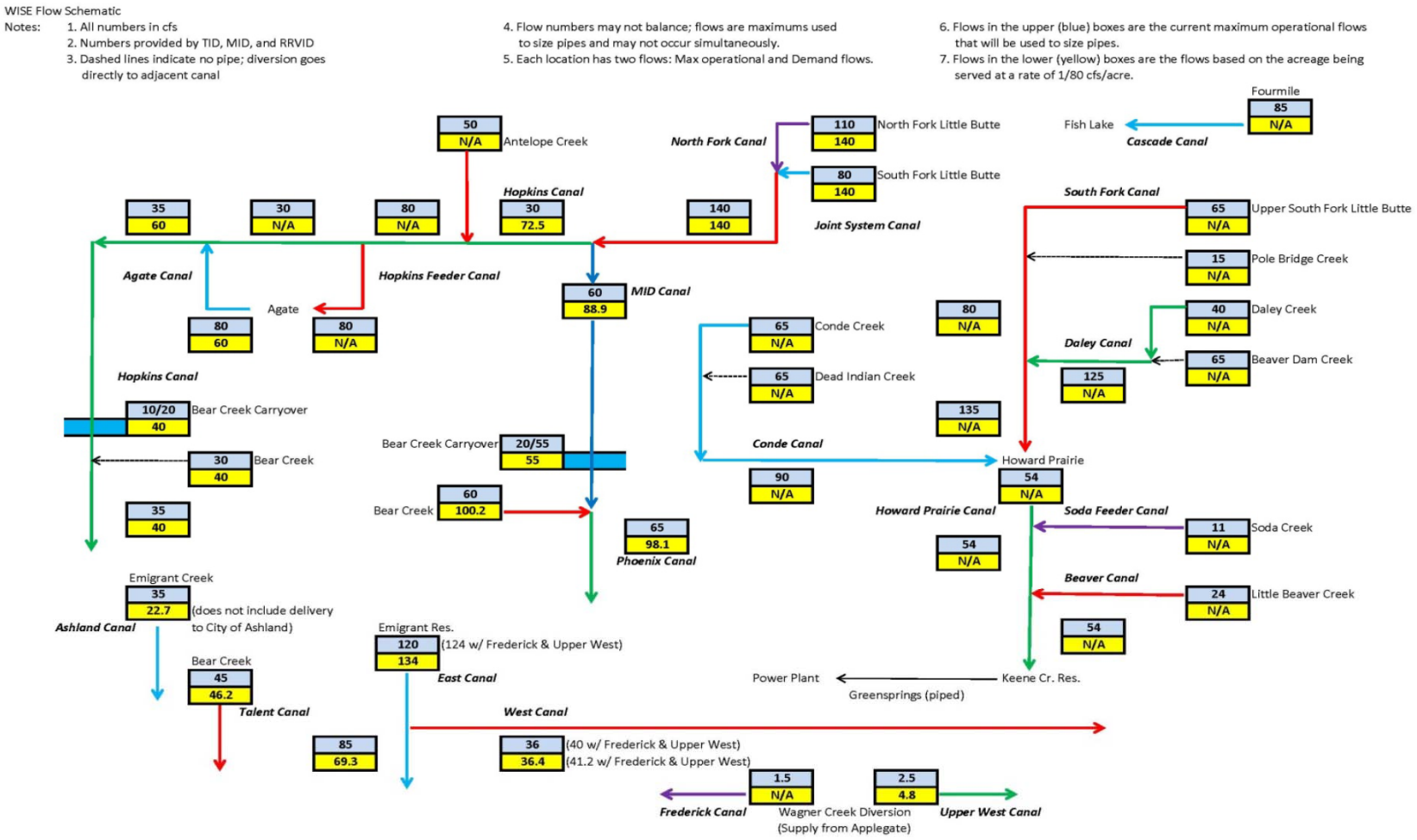
- Improve water quantity, water quality, and water reliability for native anadromous salmonids.
- Improve aesthetics and recreation values of reservoirs, streams, and rivers.
- Improve water quality at the Robert Duff Water Treatment Facility intake by improving water quality in Little Butte Creek.
- Incorporate the most cost-effective solution for the reliable reuse of effluent from the Regional Water Reclamation Facility's future discharge permit requirements into the WISE Project.

Modeled system



Determined Evaluation Criteria

Table ES-1. Summary of Evaluation Criteria

Success Criteria	Description
Water Supply Reliability	Improve water supply reliability for the irrigation districts and for native anadromous salmonids
Irrigation System Efficiency	Improve efficiency of irrigation deliveries
Effluent Reuse	Minimize cost and maximize reliability of the reuse of the RWRF effluent for agricultural irrigation
Environmental	Minimize negative environmental impacts
Water Quality	Improve water quality for native anadromous salmonids and at the Robert Duff Water Treatment Facility intake and irrigation districts
Cost Allocation	Promote fair distribution of cost (capital, operational, and maintenance) among water users such that no stakeholder shoulders an unfair financial burden
Aesthetics	Improve aesthetic values of the reservoirs, streams, and rivers
Institutional	Minimize the magnitude and difficulty of required institutional changes such as local/regional governmental and stakeholder reorganization, transfer of authority, or creation of new institutional entities
Legal/ Regulatory	Minimize legal and regulatory obstacles while maximizing the ability to meet local and regional goals
Recreation	Improve recreational values of the reservoirs, streams, and rivers
Financial	Minimize cumulative construction, operation and maintenance cost, and maximize the economic benefits of the water
Technical	Must be technically implementable

Defined Evaluation Criteria

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Began to screen out alternatives

Table ES-2. **Status of Project Elements based on Level 1 Screening**

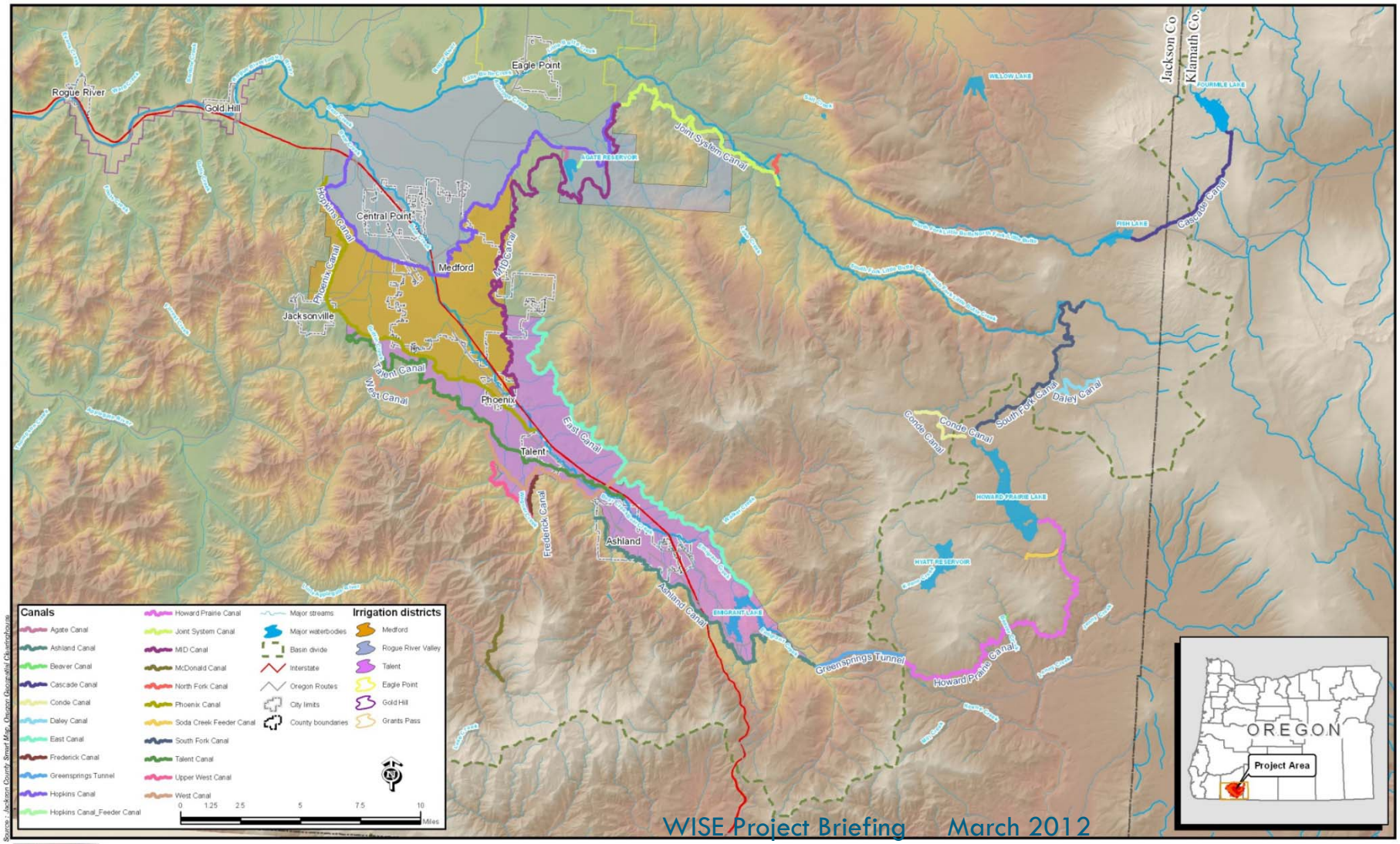
	Not Viable[1]	Fixed Project Element[1]	Variable Project Element[2]
Use reclaimed effluent			●
Encourage on-farm irrigation conservation		●	
Enhance riparian and stream habitat		●	
Acquire, transfer, or bank water rights		●	
Line irrigation canals	●		
Replace canals with piped system			●
Change irrigation system monitoring and control system		●	
Optimize water distribution within the watersheds			●
Create new storage	●		
Realign water conveyance system	●		
Increase existing reservoir storage			●
Transfer water from other watersheds	●		

Options used in Alternatives

Table ES-3. Options Developed for the Variable Project Elements

Option	Description
Conveyance Options	
C1	Keep the existing Bear Creek diversions, and pipe certain segments as part of a phased approach to the WISE project. • *Sub-Option C1a:* Pipe TID delivery area (Ashland, East, West, Frederick, Upper West, and Talent Canals (TID area) • *Sub-Option C1b:* Pipe Joint System, Phoenix, Medford, and Hopkins Canals (MID-RRVID area) • *Sub-Option C1c:* Pipe Cascade and Howard Prairie Canals (upper watershed area)
C2	Keep the existing Bear Creek diversions, but replace all main canals with pipes.
C3	Remove Bear Creek diversions and create a pressurized system.
Storage Options	
S1	Increase storage at Agate Reservoir to 8,000 acre-feet; increase of approximately 1,500 acre-feet with a raise of ~5 feet by installing flash boards across the spillway.
S2	Eliminate surcharge limit from operational rule curve at Fourmile Lake and Fish Lake; allow fill at any time to help ensure refill of these projects in a water-short years (not critical years).
S3	Remove 1/3 of flood control reserve space at Emigrant Lake for each monthly period.
S4	Increase storage at Howard Prairie Reservoir to approximately 80,000 acre-feet (increase of approximately 10,000 acre-feet with a raise of ~5-8 feet). Construction of a "structure" near the Grizzly Creek campground would increase the project storage by this modest amount.
Reclaimed Effluent	
RW1	Apply reclaimed effluent from the Medford Regional Water Reclamation Facility (RWRF) and the City of Ashland's reclamation facility services to off-set irrigation demands in adjacent lands. Estimated volumes of water available are a minimum of 23,200 acre-feet per year during a dry year to 29,700 acre-feet per year during a wet year for an average of 25,200 acre-feet per year.

Conceptual maps of c1, c2 and c3



WISE Project Briefing March 2012

FIGURE 3-4
Conceptual Piping System for Option C3

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Began to evaluate Scenarios

Table ES-4. Operational Modeling Scenarios

Type	Option Name	Description
No Action	---	Existing conditions and operations
Conveyance Options	C1a D1	C1a: Ashland, East, West, and Talent canals piped D1: crop consumptive use ratios increased by 50% of current ratios in areas served by the piped canals
	C1b D1	C1b: Joint System, Phoenix, Medford, and Hopkins canals piped D1: consumptive use ratios increased by 50% in areas served by the piped canals
	C1c	C1c: Cascade and Howard Prairie Delivery canals piped. No on-farm water management improvements are included
	C2 D1	Combination of options "C1a D1", "C1b D1" and "C1c". The existing diversions from Bear Creek are maintained.
	C3 D1	Option "C2 D1" with all diversions from Bear Creek removed. The piped canals are realigned in Bear Creek to form a linked delivery pipeline.
Storage Options	S1	Agate Lake storage is increased to 8,000 acre-feet
	S2	Flood surcharge limits removed from Fourmile and Fish lakes
	S3	One-third of flood control pool converted to conservation storage in Emigrant Lake
	S4	Howard Prairie Reservoir storage is increased. An arbitrary large storage amount (80,000 acre-feet) was used to evaluate the ability of flows from South Little Butte watershed to fill the storage.
	S5	Combination of storage options "S1" to "S4"
Option Combinations	C2 S5 D1	Combination of options "C2 D1" and "S5"
	C3 S5 D1	Combination of options "C3 D1" and "S5"
	C2 D1 RW1	Option "C2 D1" along with the use of reclaimed municipal water ("RW1")
	C3 D1 RW1	Option "C3 D1" along with the use of reclaimed municipal water ("RW1")
	S5 RW1	Option "S5" along with the use of reclaimed municipal water ("RW1")
	C2 S5 D1 RW1	Options "C2 D1", "S5", and "RW1"
	C2 S5 D2 RW1	Options "C2", "S5", and "RW1" D2: consumptive use ratios set to a maximum rate of 90% in areas served by the piped canals
	C3 S5 D1 RW1	Options "C3 D1", "S5", and "RW1"
	C3 S5 D2 RW1	Options "C3", "S5", and "RW1" D2: consumptive use ratios set to a maximum rate of 90% in areas served by the piped canals

Irrigation Improvements

Table 4-11. Summary of Water Supply Reliability Benefits of Project Elements				
Option	Irrigation Shortage Improvement (10^{th} Percentile)	Agate Lake Conservation Storage (ac-ft) (10^{th} percentile)	Emigrant Lake Conservation Storage (ac-ft) (10^{th} percentile)	Fourmile Lake Conservation Storage (ac-ft) (10^{th} percentile)
No-Action		96	3,932	1,081
C1a	0%	98	6,210	1,209
C1b	3%	100	11,752	5,773
C1c	1%	98	6,714	2,163
C2	7%	100	14,100	3,222
C3	0%	99	6,644	2,268
S1	1%	2,067	3,946	1,187
S2	0%	98	4,591	1,189
S3	0%	98	5,318	1,190
S4	0%	98	3,949	1,134
S5	2%	2,041	6,020	1,275
C2S5	9%	1,896	15,997	3,053
C3S5	1%	1,905	8,034	2,249
C2RW1	8%	99	18,348	5,794
C3RW1	6%	98	13,689	4,179
S5RW1	5%	2,059	14,018	1,480
C2S5RW1	10%	1,949	18,949	5,407
C3S5RW1	9%	1,953	14,291	5,873

Specific Irrigation Benefits

- Conserved water available for irrigation
  - 22,297 – 30,998 – 39,710 (A/F)
- Gravity pressure system
- Reduced shortages
  - 77 – 4,674 – 8,019 (A/F)
- Extended drought protection
- More flexible water availability
- Minimal moss and algae in system
- Greatly reduced canal/pipe maintenance
- Hydropower generation

Instream Benefits

- More water instream
- Increased flows in tribs
  - 2,193 – 9,895 – 20,207 (A/F)
  - Stored water component in reservoirs
  - Conserved water from surface rights
  - Water exchange from reuse component
- Elimination of mixed canal and live flows
- Significantly improved water quality

Issues

Table ES-6. Summary of Key Environmental Issues for Project Element Options

Option	Fisheries	Vernal Pool Wetlands	Shallow Wells	Cultural/ Historical	Stormwater
C1a	●	–	●	○	●
C1b	●	●	●	○	●
C1c	●	–	●	○	–
C2	●	●	●	○	●
C3	●	●	●	○	●
S1	●	●	–	●	–
S2	●	–	–	–	–
S3	●	–	–	–	–
S4	●	–	–	●	–
S5	●	●	–	●	–
RW1	●	–	–	–	–

Estimated project costs

Table ES-7. Summary of Cost Ranges for Project Options ($ thousand)			
Option	Estimated Planning Costs[1]	+50% of Estimated Cost[2]	-30% of Estimated Cost[2]
C1a	$145,000	$164,850	$76,930
C1b	$200,000	$227,850	$106,330
C1c	$109,000	$123,900	$57,820
C2	$453,000	4514,500	$240,100
C3	$656,000	$745,500	$347,900
S1	$22,500	$27,750	$12,950
S2	$4,000	$4,500	$2,100
S3	$4,000	$4,500	$2,100
S4	$48,000	$60,000	$28,000
S5	$78,500	$96,750	$45,150
RW1	$71,000	$86,250	$40,250
C2S5	$531,500	$611,250	$285,250
C3S5	$734,500	$842,250	$393,050
C2RW1	$524,000	$600,750	$280,350
C3RW1	$727,000	$831,750	$388,150
S5RW1	$149,500	$183,000	$85,400
C2S5RW1	$602,500	$697,500	$325,500
C3S5RW1	$805,500	$928,500	$433,300

Break down of costs

- Itemized costs are shown in Appendix D
- Shown by:
  - Scenario
  - Reach
- Includes
  - Costs
  - Pipe sizes
  - Water Demands

Because you asked …

- Conserved water
  - 22,297 – 30,998 – 39,710
- Reduced Shortages
  - 77 – 4,674 – 8,019
- Instream improvements
  - 2,193 – 9,895 – 20,207
- Total water improvements
  - **24,567 – 45,567 – 67,936**