

BENEFIT-COST ANALYSIS OF THE CALIFORNIA WATERFIX

<http://www.pacific.edu/Documents/school-business/BFC/WaterFix%20benefit%20cost.pdf>

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Benefit-Cost Analysis of BDCP

- UOP, Michael (July 2012)
 - Evaluates tunnels independently
 - Statewide assessment based on BDCP costs and EIR/EIS.
- BDCP chapter 9 appendix A (May 2013)
 - Evaluates benefits and costs from water agency perspective
 - Changes from EIR/EIS baseline to assume tougher environmental regulations without WaterFix, but not with WaterFix. **Justified by BDCP No-surprises Assurances under ESA Section 10.**
 - Baseline change increases water yields and increase benefits.

Difference in BDCP studies almost entirely due to water yield

	Michael (7/2012)	BDCP (5/2013)	Difference
Export Water Supply	3,916	15,722 to 16,642	11,806 to 12,726
Export Water Quality	2,328	1,819 to 1,789	-509 to -539
Earthquake Risk Reduction	866	470 to 364	-396 to -502
Environmental Benefits/Costs	0	Not Estimated*	NA (0)
Tunnel Costs (Capital, O&M)	-12,310	-13,328 to -13,343	1,018 to 1,033
In-Delta and Upstream Impacts	-1,173	Not Estimated*	NA (-1,173)
Net Benefits (\$ millions)	-6,374	4,684 to 5,452	11,058 to 11,826
Benefit-Cost Ratio	0.53	1.35 to 1.41	

WaterFix Differences With BDCP Affect Benefit-Cost Analysis

- WaterFix is Not A Habitat Conservation Plan.
 - Water agencies lose “no surprise” regulatory assurances.
 - Tunnels no longer bundled with habitat restoration.
 - BDCP Section 10 permit: requires overall improvement in ES
 - WaterFix Section 7 permit: do not jeopardize existence of ES
- Water Yields Are Lower.
- Construction Costs Updated.
- Construction Time Estimate Increased from 10 years to 15 years.

Key Assumptions for WaterFix Benefit-Cost Analysis

- Export Water Yield: annual average of 225,432 acre feet per the January 2016 WaterFix Biological Assessment
- Timeline: Construction 2017-2031, Operation benefits valued from 2032 to 2131(100 year useful life)
- Real Discount Rate: 3.5%
- Two Scenarios:
 - ▣ Optimistic: Values from 2013 BDCP/Sunding Analysis.
 - ▣ Base: Values from other state reports.

The Base Scenario Still Includes Some Pro-Tunnel Biases

- No Risk of Cost Escalation.
- Excludes some areas of potential social costs.
 - ▣ Delta recreation and upstream reservoirs
- Excludes some areas of environmental costs
 - ▣ Risk of algal blooms and construction impacts
- Assumes no technological improvements in alternative water supplies and conservation.
- Valued Delta Water exports 25% higher than current cost of alternatives.
- Long-time horizon and relatively low discount rate.

Valuing Export Water Supply in the Base Scenario

Agricultural Value:

- Difference in Rental Rate of Irrigated and Unirrigated Land Implies \$124 af. Increase 25% to \$150 af.

Urban Value:

- Cost of Alternatives DWR California Water Plan.
- Weighted average is \$633 af, but increased 25% to \$800 af – midpoint cost of recycled water.

	Low Cost (\$ af)	High Cost (\$ af)	Midpoint Cost (\$ af)	Potential 2030 Supply (million af)
Brackish Groundwater Desalination	500	900	700	.1-.2
Ocean Desalination	1000	2500	1750	.1-.2
Municipal Recycled Water	300	1300	800	1.8-2.3
Surface Storage	300	1100	700	.1-1.1
Urban Water Use Efficiency	223	522	372.5	1.2-3.1

Valuing Export Water Supply in Optimistic Scenario

Optimistic Scenario from BDCP analysis:

- Assumes very rapid urban population growth.
- Assumes no development of alternative water supplies or growth in conservation.
- Averages \$785 af across urban and agriculture uses, compared to \$367 af in base scenario.

Scenario	Tunnels' Annual Water Yield	Average Value of Water Supply	Annual Value	Present Value over 100 years
Optimistic	225,432 af	\$785	\$176.9 mil	\$2,822.4 mil
Base	225,432 af	\$367	\$82.7 mil	\$1,319.5 mil

Seismic Risk Reduction Benefit

- “Optimistic” Scenario: avg. annual value \$27.4 mil from BDCP report, present value \$436 million.
Why so low?
 - ▣ Low probability event
 - ▣ Tunnels only protect 50% of exports.
 - ▣ Worst case scenario is less than $\frac{1}{4}$ the loss of surface water in recent drought years
- Base Scenario: 0
 - ▣ Vast majority of economic damage is not water exports
 - ▣ Higher level of flood protection investment will occur without WaterFix

Benefit of WaterFix to Exporters

- Water Quality Improvement is the Biggest Benefit in the Base Scenario (value estimate from BDCP)
- Total Benefit is less than \$5 billion in the most optimistic case

	Base scenario	Optimistic Scenario
Benefits		
Export Water Supply	\$1,319,521,208	\$2,822,409,124
Export Water Quality	\$1,677,361,307	\$1,677,361,307
Earthquake Risk Reduction	\$0	\$435,796,554
Total Benefits	\$2,996,882,515	\$4,935,566,984

Cost of WaterFix to Exporters

- \$15.7 billion construction/mitigation over 15 year period. O&M \$25mil to \$38mil annually.
- Present Value Cost is \$12.3 billion

	Base scenario	Optimistic Scenario
Costs		
Construction and Mitigation	\$11,676,474,531	\$11,676,474,531
Operation and Maintenance	\$591,658,075	\$591,658,075

- For exporters alone, costs exceed benefits by more than \$7 billion.

In-Delta Costs

- Agriculture
 - ▣ Present value cost \$294 million to \$683 million.
- In-Delta Transportation Impacts
 - ▣ Present value cost of \$132.2 million for state highways evaluated in BDCP EIR/EIS
- Municipal Water Quality
 - ▣ Mitigation cost present value \$37 million to \$111 million for Contra Costa WD alone.
- In-Delta Costs Most Likely Under \$1 billion
 - ▣ Significant locally but not critical to statewide B-C ratio.

Environmental Costs/Benefits

- WaterFix EIR/EIS and biological assessment does not support any claim of environmental benefit.
 - Some species could be negatively impacted.
 - Section 7 permit is for No Jeopardy not Overall Improvement.
 - Other environmental risks.
- \$0 Environmental Benefit/Cost seemed most consistent with EIR and BA

Summary

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Costs		
Construction and Mitigation	\$11,676,474,531	\$11,676,474,531
Operation and Maintenance	\$591,658,075	\$591,658,075
Ecosystem	\$0	\$0
In-Delta Municipal	\$111,279,332	\$37,093,107
In-Delta Agriculture	\$682,807,143	\$293,953,421
In-Delta Transportation	\$132,205,755	\$132,205,755
Total Costs	\$13,194,424,836	\$12,731,384,889
Net Benefit	(\$10,197,542,281)	(\$7,795,817,905)
Benefit/Cost ratio	0.23	0.39

Conclusion

- WaterFix is worse than the “status quo” as defined by its EIR/EIS.
 - ▣ Net Benefit is -\$10 billion, and b-c ratio is 0.23 under base scenario favorable to tunnels.
- Water Agencies’ Business Case Changes EIR/EIS Baseline to Increase Water Supply Benefit.
 - ▣ Invalid For Benefit-Cost: No Accompanying Environmental Analysis
 - ▣ Scientists can improve policy discussion by evaluating WaterFix environmental effects relative to this alternative baseline