BDCP
Bay Delta Conservation Plan

BDCP Appendix 9.A, Economic Benefits of Take Alternatives

May 2013

The Bay Delta Conservation Plan (BDCP) is expected to result in benefits to water users through increased water supply reliability, improved water quality, and reduced seismic risks to the Sacramento-San Joaquin Delta (Delta) water supplies. BDCP Appendix 9.A assesses these economic benefits of the BDCP and the take alternatives.

Chapter 9, Alternatives to Take, identifies and analyzes a range of take alternatives that would cause different levels of take of, and different levels of conservation benefit to, covered fish and wildlife species from BDCP implementation. BDCP Appendix 9.A is a detailed analysis of the direct economic benefits to the state's urban and agricultural water agencies receiving water supplies from the Central Valley Project (CVP) and the State Water Project (SWP). These agencies, called the state and federal water contractors, will be paying for the construction and operation of the new water conveyance facility. To make this investment economically feasible, the economic benefits of the facility must exceed the costs. Appendix 9.A evaluates these costs and economic benefits. This information is used in Chapter 9 to evaluate the cost practicability of each take alternative.

The BDCP will be implemented over 50 years, and many important factors such as the underlying demand for water and the nature of environmental regulations in the Delta will continue to evolve. Nonetheless, two conclusions emerge from Appendix 9.A:

1. **As proposed, the BDCP will result in substantial economic benefits to the urban and agricultural water agencies** that rely on the Delta for at least a portion of their water supplies.
2. **Implementing the BDCP will help reduce a range of risks that are of great consequence to the public,** including uncertainty pertaining to water supplies, vulnerability to earthquakes in the Delta region that can disrupt water exports, and restrictions on Delta water exports as a result of future sea level rise and other effects of climate change.

Summary of BDCP Benefits

The costs and economic benefits of the BDCP and the various take alternatives described below are calculated using the following common assumptions:

- Construction begins in 2015 and lasts 10 years
- BDCP operations begin in 2025 and extend out to 2075 to include a 50-year operating period
- All values are in 2012 dollars (millions), and are discounted to present value using a 3 percent real discount rate

The table below summarizes the economic benefits and costs to the state's urban and agricultural water agencies receiving water supplies from the CVP and SWP under each take alternative. Economic benefits are calculated in comparison to "Existing Conveyance," without BDCP, for High and Low Outflow Scenarios (see box at right for explanation). As a result, some benefits are negative, meaning it would be worse to implement the alternative than to do nothing.

As is standard in welfare economics, Appendix 9.A compares economic outcomes of the BDCP proposed action to the conditions assuming the BDCP is not implemented. For the purposes of this analysis, "Existing Conveyance" represents the existing water delivery infrastructure without BDCP. The Existing Conveyance High-Outflow Scenario is the basis for comparison with the BDCP proposed action high-outflow scenario and each of the take alternatives. Similarly, the Existing Conveyance Low-Outflow Scenario is the basis for comparison with the BDCP proposed action low-outflow scenario.

Alternative or Scenario Description			Total Economic Benefits and Costs		
Alternative or Scenario	Facility Size (cfs)	Deliveries [1] (MAF)	Total Benefits	Total Costs	Net Benefits
BDCP proposed action high-outflow scenario (HOS)	9,000	4.705	$18,011	$13,328	$4,684
BDCP proposed action low-outflow scenario (LOS)	9,000	5.591	$18,795	$13,343	$5,452
A: W Canal 15,000 cfs	15,000	5.009	$23,820	$10,789	$13,030
B: Tunnels 6,000 cfs	6,000	4.487	$14,967	$12,123	$2,844
C: Tunnels 15,000 cfs	15,000	5.009	$23,820	$15,381	$8,438
D: Tunnels: 3,000 cfs	3,000	4.188	$8,918	$10,039	-$1,121
E: Isolated 15,000 cfs	15,000	3.399	-$7,531	$15,436	-$22,967
F: Through-Delta	15,000 [2]	4.172	$9,301	$4,887	$4,415
G: Less Tidal Restoration	9,000	4.705	$18,011	$13,146	$4,865
H: More Restoration	9,000	4.705	$18,011	$13,219	$4,792
I: More Spring Outflow	9,000	4.338	$13,508	$13,182	$326
Existing Conveyance High-Outflow Scenario	N/A	3.446			
Existing Conveyance Low-Outflow Scenario	N/A	3.889			

Notes:

[1] Total average annual water deliveries

[2] Two 7,500 cfs intakes would be constructed: one each at the Delta Cross Channel and Georgia Slough in the South Delta

cfs = cubic feet per second MAF = million acre-feet

Chapter 9 High-Outflow and Low-Outflow Scenarios

Existing Conveyance with High-Outflow and Low-Outflow Scenarios were used to provide a reasonable comparison point for the cost practicability analysis. In both scenarios, existing conveyance is assumed in the future.

High-Outflow Scenario

Assumes

- Operations of existing south Delta water conveyance facilities
- Fall X2 and enhanced spring outflow
- South Delta operating restriction (Scenario 6)
- Implementation of some floodplain restoration in the Yolo Bypass
- Installation of one non-physical barrier

Low-Outflow Scenario

Assumes costs similar to the high-outflow scenario, but without fall X2 and additional spring outflow.

The BDCP will reduce risks to statewide water supplies by addressing uncertainty associated with water deliveries, vulnerability of the water supplies to earthquakes in the Delta region, and restrictions on Delta water exports as a result of future sea level rise and other effects of climate change. The associated benefits of reducing each of these risks are outlined in the following tables.

Water Supply Benefits

Several take alternatives analyzed in Chapter 9 would result in significant net benefits to the agencies participating in the development of the BDCP due to the value of increased water supply reliability. **The expected present value benefits to urban water supply are $15.7 billion for the BDCP under the high-outflow scenario and $15.9 billion for the BDCP under the low-outflow scenario.**

Expected Present Value Benefits of Water Supply Reliability (millions)

Take Alternative	Facility Size (cfs)	Deliveries [1] (MAF)	Total Water Supply Benefits
BDCP proposed action high-outflow scenario (HOS)	9,000	4.705	$15,722
BDCP proposed action low-outflow scenario (LOS)	9,000	5.591	$16,642
A: W Canal 15,000 cfs	15,000	5.009	$21,305
B: Tunnels 6,000 cfs	6,000	4.487	$13,130
C: Tunnels 15,000 cfs	15,000	5.009	$21,305
D: Tunnels: 3,000 cfs	3,000	4.188	$7,799
E: Isolated 15,000 cfs	15,000	3.399	-$11,937
F: Through-Delta	15,000 [2]	4.172	$9,363
G: Less Tidal Restoration	9,000	4.705	$15,722
H: More Restoration	9,000	4.705	$15,722
I: More Spring Outflow	9,000	4.338	$11,128

Notes:

[1] Total average annual water deliveries
[2] Two 7,500 cfs intakes would be constructed: one each at the Delta Cross Channel and Georgia Slough in the South Delta

cfs = cubic feet per second MAF = million acre-feet

Water Quality Benefits

By diverting more water directly from the Sacramento River, the BDCP will reduce salinity levels and improve the quality of Delta water exports. **The improved water quality benefits to urban and agricultural users attributed to reduced salinity has a present value of roughly $1.8 billion under the BDCP proposed action high-outflow and low-outflow scenarios.**

Expected Present Value Benefits of Water Quality Improvements (millions)

Take Alternative	Facility Size (cfs)	Deliveries [1] (MAF)	Total Water Quality Benefits
BDCP proposed action high-outflow scenario (HOS)	9,000	4.705	$1,819
BDCP proposed action low-outflow scenario (LOS)	9,000	5.591	$1,789
A: W Canal 15,000 cfs	15,000	5.009	$1,952
B: Tunnels 6,000 cfs	6,000	4.487	$1,524
C: Tunnels 15,000 cfs	15,000	5.009	$1,952
D: Tunnels: 3,000 cfs	3,000	4.188	$1,063
E: Isolated 15,000 cfs	15,000	3.399	$3,741
F: Through-Delta	15,000 [2]	4.172	$0
G: Less Tidal Restoration	9,000	4.705	$1,819
H: More Restoration	9,000	4.705	$1,819
I: More Spring Outflow	9,000	4.338	$1,910

Notes:

[1] Total average annual water deliveries
[2] Two 7,500 cfs intakes would be constructed: one each at the Delta Cross Channel and Georgia Slough in the South Delta

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Benefit of Reduced Seismic Risk

An important benefit of an isolated conveyance facility is that it reduces the vulnerability of the water export system to expected seismic events in the Delta region. As presently configured, large earthquakes in and around the Delta region may cause numerous levees to fail and flood some islands. When these islands flood, sea water will be pulled into the Delta, rendering its waters unusable for export purposes for some period of time. During this outage period, no SWP or CVP deliveries can be made, resulting in a potential shortage to consumers throughout the Bay Area, San Joaquin Valley, Central Coast, and Southern California.

The expected welfare benefits of reduced seismic risks to urban and agricultural agencies would be $0.5 billion under the BDCP high-outflow scenario and $0.6 billion under the BDCP low-outflow scenario.

Expected Present Value Benefits of Reduced Seismic Risk (millions)

Take Alternative	Facility Size (cfs)	Deliveries [1] (MAF)	Benefits of Reduced Seismic Risk
BDCP proposed action high-outflow scenario (HOS)	9,000	4.705	$470
BDCP proposed action low-outflow scenario (LOS)	9,000	5.591	$364
A: W Canal 15,000 cfs	15,000	5.009	$563
B: Tunnels 6,000 cfsf	6,000	4.487	$313
C: Tunnels 15,000 cfs	15,000	5.009	$563
D: Tunnels: 3,000 cfs	3,000	4.188	$55
E: Isolated 15,000 cfs	15,000	3.399	$665
F: Through-Delta	15,000 [2]	4.172	-$62
G: Less Tidal Restoration	9,000	4.705	$470
H: More Restoration	9,000	4.705	$470
I: More Spring Outflow	9,000	4.338	$470

Notes:

[1] Total average annual water deliveries
[2] Two 7,500 cfs intakes would be constructed: one each at the Delta Cross Channel and Georgia Slough in the South Delta

cfs = cubic feet per second MAF = million acre-feet