Building Block Evaluation Summary

Type	Building Block		Option		Risk Reduction Benefits (2005 Conditions)				2005 Conditions Overall Risk Reduction[6]	Cost to Implement[5]
					Levee Failure[1]	Consequences Given Levee Failure				
						In-Delta[2]	Ecosystem[3]	Economic[4]		
Conveyance/ Flood Risk Reduction	1.1	Improved Delta Levee Maintenance	a.	Levee Subvention increased to ~$12 million/year	Low	None	None	None	Low	Low
			b.	Levee Subvention increased to ~$25 million/year	Low	None	None	None	Low	Low
	1.2	Upgraded Delta Levees	a.	Central Delta Levees (~500 miles) upgraded to HMP	None	None	None	None	None	None
			b.	Central Delta Levees (~500 miles) upgraded to PL 84-99	Moderate	None	None	None	Moderate	High
			c.	Central Delta Levees (~500 miles) upgraded to UPL	Moderate	None	None	None	Moderate	Very High
			d.	Seismically Upgrade Southern Delta Islands	High	None	None	None	High	Very High
	1.3	Enhanced Emergency Preparedness/ Response	a.	Spend ~$50 million for pre-positioning rock, etc.	None	Moderate	Low	Moderate	Moderate	Low
			b.	Spend ~$100 million for pre-positioning rock, etc.	None	Moderate	Low	High	High	Low
	1.4	Pre-Flooding of Selected Islands	a.	Southern Islands	Low	Low	Moderate	High	Moderate	Moderate
	1.5	Land Use Changes to Reduce Subsidence	a.	Change land use to wetlands/ carbon sequestration	None	Low	None	None	Low	Moderate
	1.6	Armored Pathway Through Delta	a.	Upgraded levees along pathway; dredging	High	None	None	Very High	Very High	Very High
	1.7	Isolated Conveyance Facility Alternatives	a.	Dual conveyance Peripheral Canal (5,000 cfs capacity)	None	None	None	Very High	Very High	High
			b.	Intermediate Peripheral Canal (10,000 cfs capacity)	None	None	None	Very High	Very High	High
			c.	Full Peripheral Canal (15,000 cfs capacity)	None	None	None	Very High	Very High	Very High
	1.8	San Joaquin Bypass	a.	San Joaquin River Detention and Bypass	Moderate	None	None	None	Low	Moderate
			b.	San Joaquin River Widening	Moderate	None	None	None	Low	Moderate
Infrastruc-ture Risk Reduction	2.1	Raise State Highways		Place SR 4, SR 12, and SR 160 on piers	None	None	None	Moderate	Low	Very High
	2.2	Armored Infrastructure Corridor		Construct armored infrastructure corridor	High	None	None	Moderate	Moderate	High
Environ-mental Risk Mitigation	3.1	Suisun Marsh Tidal Wetland Restoration			Low	Low	Moderate	None	Low	Low
	3.2	Tidal Marsh Cache Slough Restoration		Maximum options	None	Low	High	None	Low	Moderate
	3.3	Install Fish Screens	a.	Delta Cross Channel	None	None	None	Moderate	Moderate	Low
			b.	Clifton Court Intake	None	None	None	None	None	Low
			c.	Tracy Pumping Plant	None	None	None	None	None	Low
			d.	River diversions	None	None	None	None	None	Low
	3.4	Setback Levee to Restore Shaded Riverine Habitat	a.	10 miles	High	None	None	None	Low	Moderate
			b.	20 miles	High	None	None	None	Low	Moderate
			c.	50 miles	High	None	None	None	Low	High
	3.6	Reduce Water Exports from the Delta	a.	10 percent	None	None	Low	None[7]	Low	Moderate[8]
			b.	25 percent	None	None	Moderate	None[7]	Moderate	High[8]
			c.	40 percent	None	None	Moderate	None[7]	Moderate	Very High[8]

Levee Failure: [1]		**In-Delta**[2]		**Ecosystem**[3]	**Economic**[4]		**Capital Cost:** [5]	
None	No benefit	None	No benefit	None	None	No benefit	Low	< $500M
Low	< Factor of 1.5 (but > 1.0)	Low	< $500M (but some benefit)	Low	Low	< $500M	Moderate	$500M – $2B
Moderate	1.5 < Factor < 5	Moderate	$500M – $2B	Moderate	Moderate	$500M – $2B	High	$2B – $4B
High	> Factor of 5	High	$2B – $4B	High	High	$2B – $4B	Very High	> $4B
Estimate reduction in the frequency of levee failure for those islands that are upgraded.		Very High	> $4B	Subjective measure of the benefit of the building block.	Very High	> $4B	Capital cost to construct or implement building block.	
		Maximum possible reduction in consequences in the event levee failures occur.			Maximum possible reduction in the event levee failures occur.			

[6] Estimate of the possible contribution of the building block to the reduction in the overall Delta and statewide risk (levee failure, economic, ecosystem, etc.). For example, the benefit of upgrading certain levees might be rated high (because there is a significant reduction in the frequency of failure of those levees that are upgraded); however, the effect of an upgrade to a limited number of levees might be low when viewed in the context of the entire Delta risk.

[7] Further analyses are needed; economic risk may be reduced or increased.

[8] Further analyses are needed.

Scenario Evaluation Summary

Scenario		Building Blocks Included		Risk Reduction Benefits (2005 Conditions)				2005 Conditions Overall Risk Reduction[6]	Cost to Implement[5]
				Levee Failure[1]	Consequences Given Levee Failure				
					In-Delta[2]	Ecosystem[3]	Economic[4]		
1	**Levee Improvements**	1.1	Improved Delta Levee Maintenance	**Low**	**Moderate**	**Low** **(The most important feature of several items is to provide broad ecosystem benefits)**	**High**	**High**	**$20.0B**
		1.2b	Upgraded Delta Levees to PL 84-99						
		1.2d	Upgraded Delta Levees to Seismic Resistant (Southern)						
		1.3	Enhanced Emergency Preparedness/Response						
		1.5	Land Use Changes to Reduce Island Subsidence						
		2.1	Raise SR 12 & 160; Place on Piers (similar to I-80 across Yolo Bypass)						
		2.2	Construct Armored Infrastructure Corridor Across Central Delta						
		3.1	Suisun Marsh Tidal Wetland Restoration						
		3.2	Tidal Marsh Cache Slough Restoration						
		3.3	Fish Screens at DCC, Tracy PS, Banks PS, and Agricultural River Diversions						
		3.4	Setback Levees to Restore Shaded Riverine Habitat (20 miles)						
2	**Armored Pathway**	1.1	Improved Delta Levee Maintenance	**Low**	**Moderate**	**Low** **(The most important feature of several items is to provide broad ecosystem benefits)**	**Very High**	**Very High**	**$32.4B**
		1.2	Upgraded Delta Levees to Urban Levees						
		1.3	Enhanced Emergency Preparedness/Response						
		1.5	Land Use Changes to Reduce Island Subsidence						
		1.6	Armored Pathway (15,000 cfs)						
		2.1	Raise SR 12 & 160 and Place on Piers (similar to I-80 across Yolo Bypass)						
		2.2	Construct Armored Infrastructure Corridor Across Central Delta						
		3.1	Suisun Marsh Tidal Wetland Restoration						
		3.2	Tidal Marsh Cache Slough Restoration						
		3.3	Fish Screens at Armored Pathway, DCC, Tracy, Banks and Agricultural River Diversions						
3	**Isolated Conveyance Facility**	1.1	Improved Delta Levee Maintenance	**Low**	**Moderate**	**Low** **(The most important feature of several items is to provide broad ecosystem benefits)**	**Very High**	**Very High**	**$25.8B**
		1.2	Upgraded Delta Levees to Urban Levees						
		1.3	Enhanced Emergency Preparedness/Response						
		1.5	Land Use Changes to Reduce Island Subsidence						
		1.7	Isolated Conveyance Facility (15,000 cfs)						
		2.1	Raise SR 4, 12 & 160; Place on Piers (similar to I-80 across Yolo Bypass)						
		3.1	Suisun Marsh Tidal Wetland Restoration						
		3.2	Tidal Marsh Cache Slough Restoration						
		3.3	Fish Screens at Peripheral Canal, DCC and Agricultural River Diversions						
		3.4	Setback Levees to Restore Shaded Riverine Habitat (20 miles)						

[1] Levee Failure:		[2] In-Delta		[3] Ecosystem	[4] Economic		[5] Capital Cost:
None	No benefit	None	No benefit	None	None	No benefit	Preliminary estimate is reported. Capital cost to construct or implement building block.
Low	< Factor of 1.5 (but >1.0)	Low	< $2B	Low	Low	< $2B	
Moderate	1.5 < Factor < 5	Moderate	$2B – $10B	Moderate	Moderate	$2B – $10B	
High	> Factor of 5	High	$10B – $20B	High	High	$10B – $20B	
Estimate reduction in the frequency of levee failure for those islands that are upgraded.		Very High	> $20B		Very High	> $20B	
		Maximum possible reduction in consequence given levee failure occurs			Maximum possible reduction in the event levee failures occur.		

[6] Estimate of the possible contribution of the building block to the reduction in the overall Delta and statewide risk (levee failure, economic, ecosystem, etc.). For example, the benefit of upgrading certain levees might be rated high (because there is a significant reduction in the frequency of failure of those levees that are upgraded); however, the effect of an upgrade to a limited number of levees might be low when viewed in the context of the entire Delta risk.