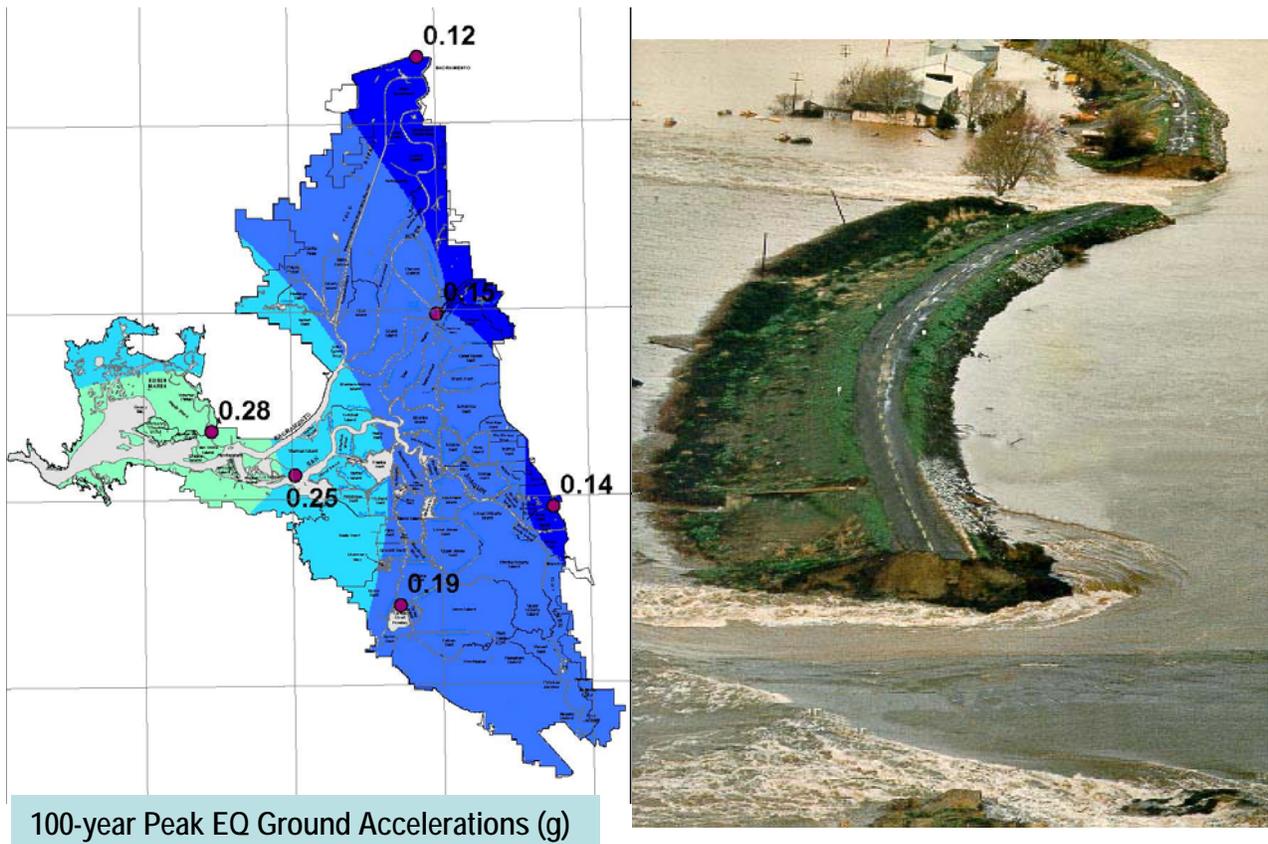


State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

DELTA RISK MANAGEMENT STRATEGY PROPOSALS

Potential Building Blocks and Scenarios for consideration in Phase 2: Evaluation of Risk Reduction Strategies



Discussion Document
DRAFT No. 2
May 15, 2007

DELTA RISK MANAGEMENT STRATEGY – Phase 2: Evaluation of Risk Reduction Strategies
Potential Building Blocks and Scenarios **DRAFT No. 2 – May 15, 2007**

Introduction

The purpose of this discussion document is to set forth potential building blocks or scenarios that would be used in potential risk reduction evaluations in the Phase 2 portion of the Delta Risk Management Strategy. The Phase 1 portion of the Delta Risk Management Strategy has been devoted to establishing a risk model to better quantify risks and potential impacts to different beneficiaries as a result of future levee failures in the Sacramento-San Joaquin Delta. The risk model has now been developed in preliminary form and an administrative draft of the Phase 1 report has been completed and is now under internal DWR review.

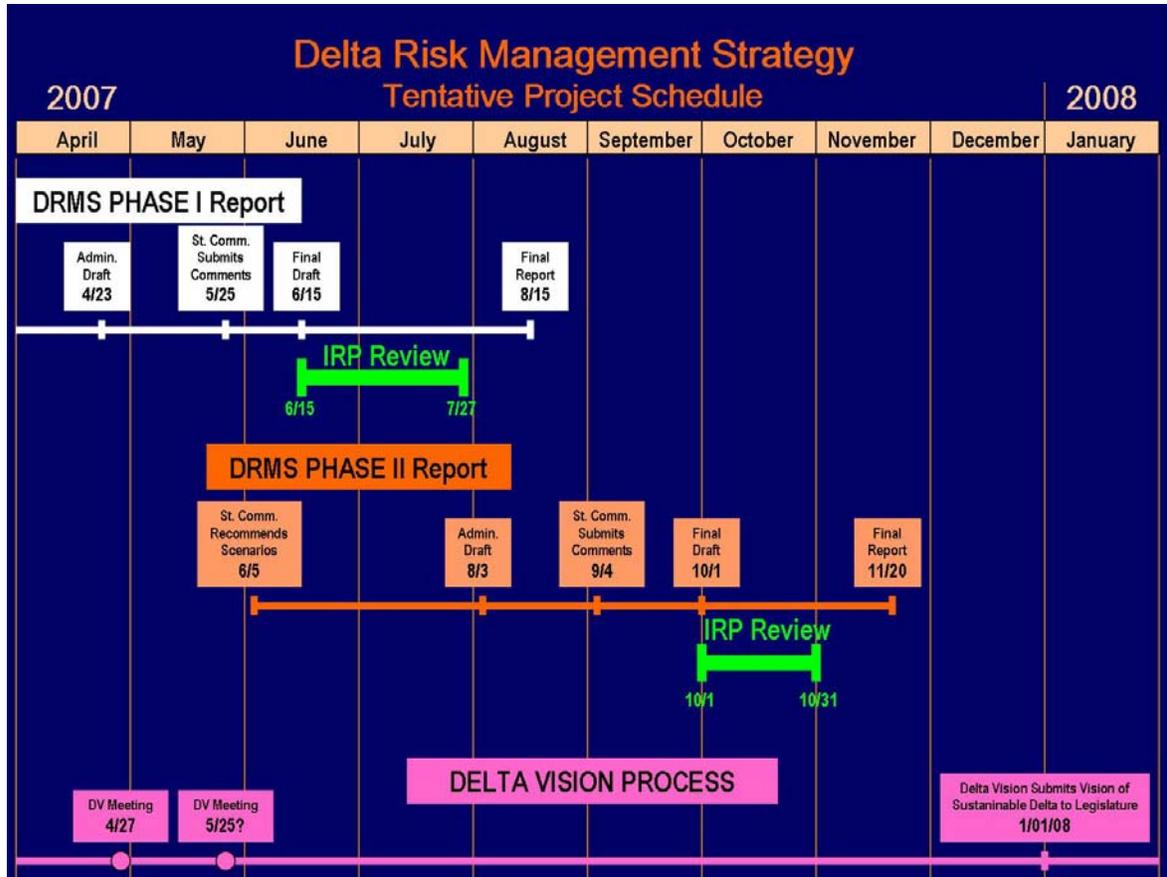
The Phase 2 portion is arguably the more important portion of this study. Using the developed risk model, different risk reduction building blocks scenarios can be considered and evaluated. However, only a certain number of building blocks and scenarios can be evaluated in the schedule needed by other Delta initiatives (e.g. Delta Vision Blue Ribbon Task Force).

Schedule for Completion of Delta Risk Management Strategy

The tentative schedule for completing the Delta Risk Management Strategy is as follows:

Task 1:	Complete Internal Review of Phase 1 Report/Studies	05/25/07
Task 2:	Identify Building Blocks and Scenarios for Phase 2 Studies	06/05/07
Task 3:	Complete Public/IRP Review, revise Risk model, and finalize Phase 1 Report/Studies	08/15/07
Task 4:	Run Phase 2 evaluations of risk reduction building blocks And scenarios, complete Administrative Draft of Phase 2 Report	08/03/07
Task 5:	Complete Internal/Public/IRP Review, rerun evaluations of risk reduction building blocks, and scenarios, and complete final version of Phase 2 Report./Studies	11/20/07

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Definitions

The following terms are proposed for use in the Phase 2 evaluations:

“building block” - This is a single risk reduction element that addresses only one type of action that would reduce the risk of levee failures, or that would mitigate the impacts of levee failures. Examples of **“building blocks”** include levee upgrades, emergency response preparations, specific facilities (e.g. Peripheral Canal), or environmental mitigation projects.

“scenario” - This is a compilation of **“building blocks”** that would be orientated towards a specific focus in reducing risk. A **“scenario”** is not intended to represent an alternative for the future of the Delta. Rather, it would be included in the risk evaluation to simply provide information on the level of risk reduction that might be possible, and the associated costs for such benefits.

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Proposed “Building Blocks” to be Evaluated in Phase 2

Shown below are the “*building blocks*” that are proposed to be evaluated at a high level in the Phase 2 evaluations. Each evaluation of a “*building block*” is intended to be a simple parametric study examining the effect of the “*building block*” risk reduction measure. For most of these evaluations, two to four versions/sizes of the “*building block*” would be evaluated.

I. Conveyance/Flood Risk Reduction “Building Blocks”

1. Improved Delta Levee/Suisun Marsh Maintenance
 - Delta Levee Subventions and Suisun Marsh maintenance increased to 2 x current level (~\$12 million/year)
 - Delta Levee Subventions/Suisun Marsh maintenance increased to 4 x current level) (~\$25 million/year)
2. Upgraded Delta Levees
 - All Central Delta Levees (~500 miles) upgraded to HMP
 - All Central Delta Levees (~500 miles) upgraded to PL84-99
 - All Central Delta Levees (~500 miles) upgraded to Urban Project Levees
 - Selected Delta islands (say Sherman, Twitchell, Brannan, Bradford, Webb, Jersey, and Bethel) have their Delta levees upgraded/replaced with seismically resistant levees (say 300-year earthquake)
3. Enhanced Emergency Preparedness/Response
 - Spend ~\$50 million for pre-positioning rock, sheetpiles, etc...
 - Spend ~\$100 million for pre-positioning rock, sheetpiles, etc...
4. Pre-flooding of Selected Western Islands (say Sherman, Twitchell, Brannan, Bradford, Webb, and Jersey)
5. Land Use Changes to Reduce Island Subsidence
 - Change land use from farming to wetlands/carbon seq.(rice growing, fish food farm, etc.) for all islands projected to have more than 3 feet of additional subsidence by 2100
6. Armored “Pathway” Through Delta Conveyance (modified PPIC “Armored Island” Concept)
 - Upgraded levees along “Pathway” (say to at least Urban Project levees)
 - Channel operable barriers (say Obermeyer Gates)
 - Channel dredging

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7. Isolated Conveyance Alternatives

- Dual isolated conveyance (say 5,000 cfs capacity)
- Intermediate Isolated conveyance (say 10,000 cfs capacity)
- Full isolated conveyance (16,000 cfs? capacity)

I. Conveyance/Flood Risk Reduction “Building Blocks” (continued)

8. Alternative Conveyance (will expand to agree with BDCP “bundle”)

- Dual isolated conveyance (say 5,000 cfs capacity)
- Intermediate Isolated conveyance (say 10,000 cfs capacity)
- Full isolated conveyance (16,000 cfs? capacity)

II. Infrastructure Risk Reduction “Building Blocks”

1. Raise State Highways and Place on Piers (similar to I-80 across Yolo Bypass)

- Highway 4
- Highway 12
- Highway 160

2. Construct Armored Infrastructure Corridor Across Central Delta – include:

- Mokelumne Aqueduct
- Burlington-Northern Santa Fe Rail Line
- Highway 4
- Natural Gas Pipelines
- Protect selected water/waste water treatment plants

III. Environmental Risk Mitigation “Building Blocks”

1. Breach dikes in Suisun Marsh

2. Cache Slough Restoration

3. Fish Screens:

- Delta Cross Channel
- Clifton Court Intake
- Tracy Pumping Plant
- River diversions

4. Set back levees to Restore Shaded Riverine Habitat

- 10 miles

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- 20 miles
 - 50 miles
5. Reduced Water Exports
- 10 percent
 - 25 percent
 - 40 percent

Each evaluation of a **“building block”** would include a cost estimate for implementing each version of the **“building block,”** an evaluation of the risk reduction gained, the associated benefits with the reduced risk, and identification of costs/impacts induced in other areas (e.g. pre-flooding of an island may result in impacted water quality, loss in recreation, higher maintenance in neighboring islands, etc...).

Proposed “Scenarios” to be Evaluated in Phase 2

Shown below are the **“scenarios”** that are proposed to be evaluated in the Phase 2 evaluations. Unlike the high level evaluations of the **“building blocks”**, the evaluations of the **“scenarios”** will include full runs of the risk model, along with calculations of risk reduction, associated benefits, identification of costs/impacts induced in other areas. It is recognized that the “scenarios” listed below will need further discussion and development. There is nothing particularly sacred about them, and some may be dropped in favor of better ones.

I. “Improved Levees” Scenario

- Improve Delta levee maintenance (to ~\$12 million/year for Delta Levee Subventions)
- Upgrade central Delta levees (~500 miles) to PL84-99
- Add \$50 million in improved emergency response capability
- Change land use from farming to wetlands/carbon seq. for all islands projected to have more than 3 feet of additional subsidence by 2100
- Raise State Highways 12 and 160 and place on Piers (similar to I-80 across Yolo Bypass)
- Construct Armored Infrastructure Corridor Across Central Delta – include:
 - Mokelumne Aqueduct
 - Burlington-Northern Santa Fe Rail Line
 - Highway 4
 - Natural Gas Pipelines
- Breach dikes in Suisun Marsh

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- Cache Slough Restoration
- Fish Screens:
 - Delta Cross Channel
 - Clifton Court Intake
 - Tracy Pumping Plant
 - River diversions
- Set back 10 miles of levees to Restore Shaded Riverine Habitat

II. “Armored Pathway” Through Delta Conveyance Scenario (modification of PPIC Armored Island)

- Improve Delta levee maintenance (to ~\$12 million/year for Delta Levee Subventions)
- Upgrade remaining central Delta levees to HMP Standard
- Add \$50 million in improved emergency response capability
- Change land use from farming to wetlands/carbon seq. for all islands projected to have more than 3 feet of additional subsidence by 2100.
- Upgraded levees along “Pathway” (say to at least Urban Project levees, or to 300-year earthquake protection)
- Channel operable barriers (say Obermeyer Gates)
- Channel dredging
- Raise State Highways 12 and 160 and place on Piers (similar to I-80 across Yolo Bypass)
- Construct Armored Infrastructure Corridor Across Central Delta – include:
 - Mokelumne Aqueduct
 - Burlington-Northern Santa Fe Rail Line
 - Highway 4
 - Natural Gas Pipelines
- Breach dikes in Suisun Marsh
- Cache Slough Restoration
- Fish Screens:
 - Delta Cross Channel
 - Clifton Court Intake
 - Tracy Pumping Plant
 - River diversions
- Set back 10 miles of levees to Restore Shaded Riverine Habitat (may be part of Pathway armoring)

III. Isolated Conveyance Scenario (modification of PPIC Peripheral Canal Plus)

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- Improve Delta levee maintenance (to ~\$12 million/year for Delta Levee Subventions)
- Upgrade central Delta levees to HMP
- Add \$50 million in improved emergency response capability
- Change land use from farming to wetlands/carbon seq. for all islands projected to have more than 3 feet of additional subsidence by 2100
- Construct full capacity isolated conveyance (16,000 cfs Capacity)
- Raise State Highways 4, 12 and 160 and place on Piers (similar to I-80 across Yolo Bypass)
- Breach dikes in Suisun Marsh
- Cache Slough Restoration
- Fish Screens:
 - River diversions
- Set back 10 miles of levees to Restore Shaded Riverine Habitat