

In-Delta Storage Program
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Economic Study Overview

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Presentation Outline

- Types of Economic Analyses
- Local Area Impacts
 - Agricultural Production
 - Recreation
 - Operations and Maintenance
- Statewide and Local Benefits Analysis
 - Urban
 - Agricultural
 - Environmental
 - Recreation
 - Levee Maintenance
 - Flood Protection
- Project Cost

Types of Economic Analyses

3

Types of Economic Analyses

- Impact Analysis
 - Who is affected is important
 - Jobs
 - Income
 - Local government revenues
 - Multiplier (i.e., “ripple”) effects are counted
- Benefit-Cost Analysis
 - Only total costs and total benefits are important, not to whom they accrue
 - Multiplier effects from benefits are assumed to balance out with those from costs
- Financial Analysis

4

Financial vs. Economic Benefit-Cost Analysis

5

Financial vs. Economic Benefit-Cost Analysis

- Financial Analysis – Will the Beneficiaries be Financially Better Off Based on What They Will be Obligated to Pay?
- Economic Benefit-Cost Analysis - Will the Project Have a Net Positive Social Value for Californians Irrespective of to Whom the Costs and Benefits Accrue?

Characteristic	Financial Analysis	Economic B-C Analysis
Analysis Period	Bond repayment period	Life of the project
Dollars	Inflation and escalation	Escalation only
Discounting	Bond rate of interest	Alternative social investment cost
Values	Direct market	Direct and indirect, market and non-market

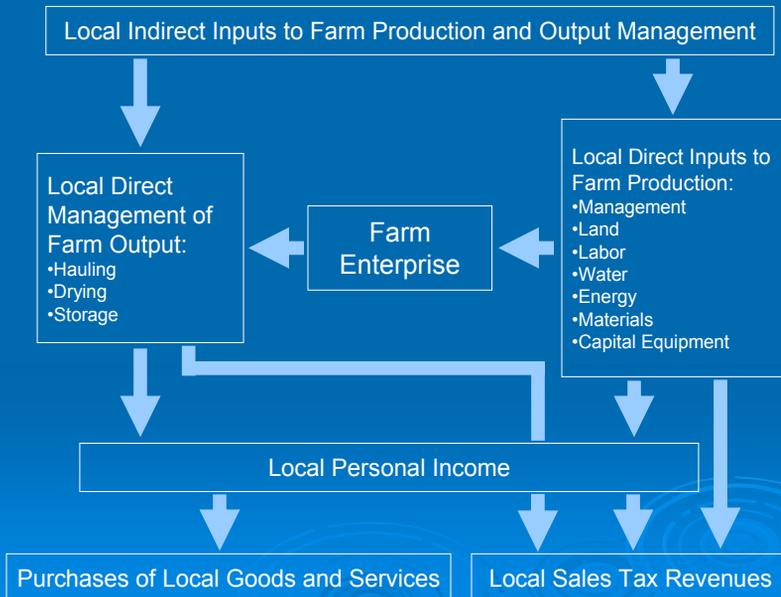
6

Local Impact Analyses

San Joaquin and Contra Costa Counties

7

Local Impact Analysis with IMPLAN



8

Local Employment and Income Effects of Changes in Agricultural Production

Crops	Net Change						
	Acres					Income (\$1,000)	Jobs (FTE)
	Webb	Holland	Bouldin	Bacon	Total		
Harvested							
Alfalfa		935	1,925		2,860	\$4,219	214
Corn (field)	-3,250		-3,200	-2,200	-8,650	-\$4,393	-181
Safflower		170		-800	-630	-\$313	-13
Small grains	-900		-1,600	-500	-3,000	-\$1,025	-47
Sunflowers				-1,200	-1,200	-\$514	-22
Tomatoes (Fresh)			-150		-150	-\$832	-25
Pasture		-2,500			-2,500	-\$320	-17
Unharvested							
Corn		106	339		445	\$179	7
Small Grains		595	1,225		1,820	\$470	22
Total	-4,150	-694	-1,461	-4,700	-11,005	-\$2,529	-61

9

Summary Local Employment and Income Effects

Effect Category	Income (\$1,000)	Employment (FTE)
Agricultural Production	-\$2,529	-61
Current Levee Maintenance	-\$760	-19
Recreation	\$901	35
Operations and Maintenance	\$5,747	128
Net Effect	\$3,359	83

10

Summary Local Sales Tax Income Effect

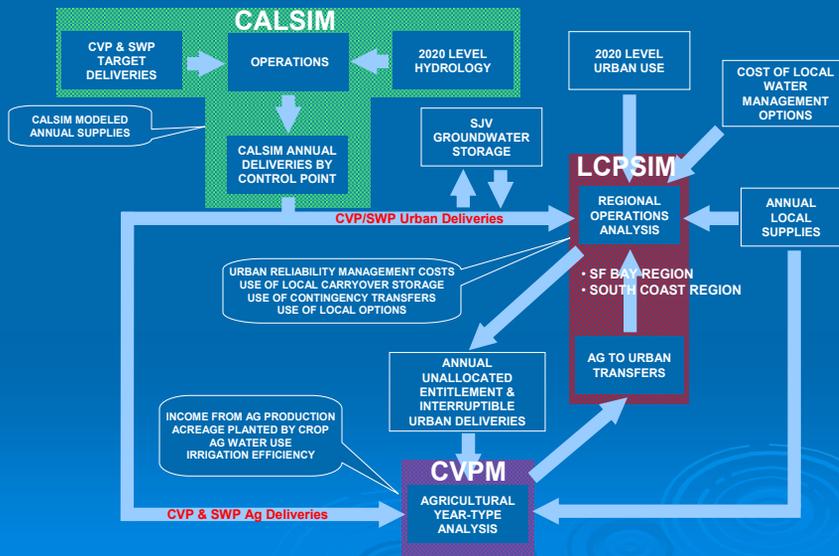
Effect Category	Tax Income (\$1,000)
Agricultural Production	-\$4
Current Levee Maintenance	-\$2
Recreation	\$7
Operations and Maintenance	\$9
Net Effect	\$11

11

Economic Benefits Analysis

12

Project Delivery Area Analysis Framework



13

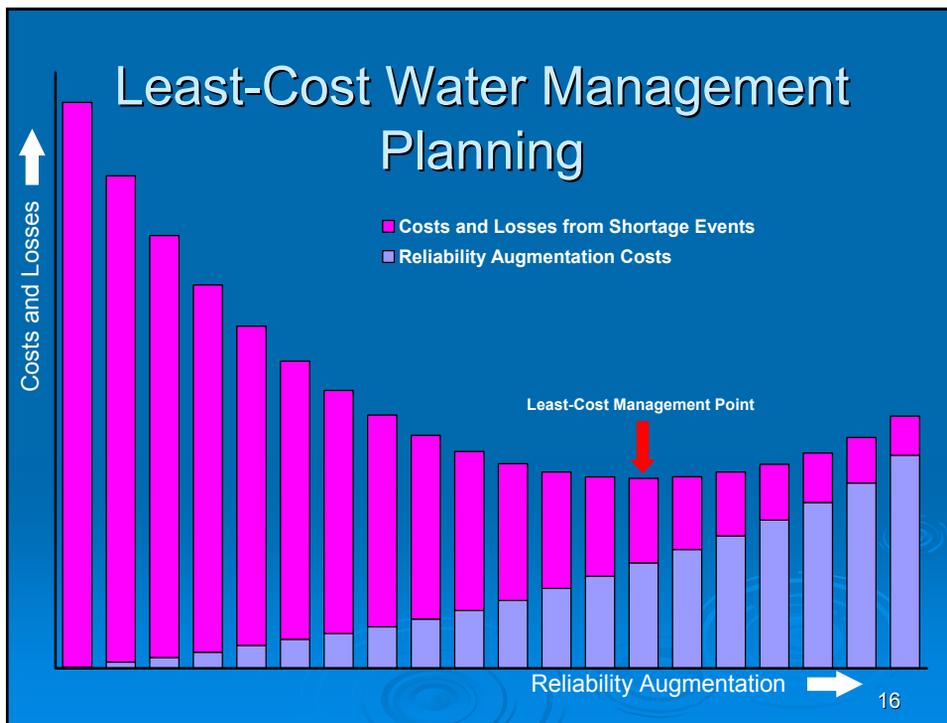
Least-Cost Water Management Planning for Urban Reliability Benefits Analysis

14

Least-Cost Water Management Planning

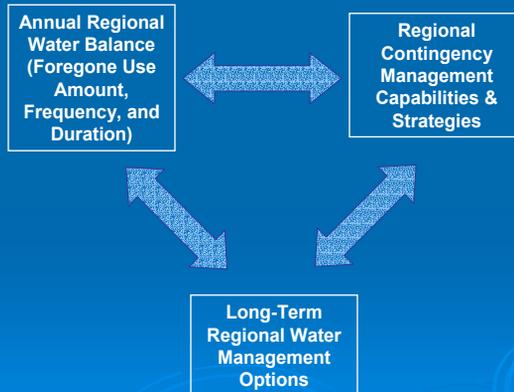
- Accounts for both types of water management costs
 - Cost of shortage events
 - Cost of reliability management
- Considers all reliability management options, including shortage contingency actions
 - Supply augmentation
 - Recycling, etc.
 - Contingency water transfers, etc.
 - Use reduction
 - Leak detection, etc.
 - Contingency conservation programs, etc.
- Selects that level of reliability which minimizes the expected cost of unreliability plus the cost of reliability management

15



Least-Cost Water Management Planning

Economic and Hydrologic Interrelationships



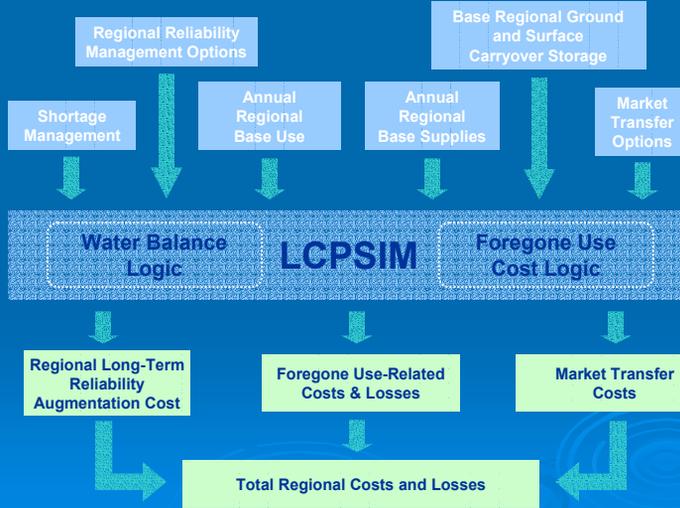
17

Least-Cost Urban Water Management Planning with LCPSIM

18

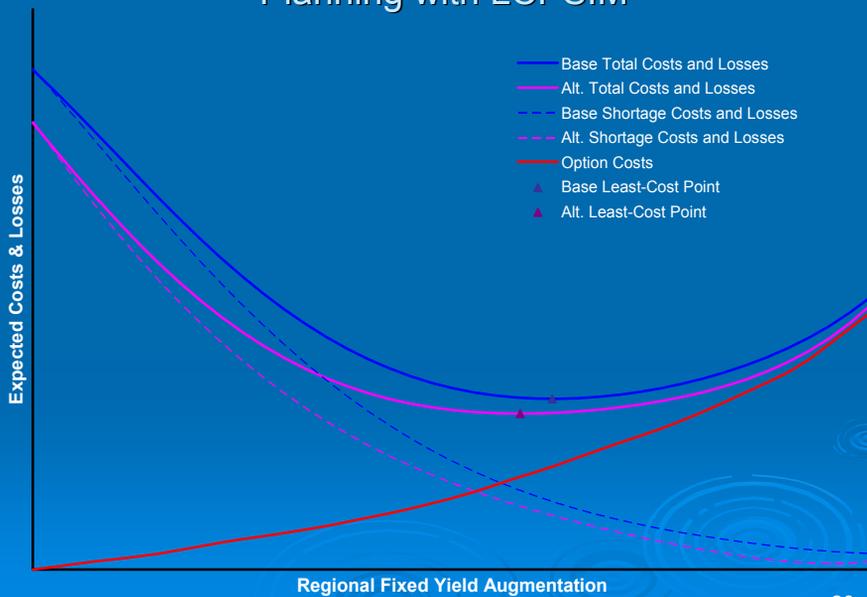
Least-Cost Urban Water Management Planning with LCPSIM

Primary Least-Cost Planning Simulation Model Elements



19

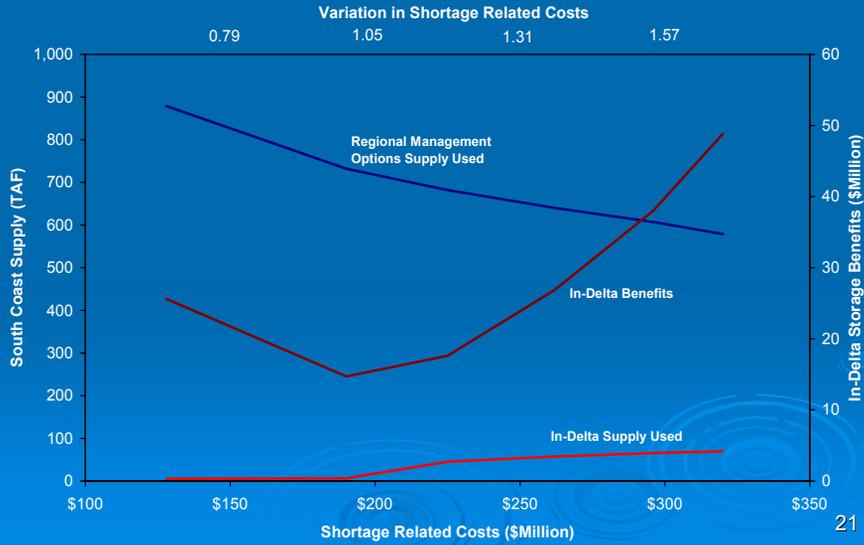
Least-Cost Urban Water Management Planning with LCPSIM



20

Least-Cost Urban Water Management Planning with LCPSIM

Sensitivity to Regional Options Costs



21

Least-Cost Urban Water Management Planning with LCPSIM

Data from Draft Summary Report

Benefit Category	Annual Water Supply Improvement (TAF)					
	Scenario 2 (Study 2)		Scenario 3 (Study 3)		Scenario 4 (Study 4)	
	Dry Period	Long-term Average	Dry Period	Long-term Average	Dry Period	Long-term Average
Urban Supply	35.3	43.0	31.6	45.4	20.4	32.3
Agricultural Supply	20.5	66.3	15.9	41.6	12.5	39.6
Total	55.8	109.3	47.5	87.0	32.9	71.9

Data from Draft Economics Report

Benefit Category	Annual Water Supply Improvement (TAF)					
	Scenario 2 (Study 2)		Scenario 3 (Study 3)		Scenario 4 (Study 4)	
	Dry Period	Long-term Average	Dry Period	Long-term Average	Dry Period	Long-term Average
Total Urban Supply Benefits	32.6	16.8	29.6	27.4	18.5	12.8
Total Ag Supply Benefits	18.6	71.3	16.5	49.6	13.0	46.8
SJV Goundwater Benefits	4.5	21.1	1.4	10.1	1.4	12.3
Total	55.7	109.2	47.5	87.1	32.9	71.9

22

Planned LCPSIM Analysis Improvements

- Input Parameter Assumptions Improvement
 - Availability and cost of regional long-term options
 - Availability and cost of contingency water transfers
 - Regional water management operations costs
 - Value of reliability to water users
- Expanded Model Validation and Verification
 - Is the model mathematically doing what it is intended to do?
 - Is the simulation realistic?

23

Urban Water Supply Benefits

Benefit Category	(\$1,000)		
	Scenario 2 (Study 2)	Scenario 3 (Study 3)	Scenario 4 (Study 4)
SF Bay Region ¹	\$224	\$220	\$123
South Coast Region ¹	\$14,723	\$13,621	\$8,887
Central Coast Region	\$428	\$422	\$317
San Joaquin Valley	\$286	\$275	\$198
Other Urban	\$1,080	\$1,060	\$780
Total	\$16,741	\$15,598	\$10,305

¹Includes water market transfers from San Joaquin Valley agricultural use to the SF Bay and South Coast Region urban use

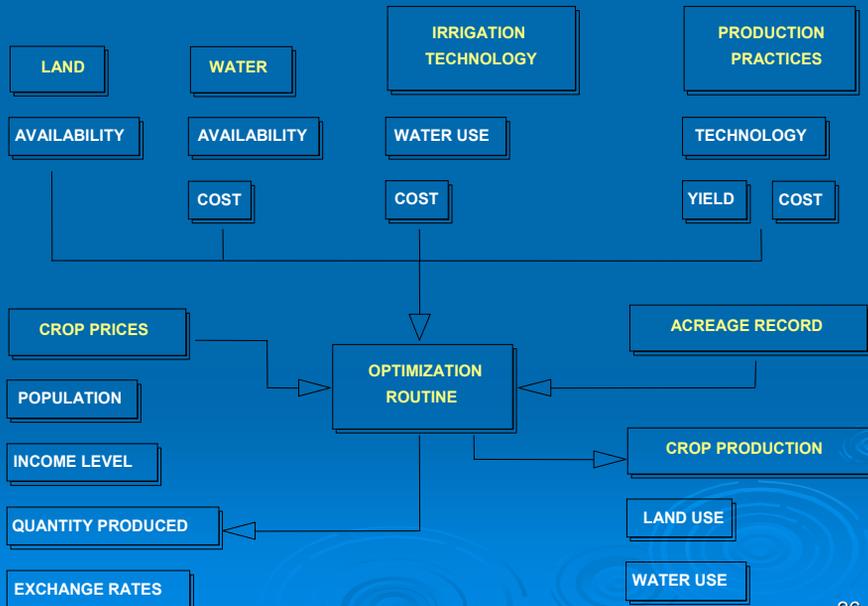
24

Ag Benefits Analysis with CVPM

- Maximizes net farm income plus consumers' surplus, subject to water and land availability to simulate market conditions
- Model includes 22 agricultural production regions in Central Valley of California and 26 representative crops
- Calibration done on historical data
- Uses cost functions to determine on-farm irrigation efficiencies

25

Central Valley Ag Production Model Logic



26

Agricultural Water Supply Benefits

Benefit Category	(\$1,000)		
	Scenario 2 (Study 2)	Scenario 3 (Study 3)	Scenario 4 (Study 4)
SWP & CVP Supply ¹	\$4,100	\$2,958	\$2,655
Value Received From Water Market	\$2	\$2	\$3
Total	\$4,102	\$2,960	\$2,658

¹Includes urban supplies reallocated from South Coast Region urban use to San Joaquin Valley agricultural use and water market transfers from San Joaquin Valley agricultural use to the SF Bay and South Coast Region urban use

Other Water Supply Benefits

Other Water Supply Benefits

Benefit Category	(\$1,000)		
	Scenario 2 (Study 2)	Scenario 3 (Study 3)	Scenario 4 (Study 4)
Groundwater Recharge	\$991	\$534	\$648
Environmental Water Account	\$0	\$6,552	\$7,707
Ecosystem Restoration Program	\$0	\$0	\$2,826
CVPIA Level 4 Refuges	\$876	\$693	\$702
Total	\$1,867	\$7,779	\$11,883

29

Recreation Benefits

30

Recreation Benefits

Category	Visitor Days	New User Factor	New Users	Unit Day Benefit	Total Benefit
				\$/Day ¹	(\$1,000)
Hunting	9,019	100%	9,019	\$24.18	\$218
Fishing	9,600	20%	1,920	\$16.93	\$33
Hiking/Biking	3,000	20%	600	\$16.93	\$10
Intpretation	30,000	20%	6,000	\$16.93	\$102
Boating	186,240	10%	18,624	\$16.93	\$315
Total	237,859		36,163		\$678

¹US Army Corps of Engineers Economic Guidance Memorandum 01_01, Unit Day Values for Recreation, Fiscal Year 2001 (indexed for inflation)

Benefits Summary

Summary of All Quantified Benefits

Benefit Category	(\$1,000)		
	Scenario 2 (Study 2)	Scenario 3 (Study 3)	Scenario 4 (Study 4)
Urban	\$16,741	\$15,598	\$10,305
Agricultural	\$4,102	\$2,960	\$2,658
Unallocated	\$1,867	\$7,779	\$11,883
Subtotal Supply Benefits	\$22,710	\$26,337	\$24,846
Recreation	\$678	\$678	\$678
Flooding Risk Reduction	\$324	\$324	\$324
Avoided Levee Maintenance	\$711	\$711	\$711
Total	\$24,423	\$28,050	\$26,559

33

Benefits Requiring Further Study to Quantify

- Delta Benefits
 - Carryover Storage
 - Wildlife Habitat Improvements
 - Interim Banking for Water Transfers Storage
 - Seismic Stability Benefits
 - Flood Benefits
- Water Quality Improvements
 - Drinking Water Quality
 - Environmental Water Quality
- Value of Operational Flexibility

34

Project Costs

35

Project Cost

(Millions of 2003 Dollars)

Capital Cost	\$774.4
Foregone Investment Value	\$78.5
Adjusted Capital Cost	\$853.0
Annualized Capital Cost	\$54.1
Annual O&M Cost	\$5.9
Total Annualized Cost	\$60.0

36