

Water Use Efficiency Back-up

**Table 1
Summary of Agricultural Conservation Estimates**

Region	Reduce Rerouted Flows					Reduce Flows to Salt Sinks				
	Potential (TAF/yr)*			Best Estimate**		Potential (TAF/yr)*			Best Estimate**	
	Low	High	Average	% of Avg	(TAF/yr)	Low	High	Average	% of High	(TAF/yr)
Sacramento	574	587	581	11%	64	0	27	14	25%	7
Delta	93	100	97	11%	11	0	0	0	95%	0
West Side San Joaquin	93	98	96	11%	11	0	7	4	95%	7
East Side San Joaquin	327	347	337	11%	37	0	6	3	95%	6
Tulare Lake	514	514	514	11%	57	17	82	50	95%	78
Total	1,601	1,646	1,624		180	17	122	70		98
Reduce Unwanted Evaporation and Transpiration										
Region	Irrigated Area* (Thou-ac)	Average Applied Water* (TAF/yr)	ETAW* (TAF/yr)	Unit ETAW (Inch/yr)	Potential Reduction**		Best Estimate**			
					Assumed % of ETAW	(TAF/yr)	Assumed Area Affected		Evaporation Reduction	
							(%)	(Thou-ac)	(Inch/yr)	(TAF/yr)
Sacramento	1,700	6,300	4,096	28.9	10.0%	410	7.5%	128	2.9	31
Delta	500	1,100	758	18.2	10.0%	76	5.0%	25	1.9	4
West Side San Joaquin	430	1,360	973	27.2	10.0%	97	10.0%	43	2.8	10
East Side San Joaquin	1,270		2,781	26.3	10.0%	278	10.0%	127	2.6	28
Tulare Lake	3,200	9,200	6,894	25.9	10.0%	689	10.0%	320	2.6	69
Total	7,100	17,960	15,502			1,550		643		142
Weighted Average				26.2	10.0%		9.2%		2.7	

* Values shown in these columns are reported in the June '99 Water Use Efficiency Program Plan and are consistent with Bulletin 160-98.

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Table 2
Unit Cost of Agricultural Conservation (Flow Reductions)

Description	Type of Reduction	Cost Type	Capital Cost	Annual Capacity	Unit Capital Cost	Present Value Capital and O&M*
IID / MWD Conservation & Transfer	Flows to Salt Sink	Average	160,000,000 \$	108,500 AF	1,475 \$/AF	1,620 \$/AF
Yakima Basin Salmon Restoration	Rerouted Flows	Average	---	---	1,000 \$/AF	1,100 \$/AF
Drip Irrigation	Unwanted Evaporation and Transpiration	High	1,500 \$/ac	0.17 AF/ac/yr (2 inch/yr)	9,000 \$/AF	---
		Low	1,000 \$/ac	0.27 AF/ac/yr (3.2 inch/yr)	3,750 \$/AF	---
		Average	1,250	0.22	5,769	6,346 \$/AF
Planned Deficit Irrigation	Unwanted Evaporation and Transpiration	High	80 \$/ac/yr	0.08 AF/ac/yr (1 inch/yr)	9,600 \$/AF **	10,560 \$/AF
		Low	40 \$/ac/yr	0.17 AF/ac/yr (2 inch/yr)	2,400 \$/AF **	3,120 \$/AF
		Average	---	---	---	6,840 \$/AF
Representative Value for Reduction of Evaporation (use rounded drip value)						6,350 \$/AF

* Present value of O&M assumed to be 10% of capital cost.

** Present cost of planned deficit irrigation assumed to be 10 times the annual cost.

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Table 3
Agricultural Water Use Efficiency - Stage 1 Cost Estimate

Cost Categories	Assumptions	Diversion Reduction		Unit Cost	Stage 1 Cost					
		Irrecov. Loss (AF/yr)	Rerouted Flow (AF/yr)	[from Table 2] (\$/AF)	Total (Stage 1 \$)	Local Cost Share		Existing Funding		Proposed Funding (Stage 1 \$)
						(%)	(Stage 1 \$)	(Stage 1 \$)	Source	
Incentive Program (Grant Funding)										
Reduce Rerouted Flows	Diversion reduction from Table 1; Local share assumes no identifiable local benefits exist.	0	180,000	1,100	198,000,000	0%	0			198,000,000
Reduce Flows to Salt Sinks	Diversion reduction from Table 1; Local share assumed.	98,000	0	1,620	158,760,000	10%	15,876,000			142,884,000
Reduce unwanted E & T	Diversion reduction from Table 1; Local share assumed.	142,000	0	6,350	901,700,000	75%	676,275,000			225,425,000
Subtotal - Incentive Grants	Local share is wt. Avg.	240,000	180,000	---	1,258,460,000	55%	692,151,000	0		566,309,000
Monitoring & Adaptive Management	10% of CALFED Incentive Grant subtotal	0	0	0	125,846,000	0%	0			125,846,000
Administration	2% of CALFED subtotal	0	0	0	25,169,200	0%	0			25,169,200
Subtotal - Grant Program	Local share is wt. Avg.	240,000	180,000	0	1,409,475,200	49%	692,151,000	0		717,324,200
Technical Assistance & Loans										
Technical Assistance	20 PY @ \$70,000/py for 7 yr	0	0	0	9,800,000	0%	0	3,500,000	Crosscut	6,300,000
Loans	Local potential is 50% of No Action Estimate; Unit cost is 50% of Salt Sink reduction cost; Additional funding of \$30M for loans	110,000	0	810	154,100,000	58%	89,100,000	35,000,000	Prop 13	30,000,000
Administration	5% of loans	0	0	0	1,500,000	0%	0			1,500,000
Subtotal - Assistance		110,000	0	810	165,400,000	54%	89,100,000	38,500,000		37,800,000
Research										
Research Grants	\$5.5M for research	0	0	0	5,500,000	0%	0	0		5,500,000
Administration	5% of research cost	0	0	0	275,000	0%	0	0		275,000
Subtotal - Research		0	0	0	5,775,000	0%	0	0		5,775,000
Grand Total (Rounded)		350,000	180,000	---	1,580,650,000	49%	781,251,000	38,500,000		760,899,000

**Table 4
Summary of CALFED Urban Conservation Estimates**

Region	Reduce Rerouted Flows					Reduce Flows to Salt Sinks				
	Potential (TAF/yr)*			Best Estimate		Potential (TAF/yr)*			Best Estimate	
	Low	High	Avg	% of Avg	(TAF/yr)	Low	High	Avg	% of Avg	(TAF/yr)
No Action Alternative (Without CALFED)										
Sacramento	140	156	148	0%	0	5	9	7	40%	3
East Side San Joaquin	87	103	95	0%	0	3	7	5	40%	2
Tulare Lake	40	45	43	0%	0	15	30	23	40%	9
San Francisco Bay	10	10	10	0%	0	65	80	73	40%	29
Central Coast	0	0	0	0%	0	20	40	30	40%	12
South Coast	70	75	73	0%	0	340	385	363	40%	145
Colorado River	30	30	30	0%	0	20	40	30	40%	12
Total	377	419	398		0	468	591	530		212
CALFED Alternative										
Sacramento	81	96	89	25%	22	4	9	7	70%	5
East Side San Joaquin	89	104	97	25%	24	6	11	9	70%	6
Tulare Lake	50	55	53	25%	13	30	45	38	70%	26
San Francisco Bay	10	10	10	0%	0	120	140	130	70%	91
Central Coast	0	0	0	0%	0	30	50	40	70%	28
South Coast	75	80	78	0%	0	400	445	423	70%	296
Colorado River	30	30	30	10%	3	25	45	35	70%	25
Total	335	375	355		62	615	745	680		476

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**Table 5
Unit Costs for Urban Conservation**

BMP Levelized Unit Cost Estimates (\$/AF/Yr)*1												
BMP Program		Low	High	Mid								
BMP 1	Residential Surveys	1,300	1,900	1,600								
BMP 2	Low Flow Showerhead Distribution	300	600	450								
BMP 3	System Leak Detection & Repair	300	500	400								
BMP 4	Metering & Billing by Volume	200	300	250								
BMP 5a	Landscape Budgets	100	200	150								
BMP 5b	Landscape Surveys	100	200	150								
BMP 9	CII Water Use Efficiency Programs	100	200	150								
BMP 14	Residential ULFT replacement	300	600	450								

Weighted Average Unit Costs by Hydrologic Region (\$/AF/Yr)												
Hydrologic Region	Gross Savings** (TAF/yr)									Weighted Avg Unit Cost(\$/AF/Yr)		
	BMP 1	BMP 2	BMP 3	BMP 4	BMP 5a	BMP 5b	BMP 9	BMP 14	Total	Low	High	Mid
	Residential Surveys	Low Flow Showerhead Distribution	System Leak Detection & Repair	Metering & Billing by Volume	Landscape Budgets	Landscape Surveys	CII Water Use Efficiency Programs	Residential ULFT replacement				
Sacramento	1,002	6,579	16,679	26,524	7,044	4,393	15,118	23,882	101,223	231	413	322
East Side San Joaquin	527	3,383	13,350	21,735	5,638	3,622	7,969	11,561	67,785	225	393	309
Tulare Lake	663	4,084	15,643	39,091	6,607	9,193	12,378	14,816	102,475	213	369	291
San Francisco Bay	2,268	17,522	22,675	0	9,577	9,514	29,607	67,666	158,830	253	482	367
Central Coast	488	3,017	5,836	0	2,465	2,568	6,692	10,785	31,850	242	454	348
South Coast	6,259	47,311	86,586	0	36,569	31,844	80,450	197,471	486,489	252	477	364
Colorado River***	NA	NA	NA	NA	NA	NA	NA	NA	NA	252	477	364
Total	11,207	81,896	160,769	87,350	67,899	61,134	152,214	326,181	948,650	243	452	348

* The data source for the estimates for BMPs 1,2,4, and 14 is Table 5-16 of the Draft Water Use Efficiency Program Plan, June 1999. Estimates for BMP 9 derived from "Evaluation of the MWD CII Survey Database", Hagler Bailly Services, Inc., November 1997. Estimates for BMP 5b (surveys) are derived from the CUWCC "Guide to Urban Water Conservation Savings and Costs", March 2000. Estimates for BMP 5a (budgets) are derived from "Landscape Water Conservation Programs: Evaluation of Water Budget Based Rate Structures," A&N Technical Services, September 1997. Estimate of BMP 3 is a placeholder. Levelized cost equals the present value of costs divided by the present value of yield (AFY) over the life of the project. The discount rate is 4.5%.

** Gross savings estimated by M.Cubed. Assumes full MOU implementation.

*** Weighted avg. unit cost for South Coast used for Colorado River region.

**Table 6
Stage 1 Cost Estimates for Urban Water Conservation**

No Action Alternative (Without CALFED)															
	NO ACTION ALTERNATIVE SAVINGS (TAFY)								Avg. Unit Costs (\$/AFY)*	Total Cost	Avg. Annual Cost	CALFED Cost Share	CALFED Stage 1 Cost	Local Stage 1 Cost	
	Stage 1 Program Year														
	1	2	3	4	5	6	7	8							
Sacramento	0	1	1	2	2	2	3	3	322	3,606,835	515,262	0%	-	3,606,835	
East Side San Joaquin	0	1	1	1	1	2	2	2	309	2,469,681	352,812	0%	-	2,469,681	
Tulare Lake	1	3	4	5	6	8	9	9	291	10,476,625	1,496,661	0%	-	10,476,625	
San Francisco Bay	4	8	12	17	21	25	29	29	367	42,607,437	6,086,777	0%	-	42,607,437	
Central Coast	2	3	5	7	9	10	12	12	348	16,704,918	2,386,417	0%	-	16,704,918	
South Coast	21	41	62	83	104	124	145	145	364	211,176,837	30,168,120	0%	-	211,176,837	
Colorado River	2	3	5	7	9	10	12	12	364	17,476,704	2,496,672	0%	-	17,476,704	
Subtotal: No Action	30	61	91	121	151	182	212			304,519,037	43,502,720		-	304,519,037	
CALFED Urban Incentive Program															
	CALFED INCREMENTAL SAVINGS (TAFY)								Avg. Unit Costs (\$/AFY)*	Total Cost	Avg. Annual Cost	CALFED Cost Share	CALFED Stage 1 Cost	Local Stage 1 Cost	
	Stage 1 Program Year														
	1	2	3	4	5	6	7	8							
Sacramento	4	8	11	15	19	23	27	27	413	44,050,808	6,292,973	50%	22,025,404	22,025,404	
East Side San Joaquin	4	9	13	17	21	26	30	30	393	47,223,371	6,746,196	50%	23,611,686	23,611,686	
Tulare Lake	6	11	17	23	28	34	39	39	369	58,071,874	8,295,982	50%	29,035,937	29,035,937	
San Francisco Bay	13	26	39	52	65	78	91	91	482	175,320,350	25,045,764	50%	87,660,175	87,660,175	
Central Coast	4	8	12	16	20	24	28	28	454	50,886,418	7,269,488	50%	25,443,209	25,443,209	
South Coast	42	85	127	169	211	254	296	296	477	563,734,248	80,533,464	50%	281,867,124	281,867,124	
Colorado River	4	8	12	16	20	24	28	28	477	52,418,231	7,488,319	50%	26,209,115	26,209,115	
Subtotal: CALFED Incentive	77	154	231	308	385	461	538			991,705,300	141,672,186		495,852,650	495,852,650	

Notes:

Savings progress linearly. Full implementation achieved in Year 7 of Stage 1.

* Assumes mid-point cost estimate

** Assumes high-point cost estimate to reflect diminishing returns to conservation estimates. BMPs will have cream-skimmed most cost-effective conservation

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Table 7 Summary - CALFED Stage 1 Urban WUE Cost Estimate					
Other Program Components	Avg. Annual Cost	State/Fed Cost Share	State/Fed Stage 1 Cost	Existing \$ (Prop 204/13)	State/Fed Funding Req'mt
Monitoring & Adaptive Management	1,000,000	100%	7,000,000	0	7,000,000
Research Grant Program	1,000,000	100%	7,000,000	0	7,000,000
MOU Certification Program	1,750,000	100%	12,250,000	0	12,250,000
Technical Assistance/Field Support	2,000,000	100%	14,000,000	0	14,000,000
BMP Implementation Revolving Loan Program***	4,350,272	100%	30,451,904	25,000,000	5,451,904
Subtotal: Other Program Components	10,100,272		70,701,904	25,000,000	45,701,904
Subtotal: Incentive Program (see Table 3)	141,672,186		495,852,650	30,000,000	465,852,650
Total CALFED Stage 1 Costs (rounded)			567,000,000	55,000,000	511,555,000

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Table 8							
Estimates of Water Use Efficiency Stage 1 Investment & Return							
Category		Stage 1 Investment (\$ Million)			Return (TAF/year)		
		State +Fed	Local	Total	Reduce Salt Sinks and Evap.	Reduce Rerouted Flows	
Cost Effective State-Wide	Ag*	717	} Grants	692	1,409	240	180
	Urban*	496		496	992	476	62
	Total	1,213		1,188	2,401	716	242
Cost Effective Locally	Ag*	44	} Loans	89	133	110	0
	Urban*	46		305	351	212	0
	Total	90		394	484	322	0
Grand Total	Ag*	761		781	1,542	350	180
	Urban*	542		801	1,343	688	62
	Recycling**	800		800	1,600	310	23
	Total	2,103		2,382	4,485	1,347	266

*Values summarized from Tables 3 and 7.

**Recycling costs are assumed using best available information and professional judgment. Recycling yield computed by assuming present value cost is \$4,800/AF and rerouted flows are 7% of total flow reduction.

Table 9											
Estimates of Water Use Efficiency Stage 1 Investment & Return											
Category		Stage 1 Investment				Return (TAF/year)					
		State +Fed		Local		Total		Reduce Salt Sinks and Evaporation	Reduce Rerouted Flows		
<i>Grand Total</i>	Ag*	549 to	761	471 to	781	1016 to	1,542	260 to	350	134 to	180
	Urban*	391 to	542	483 to	801	885 to	1,343	520 to	688	47 to	62
	Recycling*	577 to	800	483 to	800	1054 to	1,600	225 to	310	17 to	23
	Total	1,518 to	2,103	1,438 to	2,382	2,955 to	4,485	1,005 to	1,347	198 to	266

*Upper range values summarized from Table 8. Lower range values developed with policy-level guidance.