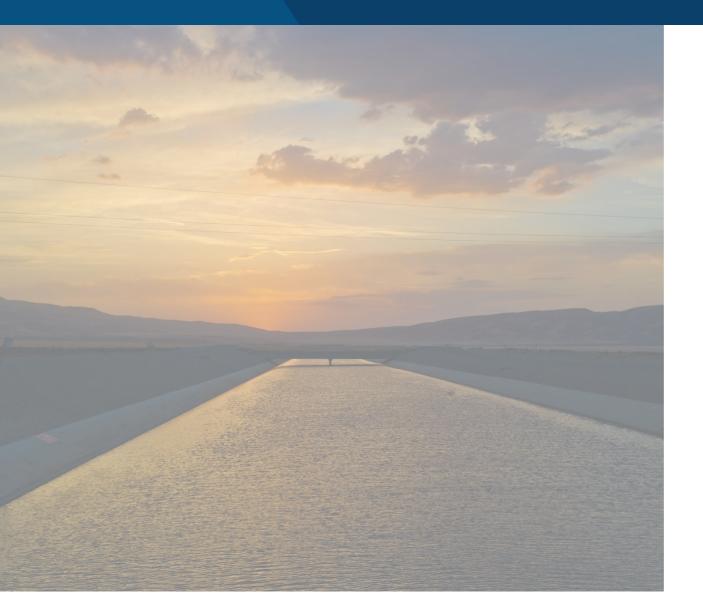
# Water Management Strategies CCWA Board of Directors Meeting

January 27, 2022





- Introductions
- Purpose and Goals
- Schedule & Process Review
- Model Overview
- Recommendations
- Q&A
- Next Steps



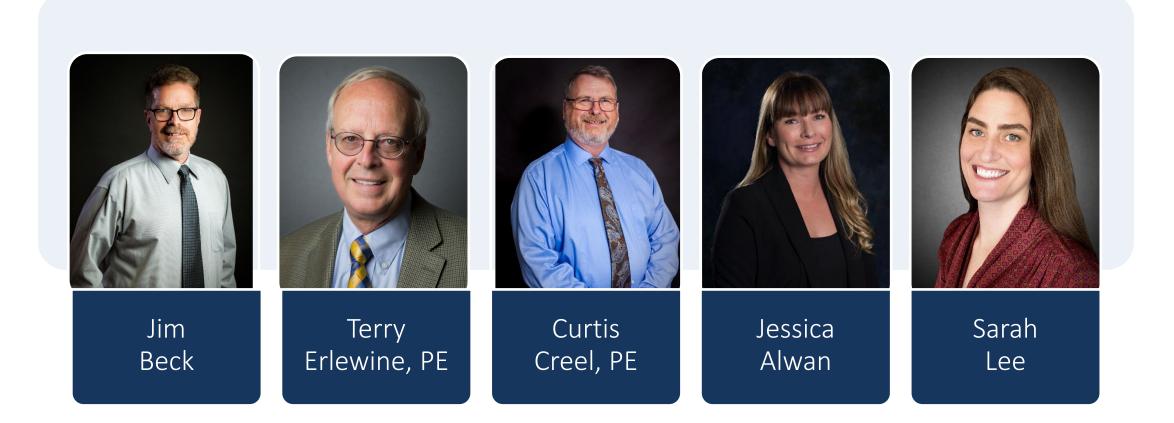
### Purpose and Goal

To develop water management strategies to maximize yield of the State Water Project for San Luis Obispo and Santa Barbara counties through an iterative process of stakeholder engagement.











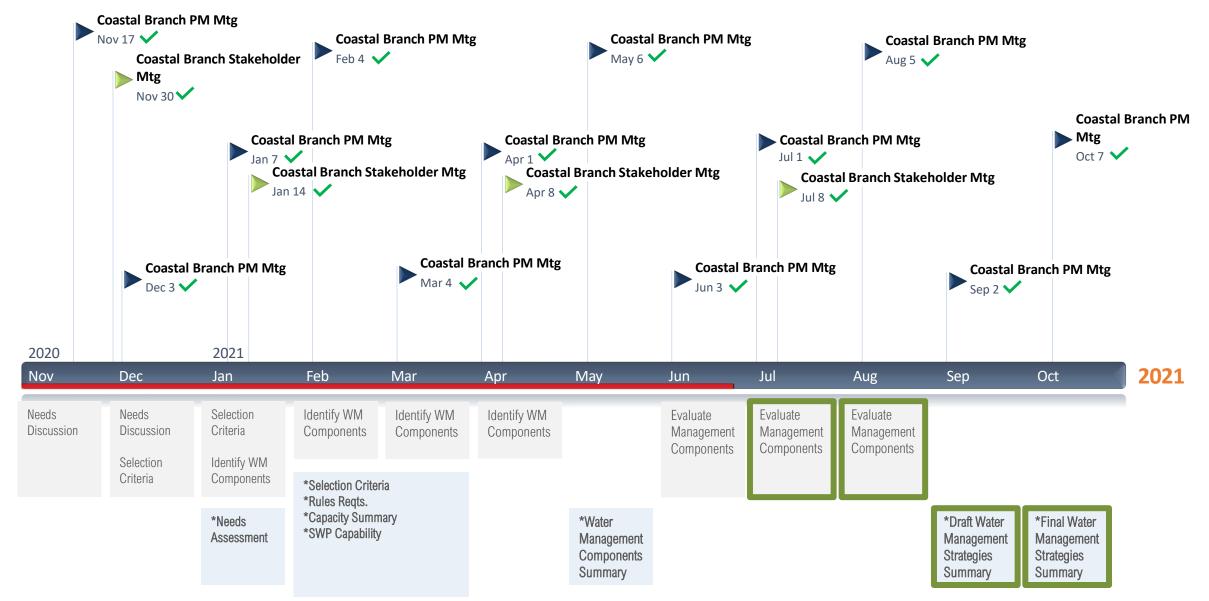


Jessica Alwan

### SCHEDULE AND PROCESS REVIEW



### Water Management Strategies Schedule January 2022



### Process Update





Jim Beck

### **RECOMMENDATIONS SUMMARY**



# **Recommendations Summary**

- 1. Explore shared conveyance capacity program
- 2. Explore excess Table A transfer program
- 3. Explore external storage/exchange program
- 4. Refine model if Management Tool Amendment is not implemented
- 5. Explore alternative management of uncontracted SWP Table A
- 6. Explore supplemental groundwater supply options





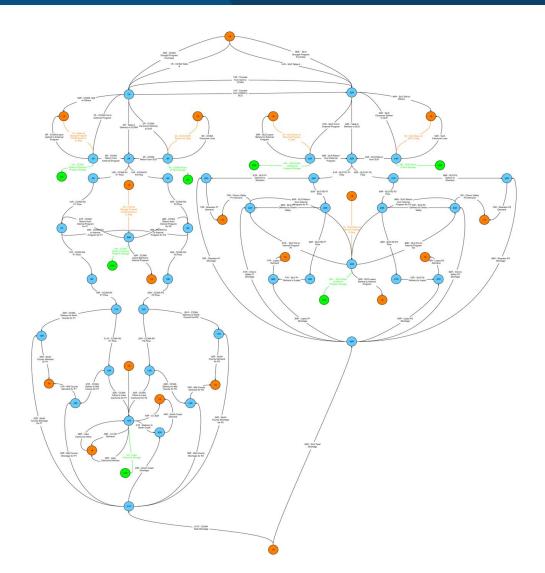
Terry Erlewine & Curtis Creel

### MODEL OVERVIEW

Used to Inform Report Conclusions and Recommendations



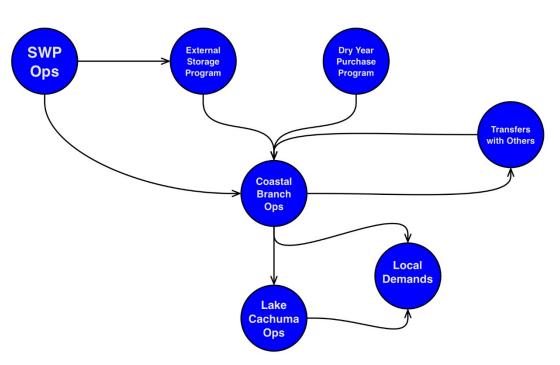
# Model Overview



- Uses Network Flow Programming
- Minimizes delivery shortages
- Provides optimistic bookends of possible policies
- Used to compare alternatives



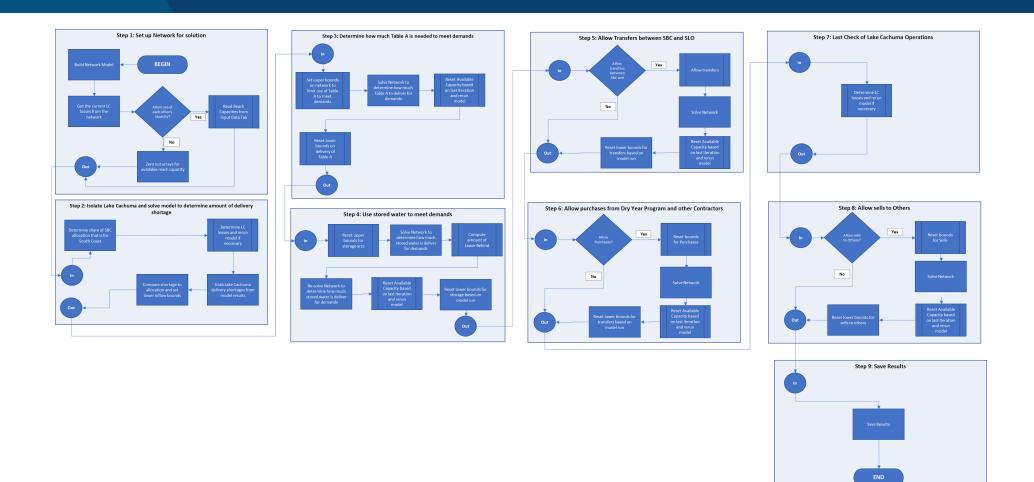
# Model Overview – cont.



- Includes Seven Key Components
- Models CCWA and SLO water supplies and operations separately
- Uses Lake Cachuma to meet South County demands
- Pre-processes demands and allocations



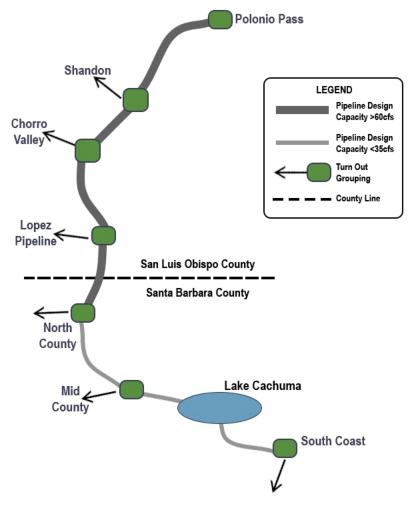
### Model Overview





# Model Overview – cont.

#### State Water Project Coastal Branch



- 98 Year Study Horizon with annual time step
  - Sub-periods: (Oct-Apr, May-Sept)
- Demands aggregated into locations shown
- Conveyance capacity reflected between indicated demand locations
- SWP-centric analysis
  - Local water supplies not directly considered (exception is simplified Lake Cachuma operation)



# Model SWP Operation Assumptions

		Sar	n Luis Operat	ions	
	Max Winter- Spring SLR SWP				
	Storage for		SLO	SLO Non-	
	small	CCWA	Contracted	Contracted	SLO Max
	Contractors		Max Use of		Use of SLR
Water Year	(taf)	of SLR (af)	SLR	SLR	(af)
1922	125	4,447	1,030	1,414	2,444
1923	77	2,752	637	875	1,512
1924	452	16,086	3,726	5,115	8,841
1925	111	3,933	911	1,251	2,162
1926	34	1,193	276	379	656
1927	57	2,030	470	645	1,116
1928	34	1,225	284	390	674
1929	116	4,114	953	1,308	2,261
1930	354	12,587	2,916	4,002	6,918
1931	-	-	-	-	-
1932	119	4,235	981	1,346	2,327
1933	9	317	74	101	174
1934	327	11,623	2,693	3,696	6,388
1935	5	171	40	55	94
1936	266	9,472	2,194	3,012	5,206
1937	5	179	42	57	99
1938	-	-	_	-	-
1939	118	4,186	970	1,331	2,301
1940	202	7,188	1,665	2,286	3,951
1941	-	-	-	-	-

- San Luis Reservoir operations based on CalSim II modeling
- Pre-processed to estimate available space to store CCWA and SLO Carryover
- In about 1 in 5 years, carryover is at risk of spilling



# Model Transfer Assumptions

DRY YEAR PL	JRC	HASE P	ROGRAM	EXTERNAL PURCHASE PROGRAM							
Year Type	ba ye		Max amount that can be purchased each year by all Contractors (AF)	Year Type	for w Othe on y	ase Price ater from ers based ear type \$/AF)	Potential Annual Supply to Coastal Branch Contractors (AF)				
Wet Years	\$	75	0	Wet Years	\$	40	15,000				
Above Normal Years	\$	75	0	Above Normal Years	\$	40	8,000				
<b>Below Normal Years</b>	\$	500	0	Below Normal Years	\$	250	5,000				
Dry Years	\$	750	100,000	Dry Years	\$	1,000	2,000				
Critically Dry Years	\$	1,500	40,000	Critically Dry Years	\$	2,000	500				

#### SALES PROGRAM PARAMETERS

	S	Sale of					
	W	ater to					
	C	Others		Sale	of Non-	Sale	e of Non-
	ba	ased on	Others	Cnr	t to SLO	(	Cnrt to
Year Type	ye	ar type	Demand		Mus	(	Others
1	\$	(35)	10,000	\$	(125)	\$	(50)
2	\$	(35)	25,000	\$	(175)	\$	(100)
3	\$	(150)	75,000	\$	(200)	\$	(200)
4	\$	(600)	75,000	\$	(400)	\$	(800)
5	\$	(1,200)	100,000	\$	(600)	\$	(1,500)

- Transfers limited by available supply and demand based on water year types
- Pre-processed to determine annual availability



## **Coastal Branch Delivery Assumptions**

Area	Table A Amount * (Acre-Feet)	Coastal Participant Amount (Acre-Feet)	Maximum Historical (Acre-Feet)	Average Historical (Acre-Feet)
SLO Uncontracted	14,463	0	0	0
SLO-North County	100	100	67	45
SLO-Chorro Valley	5,653	2,338	2,518	2,045
SLO-Lopez Pipeline	4,784	2,392	2,686	1,649
Subtotal SLO	25,000	4,830	5,271	3,739
SB-North County	18,975	17,250	14,641	10,536
SB-Mid County	8,886	8,078	6,831	4,217
SB-South Coast	17,625	13,750	15,587	6,811
Subtotal SB	45,486	39,078	39,059	21,564
Total	70,536	43,908	44,330	25,303

\*Includes drought buffer amounts

# Model Limitations

- Uses annual time step limited modeling of inter-year operations
- The Model only considers deliveries from the Coastal Branch
- Does not model local water management activities
  - Local supplies
  - Local facilities
  - Local demand management strategies



# Portfolio Summary

Portfolio	Acquire Dry Year Water	SLO Un- Contracted Use	Unused Capacity Access	CCWA External Storage Program	SLO External Storage Program	SLO GW Recharge	Transfer between CCWA and SLO	Acquire Water from Others	Sale Water to Others
F1									
F2				30 taf	10 taf				
F3				30 taf	10 taf	1 taf			
F4				30 taf	10 taf	1 taf			
F5				30 taf	10 taf	1 taf			



### Selection Criteria

#### To best determine if a management measure should be implemented

Criteria	Measure	Considerations
Water Supply	acre-feet cubic feet per second	Does the amount of volume or flow satisfy the participant need under a particular condition?
Water Quality	Maximum level and concentration	Is there difference in resulting water supply; how well does water supply meet water quality needs; are there any negative adverse water quality effects?
Ability to Permit	Weeks	How lengthy and difficult would permitting process be?
Cost	Dollars	Is it affordable for the short term? Long term?
Proximity	Yes or no	Is the action local or imported? Will it shift supply to a more sustainable/long-term solution?
Equity	Yes or no	Do alternatives maintain or improve DAC and tribal access to adequate water supplies?
Reliability	More or less	Is the supply cost and availability probable? HALLMARK Focus on moderate or extreme dry years? GROUP

### Portfolio Summary Results – on one page!

	Part	External	AT O			Deliveries	to Turnouts	II —	Shortages	Carryo	wer Spill	Shar	re of SLR Storage		External Program				Transfers		5	Sells		Purchases		II ——	Use of unused Ca	acity						Water Supply and Shortage Cost Summary													
	are clo	Storage S Program		-	Percent of Table A Used						1					ccw	(A				SLO Contracted	Amount		SLD Non-contracte	SLO d Contracted Dry Y	ear Purchase	CCWA	9.0	CCW/		sio	Reach 1	Reach 2	Reach 3		Annual SWP State	tement of Charges (2	(S/vr)		External Storage Pr		Tra	ufer Cost/Revenue	(5/v)	Total Cost	Shortan	Cost
	9 5	ő	ded ster	806								-	SLO SLO No	20-	-	mount Stored in		Amount Provid	led to	Am	ount Stored in		Amount Provided to	D Transfer to Transfe	r to Transfer to		SWP	SWP		SWP	SWP	SEC Using SLO	Using SBC Using SLO U	ing SBC Using SLD Usin	e .												
	2 5	8	A 5 A	2		CCWA	SLD	CCWA	SLD	CCWA	SLO	CCWA	Contracted Contract	tted Use o	f Storage	Program	Amount Returns	d Banking Part	ner Use of St	rage	Program	Impunt Returned	ed Banking Partner	MUs CCW	A CCWA SL	D CCWA	Contractors SLO	Contractors CCW	IA Dry Year Co	ntractors Dry 1	Year Contractors	SLD CC	WA SLO COV	A SLO CCWA	CC	CWA		51.0		CCWA	9.0	CCW	A	9.0	CWA SLO	CCWA	5L0
Somario Description	Year Punchase Program A vailable OB A Capadity	Max Use by CCWA Transfer to its Member Agencies	from o ther Contractors etween 3.0 and CCWA Lop eafor GW Recharge	excess Table A to other Contractors	COWA SLD	98-Yr Total Average	98-Yr Total Averag	ps 98-Yr Total Aven	rage 98-Yr Total Average	95-Yr Total Avera	98-Yr ge Total Avec	ige Average	Average Average	ge Max	Average 95-	Yr Total Average	98-Yr Total Aven	98-Yr age Total Ave	rage Max	Average 98-Yr	Total Average	98-Yr Total Averag	98-Yr ge Total Average	e 98-Yr Total 98-Yr T	S6- stal 98-Yr Total Tot	Yr 98-Yr al Total	98-Yr 98-Yr Total Total	98-Yr Total Tota	fr S&-Yr al Total 98	SB- HT Total Tot	-Yr tal 98-Yr Total	Average Ave	rage Average Aver	ge Average Average	Fied V	/ariable Tota	al Flored	Variable To	otal Fixed	Capital Variable	Ford Capital Varial	ble Sales	Purchases Sale	les Parchases	(\$/AF) (\$/AF)	(\$/AF)	(\$/AF)
											_							_	-															-													
Portfolio 1 (F1) Current Baseline Condition	x x				46.1% 21.4%	2,072,264 21,146	513,409 5,239	9 242,359 2,	473 3,149 32	531,559 5,	424 896,818 9,3	51 2,195	629 1,3	222 -											1	956 17,031			- 17,031	- 1;	. 956		243 -	01	\$ 43,475,328 \$3,	399,422 \$46,874	730 \$ 6,670,739	9 \$ 719,268 \$ 7,3r	90,007 \$		5.5.	5 - 3	5 292,515 5	<ul> <li>\$ 38,607</li> </ul>	2,231 \$ 1,418	\$ 2,550	3,000
Portfolio 2 (F2) F1 plus using limited external storage	X X	X 35.000 10	000		48.4% 22.1%	2.158.534 22.026	516.558 5.271	1 135.271 1.2	380	427.790 4.	355 880.409 8.5	64 2.187	652 1.3	306 30.000	19,878 1	129.538 1.322	114.437 1.	168 15.321	154 10.000	9,105 1	3.682 140	2.378 2	24 1.304 13	25.107		- 14.633			- 14.633				259 -	21 5 -	\$ 43,475,308 \$3.	540.942 \$47.016	250 \$ 6.670.739	9 \$ 723,680 \$ 7.3I	94.419 \$ 1.	463.657 \$ 182.863	\$ 487,885 \$ 9.4	07 5 - 5	5 255,811 5	· 5 · 5	2.221 5 1.497	\$ 2.515	
Portfolio 3 (F3) F2 plus added demand for SLO GW Replenishment	x x	X 30.000 10	000 1.000		48.5% 26.1%	2.159.314 22.034	614,558 6,271	1 135.274 1.3	380	426,894 4	355 783.409 7.5	94 2.187	529 1.3	299 30.000	19,935 1	129.654 1.323	114.437 1.	168 15.217	155 10.000	8,620 2	6.425 147	3.121 3	22 1.304 13	41,525		- 14.633			- 14.633	-			676 -	38 5 -	5 43,475,308 53,	542.222 \$47.017	530 \$ 6.670.729	\$ \$60,974 \$ 7.5	31.713 \$ 1.	463.657 \$ 182.922	\$ 487,885 \$10.5	44 5 - 3	5 255,811 5	· 5 · 5	2,220 5 1,281	\$ 2,515	
Portfolio 4 (F4) F3 plus allow transfers between CCWA and SLD	x x	X 30,000 10	mo 1,000 X	1 11	48.4% 31.0%	2,274,567 23,210	614,558 6,271	1 43,273	442	428,302 4	370 662,611 6,7	61 2,187	507 5	998 30,000	20,583 3	128,246 1,309	108,016 1,	102 15,217	155 10,000	6,535 21	6,584 271	22,627 23	31 1,304 13	37,141 129,	94 578 1,	627 6,535		- 129,7	772 6,535	- 1/	627 -	1 -	676 -	18 20 -	\$ 43,475,328 \$2,	731,287 \$47,206	595 \$ 6,670,739	\$ 860,974 \$ 7,53	31,713 \$ 1,	463,657 \$ 175,652	\$ 487,885 \$ 36,6	52 \$ - :	\$1,174,358 \$1,053	3,226 \$ 26,056 \$	2,155 \$ 1,121	\$ 2,835	
Portfolio 5 (FS) F4 plus allow external purchases and sells	x x	X 30,000 10	mo 1,000 X X	x	57.4% 52.4%	2,245,381 22,912	614,558 6,271	1 36,349	371	29,227	298 137,774 1,4	06 1,679	353 5	575 30,000	20,533 3	129,477 1,321	114,260 1,	166 15,217	155 10,000	4,344 44	0,805 416	39,501 40	03 1,304 13	24,505 98,	729 1	427 6,536	410,703 -	567,936 99,2	6,535	7,993 1,	407 101	11 -	676 -	18 15 -	\$ 43,475,328 \$2,	683,429 \$47,158	717 \$ 6,670,739	\$ 860,974 \$ 7,53	31,713 \$ 1,	463,657 \$ 182,652	\$ 487,885 \$61,1	26 \$7,837,385 :	\$1,160,685 \$4,235	5,284 \$ 23,082 \$	1,839 \$ 617	\$ 2,878	



### **Portfolio Results** Allocation Utilization

Portfolio	Description	CCWA % Table A Used	SLO % Table A Used
Portfolio 1 (F1)	Current Baseline Condition	46.1%	21.4%
Portfolio 2 (F2)	F1 plus using limited external storage	48.4%	22.1%
Portfolio 3 (F3)	F2 plus added demand for SLO GW Replenishment	48.5%	26.1%
Portfolio 4 (F4)	F3 plus allow transfers between CCWA and SLO	48.4%	31.0%
Portfolio 5 (F5)	F4 plus allow external purchases and sells	57.4%	52.4%

CCWA Long-term average allocation is 58%, far more than utilized



# Portfolio Results

### Deliveries, Shortages and Spill

Portfolio	Description	۲able A (۹			Deliveries .F)	Short (A	<b>–</b>	Carryover Spill (AF)			
		CCWA	SLO	CCWA	SLO	CCWA	SLO	CCWA	SLO		
1(F1)	Current Baseline Condition	46.1	21.4	21,146	5,239	2,473	32	5,424	9,151		
2 (F2)	Baseline with Limited External Storage	48.4	22.1	22,026	5,271	1,380	0	4,365	8,984		
3 (F3)	F2 with added SLO GW Demand	48.5	26.1	22,034	6,271	1,380	0	4,356	7,994		
4 (F4)	F3 with CCWA ⇔ SLO Transfers	48.4	31.0	23,210	6,271	442	0	4,370	6,761		
5 (F5)	F4 with External Transfers	57.4	52.4	22,912	6,271	371	0	298	1,406		



### **Portfolio Results** Water Supply and Shortage Cost

Portfolio	Description	CCW Tota (\$/a	l Cost	SLO Total (\$/af	Cost )	Shor	CCWA Shortage Cost (\$/af)		age (\$/af)
Portfolio 1 (F1)	Current Baseline Condition	\$	2,204	\$	1,414	\$	2,550	\$	3,000
Portfolio 2 (F2)	F1 plus using limited external storage	\$	2,194	\$	1,494	\$	2,515		
Portfolio 3 (F3)	F2 plus added demand for SLO GW Replenishment	\$	2,193	\$	1,277	\$	2,515		
Portfolio 4 (F4)	F3 plus allow transfers between CCWA and SLO	\$	2,128	\$	1,118	\$	2,835		
Portfolio 5 (F5)	F4 plus allow external purchases and sells	\$	1,816	\$	615	\$	2,878		



)4

### Input Data Water Supply and Shortage Cost

SWP Stateme	nt of Charges (2	2021 from Bulle	etin 132-2019)	External Storage Pro Parameter	<b>U</b>	Transfe	ers/Purchases
				Cost/Storage	\$ 750	Year	
Santa Barb	ara County	San Luis Ob	ispo County	Term (years)	30	Туре	Cost
<i></i> , ,						1 \$	\$ 100
Fixed	Variable	Fixed	Variable	Rate	5.0%	2 9	\$ 500
\$ 43,475,308	\$ 134	\$ 6,670,739	\$ 134	Put Cost/AF	\$ 50	3	5 1,000
						4 9	\$ 1,500
Shortage Cost	Multiplier		1.5	Return Cost/AF	\$ 100	5	\$ 2,000





Jim Beck

### **CONCLUSIONS & RECOMMENDATIONS**



# **SLOFCWCD** Conclusions

- SLOFCWCD has adequate SWP water supplies to meet its current Participant and simulated additional demands in all years under historic hydrologic patterns.
- Assumes that it can use available Coastal Branch conveyance capacity beyond its contracted share and historic hydrologic patterns remain the same in the future.
- SLOFCWCD has unused SWP water supplies in most years that frequently spill from San Luis Reservoir.
- Supply could be sold to CCWA or other SWP Contractors to reduce its overall SWP costs.
- Access to the water market without regulating programs provides little financial benefit.



# CCWA (SB) Conclusions

- As with SLOFCWCD, CCWA cannot store its unused SWP water supplies during high SWP allocation years for later use during lower SWP allocation years.
- A significant amount of its unused SWP water will spill from San Luis Reservoir.
- CCWA has frequent SWP supply shortages in dry years.
- CCWA's unused SWP water could be sold to other SWP Contractors and would reduce its overall SWP costs.
- The availability of annual or multi-year purchases with the SWP Water Management Amendment reduces shortages for CCWA.
- There is conveyance capacity available in the Coastal Branch in most years.



Explore a program to share conveyance capacity among the Coastal Branch Contractors.

- High level analysis of available unused capacity has been completed
- Optimized coordinated use of conveyance capacity available to CCWA and SLOFCWD could yield water supply and financial benefits to both organizations and their stakeholders
- Requires analysis of more detailed water supply and delivery schedules that could be completed with additional model refinement



Explore a program to transfer excess Table A between SLOFCWCD and CCWA.

• While a purchase program with other SWP Contractors would help CCWA reduce its shortages, the greatest benefit from a transfer program would likely occur if it can purchase unused Table A from SLOFCWCD.



Explore an external storage/exchange program for the Coastal Branch Contractors

- Particularly if there is increased demand for State Water Project supplies in the Coastal Branch, dry years become more extreme and storage reliability in San Luis Reservoir changes.
- External storage and exchange programs would not be subject to spill as carryover stored in San Luis Reservoir; thus, reducing the risk of water supply loss.
- In addition, some of the water stored in an external program could be exchanged with the banking partner to reduce the cost of using the storage.



Refine quantitative analysis of Model limitations if CCWA and SLOFCWCD do not fully implement the Management Tool Amendment or attempt to integrate their operations.

- The Model currently aggregates the operations for CCWA and SLOFCWCD into a single model.
- Additionally, it does not segregate contract rights for each of the Coastal Branch Contractors' member agencies; therefore, it may overestimate the capability to meet demands in some years.
- If there are limitations on how individual member unit water allocations can be used and stored, these limitations would need to be added to the model to fully investigate how they would impact water management decisions.



Explore alternative management of SLOFCWCD's uncontracted SWP Table A.

 Available options include entering into contracts with other entities for purposes such as groundwater basin supply augmentation, one-year or multi-year sale of unused Table A or permanent sale of a portion of SLOFCWCD's uncontracted SWP Table A Amount.



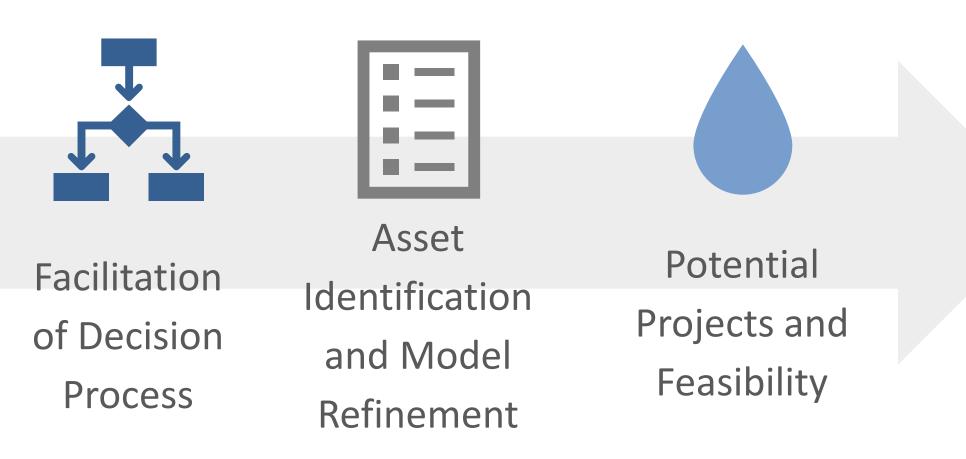
Explore supplemental groundwater supply options.

- Given the considerably higher value of SWP supplies through sales in drier years, an alternative approach for supplemental groundwater basin supply would be to provide higher amounts of water deliveries in wetter years and lower amounts (or none at all) in drier years.
- An intermittent SWP supply approach would likely be more cost effective for SWP supplies, but there would be a tradeoff from increased turnout and delivery facility costs for higher capacity deliveries and lower use factors.



### Phase II: Potential Project Identification

Pending Board Approvals







Jim Beck



