Staff Technical Workshop Part 6: City and County of San Francisco (CCSF) Effects

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Overview

- What are potential and likely effects of the project on the City and County of San Francisco?
- Tuolumne River Water Rights Context
- Method of Analysis
- Project Effects on CCSF Water Bank
- Determination of Replacement Water Needed
- Potential Actions to Meet Water Supply Demand
- Economic Analysis

Tuolumne River watershed



Tuolumne River Water Rights

- Pre-1914 Water Rights of Modesto ID and Turlock ID (MID/TID)
- The Raker Act of 1913 and Hetch Hetchy
- The Fourth Agreement (1966)
 - "... It is now necessary to set forth the respective responsibilities of the Districts and the City in the New Don Pedro Project..."
 - Article 7 Establishes water accounting ("water bank")
 - Article 8 Agree to ". . . re-allocation of storage credits to apportion such burdens [of future instream flow requirements] on the following basis: 51.7121% to City and 48.2879% to Districts. . . "

Raker Act requirements

- CCSF must bypass 2,350 cfs, or the entire natural daily flow of the Tuolumne River whenever the flow is less than that amount
- From April 15–June 13 (peak snowmelt) CCSF must bypass 4,000 cfs

Corrected slide: does not include 66 cfs added in 4th Agreement

Raker Act Allotment Availability

Corrected slide: includes 66 cfs added in 4th Agreement



(Source: DWR in Environmental Defense 2004)

Data Sources

CCSF Tuolumne River Flow Accounting
PUC Form P-173 (2011)

• WSE Model

- Accounting of increased flow requirements
 (20% / 40% / 60% Unimpaired Flow)
- Flood releases

Water Credit Account Modeling

 $Vol_{CCSF,t} = Vol_{CCSF,t-1} + NDP Inflow_{t-1} - Raker Act_{t-1} - Evap_{t-1} - Flood_{t-1} - Increased FERC flows_{t-1}$

Vol_{CCSF,t} = Current balance of water in the CCSF's account \leq 570 TAF (+½ of permitted encroachment in the flood control space)

Vol_{CCSF,t-1} = Previous day's balance in the CCSF's account.

NDP Inflow = Estimated inflow to New Don Pedro Reservoir, credits to account

Raker Act = Debits from the account, set forth in the Raker Act as:

4/15 - 6/14: 4,066 cfs or natural flow at La Grange, whichever is less 6/15 – 4/14: 2,416 cfs or natural flow at La Grange, whichever is less

Evap Evaporation = 50% Districts, 50% CCSF

Flood = Assigned proportional to net credit balance vs. reservoir storage

Increased FERC flows = 51.71% burden to the City out of the City's credit

Baseline Credit Balance and Historical Balance



Figure 1.4-1, Page L-15 of Appendix L

Analysis Overview: 4TH Agreement Scenarios

- <u>Scenario 1</u>: Storage credits would be reallocated only if CCSF has a positive credit balance in the water bank account.
- <u>Scenario 2</u>: Storage credits would be reallocated even if CCSF has a negative balance in the water bank account.

CCSF Water Bank Account Balance



Figure 1.4-2, Page L-18 of Appendix L

CCSF Water Bank Account Balance



Figure 1.4-3, Page L-19 of Appendix L

Annual Supplement Needed to Maintain a Positive Balance in the New Don Pedro Reservoir CCSF Water Bank Account for Each Scenario (The drought 6-year average is for the years 1987–1992.)

		Scenario 1				Scenario 2	
		Supplement Needed				pplement N	eeded
	Baseline	LSIR Alt. 2	LSIR Alt. 3	LSIR Alt. 4	LSIR Alt. 2	LSJR Alt. 3	LSJR Alt. 4
	Supplement	(20% UF)	(40% UF)	(60% UF)	(20% UF)	(40% UF)	(60% UF)
Calendar Year	Needed (TAF)	(TAF)	(TAF)	(TAF)	(TAF)	(TAF)	(TAF)
1983	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0
1988	54.6	70.5	147.5	209.3	73.6	185.1	311.8
1989	0.0	19.9	20.4	0.0	45.4	188.4	330.7
1990	20.2	58.6	68.0	46.5	73.7	142.2	213.9
1991	3.8	12.8	3.8	3.8	64.9	182.4	300.6
1992	29.6	29.6	29.6	29.6	58.5	125.5	198.2
1993	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	61.3
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0
2002	0	0	0	11.4	0	0	57.7
2003	0	0	0	0	0	0	119.4
Drought Total	108.2	191.3	269.3	300.5	316.2	823.6	1593.7
6-yr Average	18.0	31.9	44.9	48.2	52.7	137.3	225.9
21-yr Average	5.2	9.1	12.8	14.3	15.1	39.2	75.9
UF = unimpaired flow	ፕ _ግ ሬ			fAnnondin	· I		13
TAF = thousand acre-feet I a DIE L.4-1, Page L-17 OI Appendix L							

Economic Analysis

Presentation Topics

- SFPUC Water District Profile
- Economic Analysis Overview
- Estimated Water Supply Costs
- Potential Ratepayer Effects
- Estimated Regional Economic Impacts

SFPUC Water District Profile

- CCSF, through the SFPUC, owns and operates a regional water system providing service to approximately 2.6 million residents
 - Retail water supplier to San Francisco
 - Wholesale supplier to 27 water agencies and water companies in three Bay Area counties, including those serving parts of Alameda, San Mateo, and Santa Clara Counties
- Capacity of the SFPUC water system is approximately 265 mgd (296,800 AF/y) on average
 - 85 percent is from the Tuolumne River Watershed through SFPUC's Hetch Hetchy Project
 - 15 percent is from the combined Alameda and Peninsula Watersheds

SFPUC Water District Profile (con't)

- During drought periods, the water provided by the Hetch Hetchy Project can amount to more than 93 percent of total water to service area.
- Individual water agencies rely on SFPUC supplies to varying extents, and water use by customer class varies widely among the wholesale agencies (Table 20.3.3-8).
 - About 59 percent delivered to residential customers
 - 21 percent to commercial and industrial customers
 - 11 percent to government and other users
 - 9 percent to dedicated irrigation users

Economic Analysis Overview



- SFPUC would purchase water to offset water shortages during extended drought periods

- SFPUC would pass the additional cost on to its retail customers





customers and net income of proprietors

- Retail customers: temporary rate surcharge

- Wholesale customers: higher wholesale water rates \rightarrow

temporary rate surcharge to their retail customers

Regional Economic Impacts

- decrease in economic output
- decrease in jobs
- other effects on economic activity (e.g., fiscal)

Estimated Water Supply Costs

Key Assumptions

- SFPUC would meet its water demands during severe drought periods (such as within the 6-year drought 1987–1992) by purchasing water from Irrigation Districts (e.g., MID/TID).
- Water purchase price would be \$1,000 per AF.
- No other costs to SFPUC (i.e., costs to wheel, treat, or distribute Hetch Hetchy water) are assumed.
- O&M costs to obtain water from the Hetch Hetchy water system do not vary based on the amount of water delivered annually.

Potential Cost of Other Water Supply Options

- In-Delta Diversion (SFPUC 2007)
 - Construction and operation of facility at Tesla Portal
 - \$306.1M capital costs
 - \$7.8M annual operating maintenance costs
- Water Supply Desalination Project (BARDP) (SFPUC 2008b)
 - Use of existing infrastructure, including the use of Mallard Slough Pump Station and associated water rights, conveyance to and from Los Vaqueros Reservoir, and Los Vaqueros Reservoir (for storage)
 - \$168M Capital costs
 - \$10.5M Annual operating costs (MWH 2010)

Estimated Water Supply Costs: Short Term (1987-1992) Average Annual Cost

Estimated Mean Annual Cost to SFPUC for Replacing Water Supplies during an Extended Drought Period

	Sce	nario 1	Scenario 2		
	Required				
	Water	Estimated	Required	Estimated	
	Transfer	Purchase	Water Transfer	Purchase	
Alternative	(TAF)	Cost	(TAF)	Cost	
LSJR Alt. 2 (20% UF)	14	\$14,000,000	35	\$35,000,000	
LSJR Alt. 3 (40% UF)	27	\$27,000,000	119	\$119,000,000	
LSJR Alt. 4 (60% UF)	30	\$30,000,000	208	\$208,000,000	

Source: Appendix L, Table L.6-1a; Chapter 20, Table 20.3.3-9a.

Estimated Water Supply Costs: Longer-Term (1983-2003) Average Annual Cost

Estimated Mean Annual Cost to SFPUC for Replacing Water Supplies during an Extended Drought Period

	Scenario 1		Scen	ario 2
	Required		Required	
	Water		Water	Estimated
	Transfer	Estimated	Transfer	Purchase
Alternative	(TAF)	Purchase Cost	(TAF)	Cost
LSJR Alt. 2 (20% UF)	4	\$4,000,000	10	\$10,000,000
LSJR Alt. 3 (40% UF)	8	\$8,000,000	34	\$34,000,000
LSJR Alt. 4 (60% UF)	9	\$9,000,000	71	\$71,000,000

Source: Appendix L, Table L.6-1b; Chapter 20, Table 20.3.3-9b.

Potential Ratepayer Effects

Key Assumptions

- **BASELINE CONDITIONS**: The total combined SFPUC Water Enterprise and Hetch Hetchy Water budget for fiscal year 2013–2014 (\$483.2 million) is assumed.
- Budgetary cost increases for SFPUC to replace water during extended drought conditions would result in <u>proportional rate increases</u> in SFPUC's retail and wholesale water rates, relative to baseline rates.

Potential Ratepayer Effects: Calculation Steps

- Step 1 Establish baseline annual water budget
- Step 2 Use estimates of water replacement cost as the basis for determining the change in baseline annual water budget
- Step 3 Estimate the annual percent change from the baseline water budget and use as the basis for approximating the annual effect on customer rates

Potential Ratepayer Effects: Example Calculation for LSJR Alt. 3 (40% UF) under Scenario 1

Step 1 - Establish baseline annual water budget: 2013-14 Water Enterprise budget (\$446.3M) + Hetch Hechy Water budget (\$36.9M) = \$483.2M

Step 2 – Use estimates of water replacement cost as the basis for determining the change in baseline annual water budget:

- Short-Term: \$27M+\$483.2M = \$510.2M
- Longer-Term: \$8M+\$483.2M = \$491.2M

Step 3 - Estimate the annual % change in the water budget and use as the basis for approximating the annual effect on customer rates:

- Short-Term: \$27M/\$483.2M = 5.6% (surcharge)
- Longer-Term: \$8M/\$483.2M = 1.7% (more permanent rate change)

Potential Ratepayer Effects: Annual Budget Effects (Short Term 6-yr Drought Average)

Estimated <u>Short-Term</u> Annual Budget Effects to SFPUC of Purchasing Replacement Water Supplies during an Extended Drought Period: Scenario 1

	Baseline	LSJR Alt. 2 (20% UF)	LSJR Alt. 3 (40% UF)	LSJR Alt. 4 (60% UF)
Average Annual Water Replacement Costs (\$ Millions)		14	27	30
Water Budget with Replacement Costs (\$ Millions)	483.2	497.2	510.2	513.2
Percentage Change in Water Budget Expenditures		2.9%	5.6%	6.2%
Water Budget with Replacement Costs (\$ Millions) Percentage Change in Water Budget Expenditures	483.2 	497.2 2.9%	510.2 5.6%	513.2 6.2%

Source: Appendix L, Table L.6-6; Chapter 20, Table 20.3.3-14a.

Potential Ratepayer Effects: Annual Budget Effects (Longer Term 21-yr Average)

Estimated <u>Longer-Term</u> Annual Budget Effects to SFPUC of Purchasing Replacement Water Supplies during an Extended Drought Period: Scenario 1

		LSJR Alt. 2	LSJR Alt. 3	LSJR Alt. 4
	Baseline	(20% UF)	(40% UF)	(60% UF)
Average Annual Water				
Replacement Costs (\$ Millions)		4	8	9
Water Budget with				
Replacement Costs (\$ Millions)	483.2	487.2	491.2	492.2
Percentage Change in Water				
Budget Expenditures		0.8%	1.7%	1.9%
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Source: Appendix L, Table L.6-8; Chapter 20, Table 20.3.3-14b

Potential Ratepayer Effects: Annual Budget Effects (Scenario 2)

Estimated <u>Short-Term</u> and <u>Longer-Term</u> Annual Average Budget Effects of Purchasing Replacement Water Supplies during an Extended Drought Period: Scenario 2

Short-Term	Baseline	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4
Average Annual Water Replacement Costs (\$ Millions)		35	119	208
Water Budget with Replacement Costs (\$ Millions)	483.2	518.2	602.2	691.2
Percentage Change in Water Budget Expenditures		7.2%	24.6%	43.1%
Longer-Term	Baseline	LSJR Alternative 2	LSJR Alternative 3	LSJR Alternative 4
Average Annual Water		10	34	71
Replacement Costs (\$ Millions)				
Water Budget with	483.2	493.2	517.2	554.2
Replacement Costs (\$ Millions)				
Percentage Change in Water		2.1%	7.0%	14.7%
Budget Expenditures				

31

Estimated Regional Economic Impacts

Estimated Regional Economic Impacts: Overview of Analysis

Estimating Annualized Impacts on the Bay Area Regional Economy from Purchasing Replacement Water Supplies

- Estimate additional water supply costs by water district, customer type, and county (San Francisco, Alameda, San Mateo, and Santa Clara)
- Evaluate how different customer types would likely respond to higher water rates and develop modeling assumptions
- Develop county-level and region-wide IMPLAN models for simulating effects on economic activity (output and jobs), based on estimated changes in the demand for goods and services in economic sectors affected by increases in water costs

Key Assumptions

Increased water costs would be passed along to customers, so no reductions in output values or employment levels would be expected (although demand for water may fall while rate surcharges are in effect).

- Households: reduce their discretionary spending on other goods and services within the four-county Bay Area region
- **Commercial and Industrial users:** absorb reduced levels of profits rather than cut production or raise prices (For this assessment, all business owners and shareholders are assumed to reside within the region.)
- **Government agencies:** increase in operating costs, resulting in decreased spending on labor and other goods and services required for agency operations
- **Dedicated irrigation users:** decrease in discretionary spending by private water users (e.g., multi-family residential complexes, commercial and industrial landscaped areas)

Estimated Regional Economic Impacts: Economic Output and Jobs

Estimated Average Annual Effects on Total (Direct, Indirect, and Induced) Economic Output and Jobs in the Bay Area Region during Severe Drought Years: Scenario 1

Bay Area		LSJR Alt. 2	LSJR Alt. 3	LSJR Alt. 4
Region	2010 Baseline	(20% UF)	(40% UF)	(60% UF)
Total Region				
Output (\$	645,299.8	-16.2	-31.4	-35.3
Millions)				
% of Output	100	-0.03	-0.05	-0.05
Total Region Jobs	3,183,201	-117	-226	-254
% of Jobs	100	<-0.01	<-0.01	<-0.01
Sources: Appendix L. T	able L. 6-3. Chapter 20	Table 20 3 3-10		

Estimated Regional Economic Impacts: Economic Output and Jobs

Estimated Average Annual Effects on Total (Direct, Indirect, and Induced) Economic Output and Jobs in the Bay Area Region during Severe Drought Years: Scenario 2

Bay Area Region	2010 Baseline	LSJR Alt 2 (20% UF)	LSJR Alt 3 (40% UF)	LSJR Alt 4 (60% UF)
Total Region Output (\$ Millions)	645,299.8	-40.5	-139.5	-243.6
% of Output	100	-0.06	-0.22	-0.38
Total Region Jobs	3,183,201	-292	-1,005	-1,756
% of Jobs	100	-0.01	-0.03	-0.06
Sources: Appendix L. Table L.6-5.	Chapter 20, Table 2	20.3.3-12.		

Estimated Regional Economic Impacts: Sensitivity Analysis

Estimated Average Annual Effects on Total Economic Output in the Four-County Bay Area Region during an Extended Drought Period, Assuming Alternative Average Annual Water Transfer Prices

			Total Region Output (\$ Millions)			
			Change from Base	line under LSJ	R Alternative	
Scenario	Water Transfer Price (\$/AF)	2010 Baseline	LSJR Alt. 2 (20% UF)	LSJR Alt. 3 (40% UF)	LSJR Alt.4 (60% UF)	
	500	645,300	-8.1	-15.7	-17.7	
Scenario 1	1000	645,300	-16.2	-31.4	-35.3	
	2000	645,300	-32.4	-62.8	-70.6	
	500	645,300	-20.3	-69.8	-121.8	
Scenario 2	1000	645,300	-40.5	-139.5	-243.6	
	2000	645,300	-81	-279	-487.2	

Estimated Regional Economic Impacts: Sensitivity Analysis

Estimated Average Annual Effects on Total Jobs in the Four-County Bay Area Region during an Extended Drought Period, Assuming Alternative Average Annual Water Transfer Prices

			Total Region Employment (# of Jobs) Change from Baseline under LSJR Alternative			
Scenario	Water Transfer Price (\$/AF)	2010 Baseline	LSJR Alt. 2 (20% UF)	LSJR Alt. 3 (40% UF)	LSJR Alt. 4 (60% UF)	
	500	3,183,201	-58.5	-113	-127	
Scenario 1	1000	3,183,201	-117	-226	-254	
	2000	3,183,201	-234	-452	-508	
	500	3,183,201	-146	-502.5	-878	
Scenario 2	1000	3,183,201	-292	-1005	-1756	
	2000	3,183,201	-584	-2010	-3512	

Source: Based on information presented in Appendix L, Tables L.6-2 through L.6-5