CALFED WATER QUALITY

LOADING ANALYSIS FRAMEWORK

CONTENTS

1) CONSTITUENT SELECTION TABLE
2) SOURCE SELECTION TABLE
3) EXAMPLE (METALS)
4) EXAMPLE (TDS)

Prepared for
CALFED Water Quality Action Team
Sacramento, CA

April 2, 1997

Woodward-Clyde

Woodward-Clyde International
500 12th Street, Suite 200
Oakland, CA 94607
S9634/6000

Ecosystem

Industrial
Recreational

CONSTITUENT SELECTION TABLE

		303(d) List Problem Area	303(d) List Solution Area		303(d) List Affecting Problem Area				
Type	Constituent	Delta	Sacramento Basin	San Joaquin Basin	Bay Region	Sacramento R. (above dams)	Drinking Water	Agricultural Water	LOADING LIST
Metals	~~As~~								
	Cd	■	■		■	■			■
	~~Cr~~								
	Cu	■	■	■	■	■			■
	Hg	■	■	■	■	■			■
	~~Pb~~								
	~~Ni~~								
	Zn	■	■	■	■	■			■
Trace El.	selenium	■		■	■				■
	boron			■				■	■
Organics	TOC						■		■
	~~DOC~~								
	~~THM~~								
	~~THMFP~~								
	~~TFPC~~								
	chlorpyrifos	■	■	■					■
Pesticides	DDT	■		■					■
	carbofuran		■						■
	chlordane (A)	■	■	■					■
	diazinon	■	■	■					■
	toxaphene (A)	■	■	■					■
	PCBs		■						■
	~~endosulfan (A)~~			■					■
Salts	TDS			■			■	■	■
	salinity	■		■				■	■
	SAR							■	■
	bromide						■		■
	chloride							■	■
Biotic	pathogens				■	■	■		■
	~~viruses~~								
Nutrients	nitrate	■			■	■	■	■	■
	~~phosphorous~~								
	ammonia	■		■					■
Other	DO	■		■					■
	turbidity				■		■	■	■
	temperature		■					■	■
	unk. toxicity	■	■	■					■
	pH					■		■	■
	alkalinity							■	■
	sediment.		■						■

X

Solution area
~~Hyperacidic~~
fish
Problem area
all

c:\projects\cal-fed\WQ-2.XLS 1
4/2/97 11:37 AM

D-037364

D-037364

SOURCE SELECTION TABLE

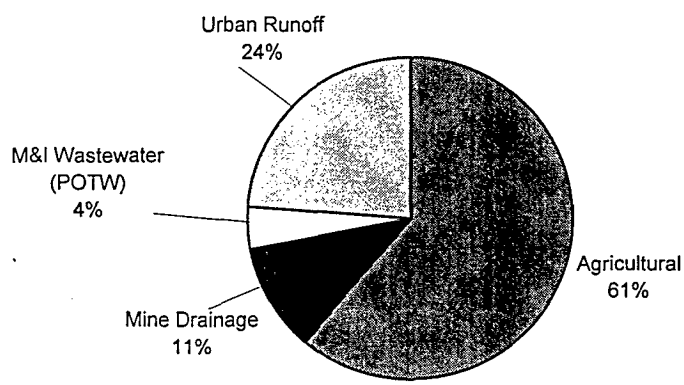
Type	Constituent	Agricultural	Mine Drainage	M&I Wastewater (POTW)	Urban Runoff	Flow Regulation	Dams	Dairies	Construction	On-site Disposal	Marinas
Metals	As										
	Cd	■	■	■	■	■					
	Cr										
	Cu	■	■	■	■	■					
	Hg	■	■	■	■	■					
	Pb										
	Ni										
	Zn	■	■	■	■	■					
Trace El.	selenium	■	■	■	■	■					
	boron	■									
Organics	TOC										
	DOC										
	THM										
	THMFP										
	TFPC										
	chlorpyrifos	■			■						
Pesticides	DDT	■									
	carbofuran	■									
	chlordane (A)	■			■						
	diazinon	■			■						
	toxaphene (A)	■									
	PCBs			■	■						
	endosulfan (A)	■									
Salts	TDS	■									
	salinity	■			■	■		■			
	SAR										
	bromide										
	chloride										
Biotic	pathogens	■			■				■	■	■
	viruses										
Nutrients	nitrate	■			■	■			■		
	phosphorous										
	ammonia	■		■				■			
Other	DO	■		■	■	■	■	■	■		
	turbidity	■			■						
	temperature						■				
	unk. toxicity										
	pH		■								
	alkalinity										
	sediment.		■								

LOADING TABLE

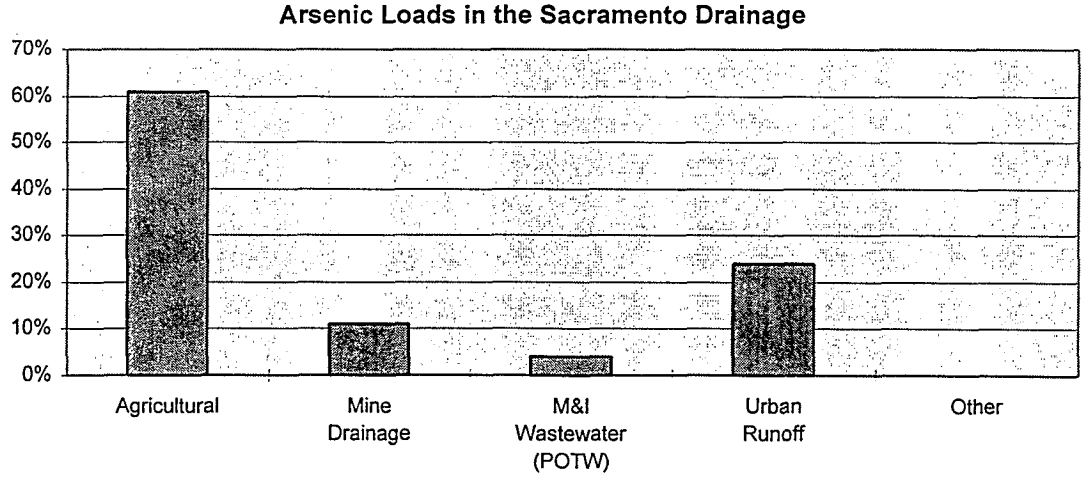
	Metal Loadings to the Sacramento R. (%)							
	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
Agricultural	61%	15%		28%		15%		17%
Mine Drainage	11%	72%		59%		3%		60%
M&I Wastewater (POTW)	4%	1%		2%		3%		3%
Urban Runoff	24%	12%		11%		80%		20%
Other								
Total	100%	100%	0%	100%	0%	100%	0%	100%

Source: Brown & Caldwell, 1995. Study of Drinking Water Quality in Delta Tributaries. April (Appendix A, Table 2)

Example:
Arsenic Loads in the Sacramento Drainage



Example:
Arsenic Loads in the Sacramento Drainage

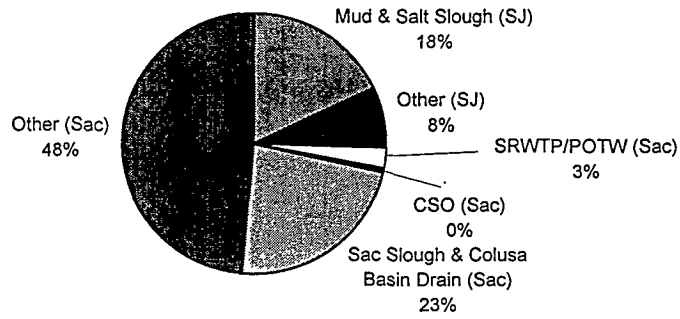


LOADING TABLE

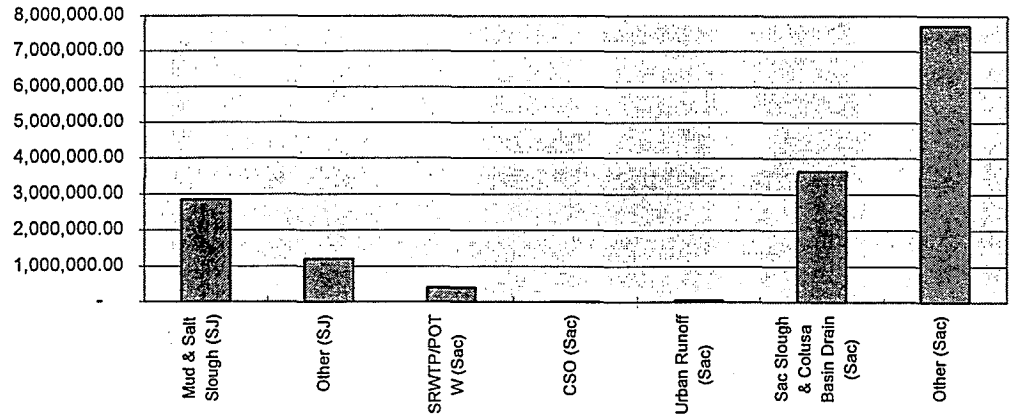
	TDS (lbs/day)				
	Average	Dry Year/ Wet Season	Dry Year/ Dry Season	Wet Year/ Wet Season	Wet Year/ Dry Season
Mud & Salt Slough (SJ)	2,852,250.00	3,318,000	2,142,000	4,087,000	1,862,000
Other (SJ)	1,208,250.00	882,000	-	2,013,000	1,938,000
SRWTP/POTW (Sac)	405,500.00	390,000	432,000	440,000	360,000
CSO (Sac)	11,000.00	-	-	44,000	-
Urban Runoff (Sac)	50,000.00	156,000	-	44,000	-
Sac Slough & Colusa Basin Drain (Sac)	3,631,500.00	2,418,000	1,728,000	7,260,000	3,120,000
Other (Sac)	7,724,000.00	4,836,000	3,240,000	14,300,000	8,520,000
Total	15,882,500	12,000,000	7,542,000	28,188,000	15,800,000

Adopted from: Brown & Caldwell, 1995. Study of Drinking Water Quality in Delta Tributaries. April (Figure 4-3)

Example:
TDS Loads to the Delta



Example:
TDS Loads to the Delta (lbs/day)



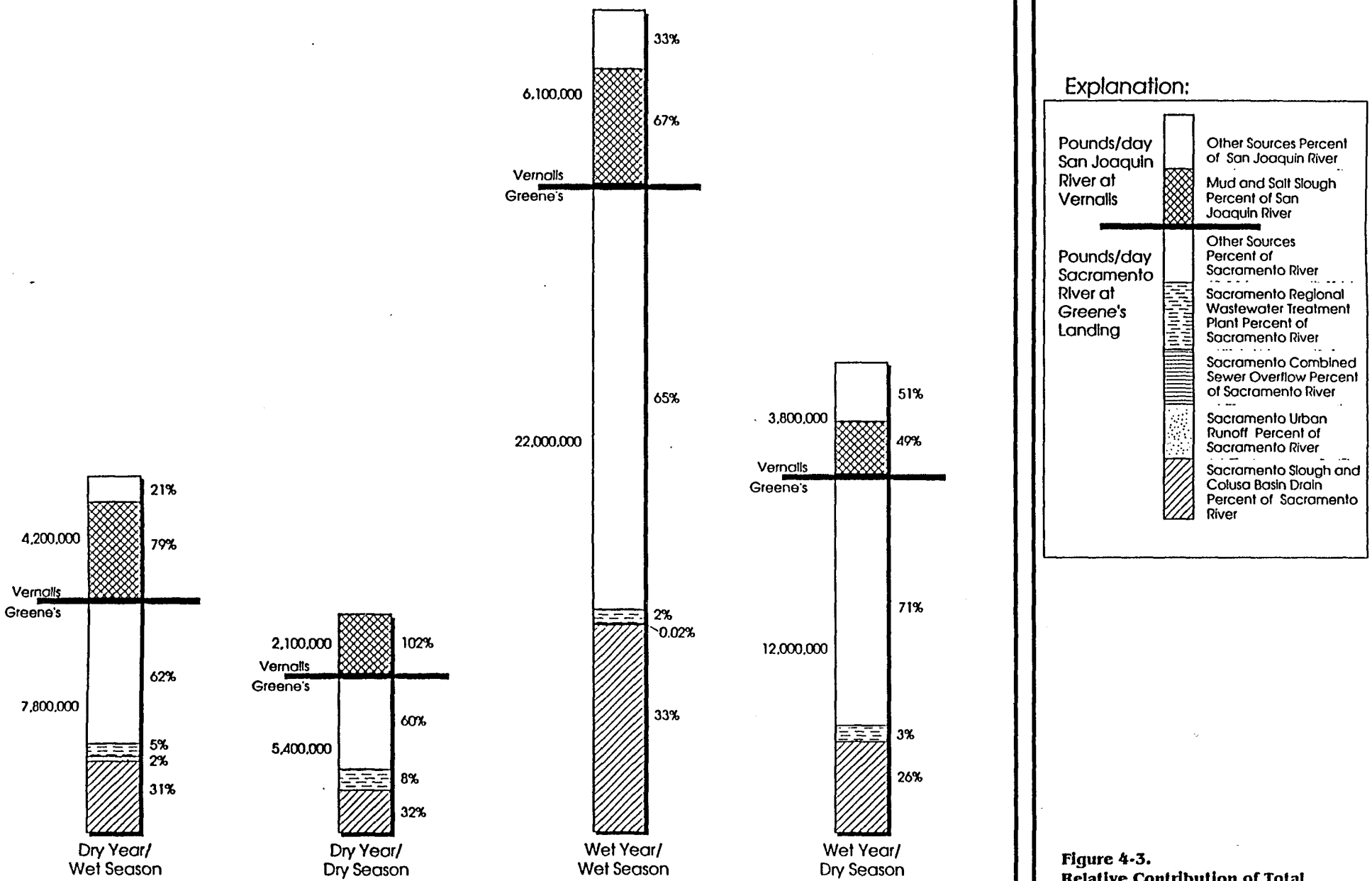


Figure 4-3.
Relative Contribution of Total Dissolved Solids from the Delta Tributaries

BROWN AND CALDWELL

D-037368

D-037368