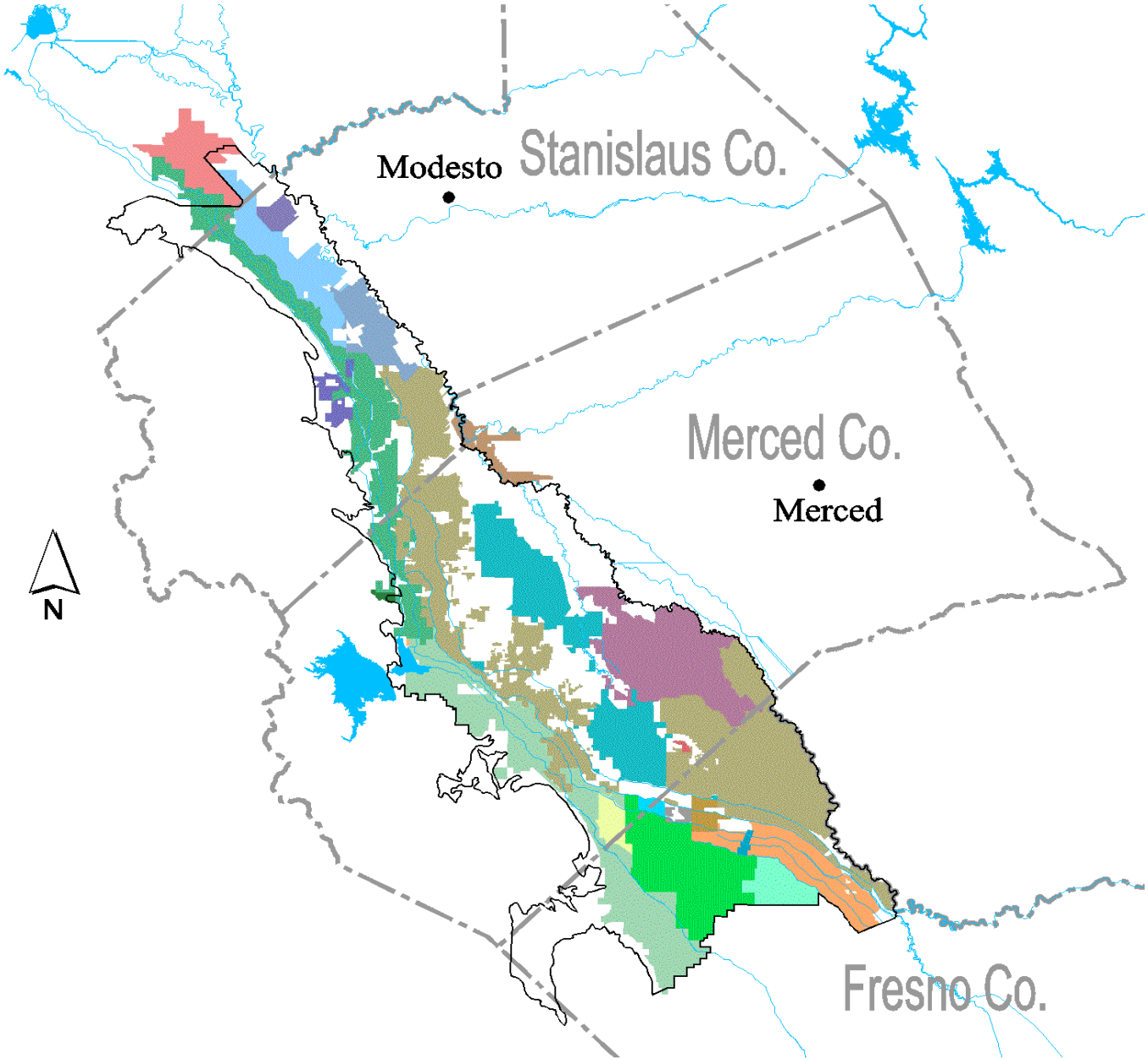
Creating DAU by County Water Balances

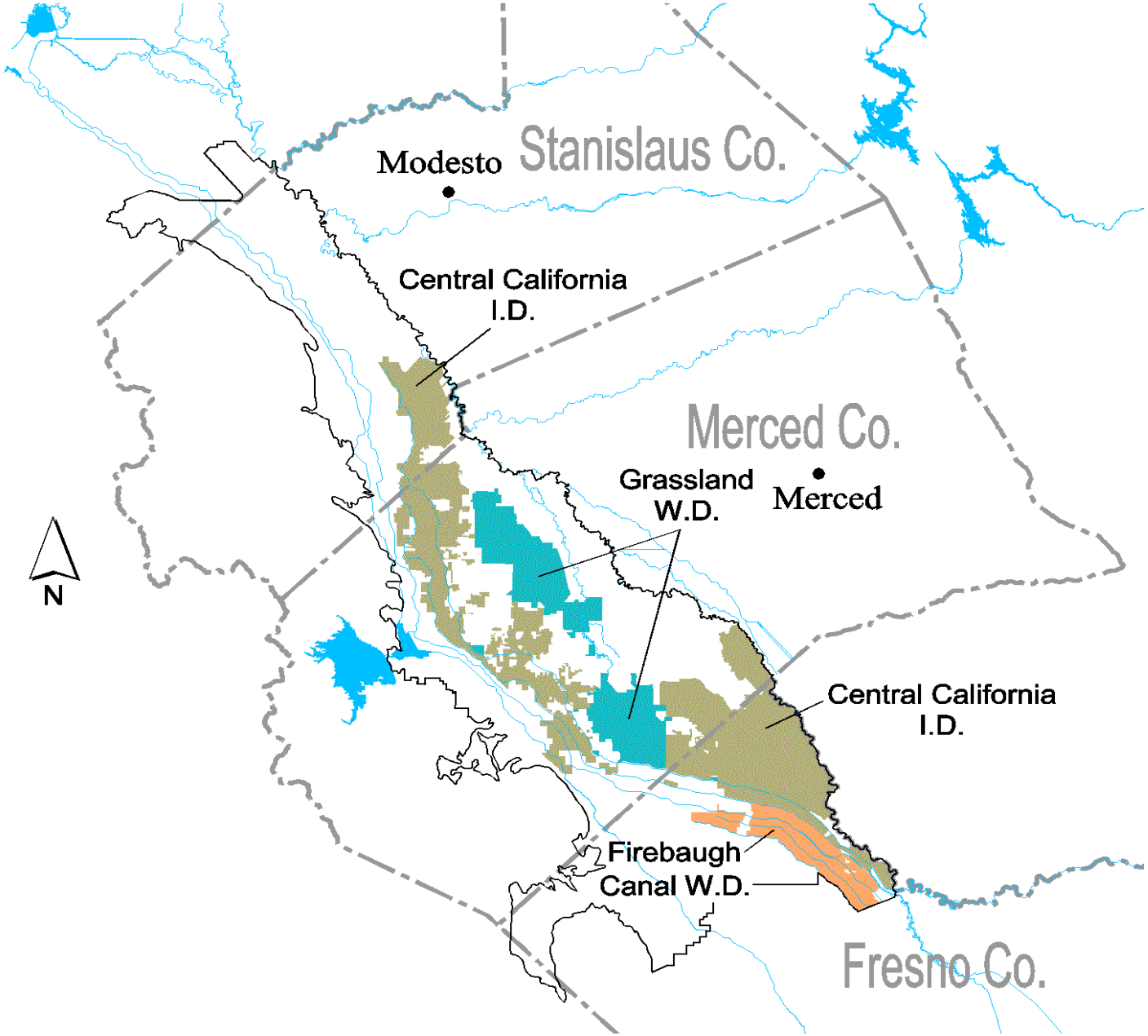
- Ag Applied/Net Water Demand
- M&I Applied Water/Net Water Demand
- Environmental Applied/Net Water Demand – Refuges
- Increase applied and net water demand to include conveyance and other losses
- SWP Supplies By Water District
- CVP Supplies By Water District
- Local Surface Supplies By WD and Unincorporated Areas (Ditch Companies, Individuals
- Transfers – Difficult to track unless SWP/CVP
- Other Water Demands/Supplies – Oil Recovery, HWUI's, etc.

Detailed Example: DAU 216



Detailed Example: DAU 216

- - 3 counties in SJD portion
  - SWP, CVP, Local Supplies
  - Wetlands

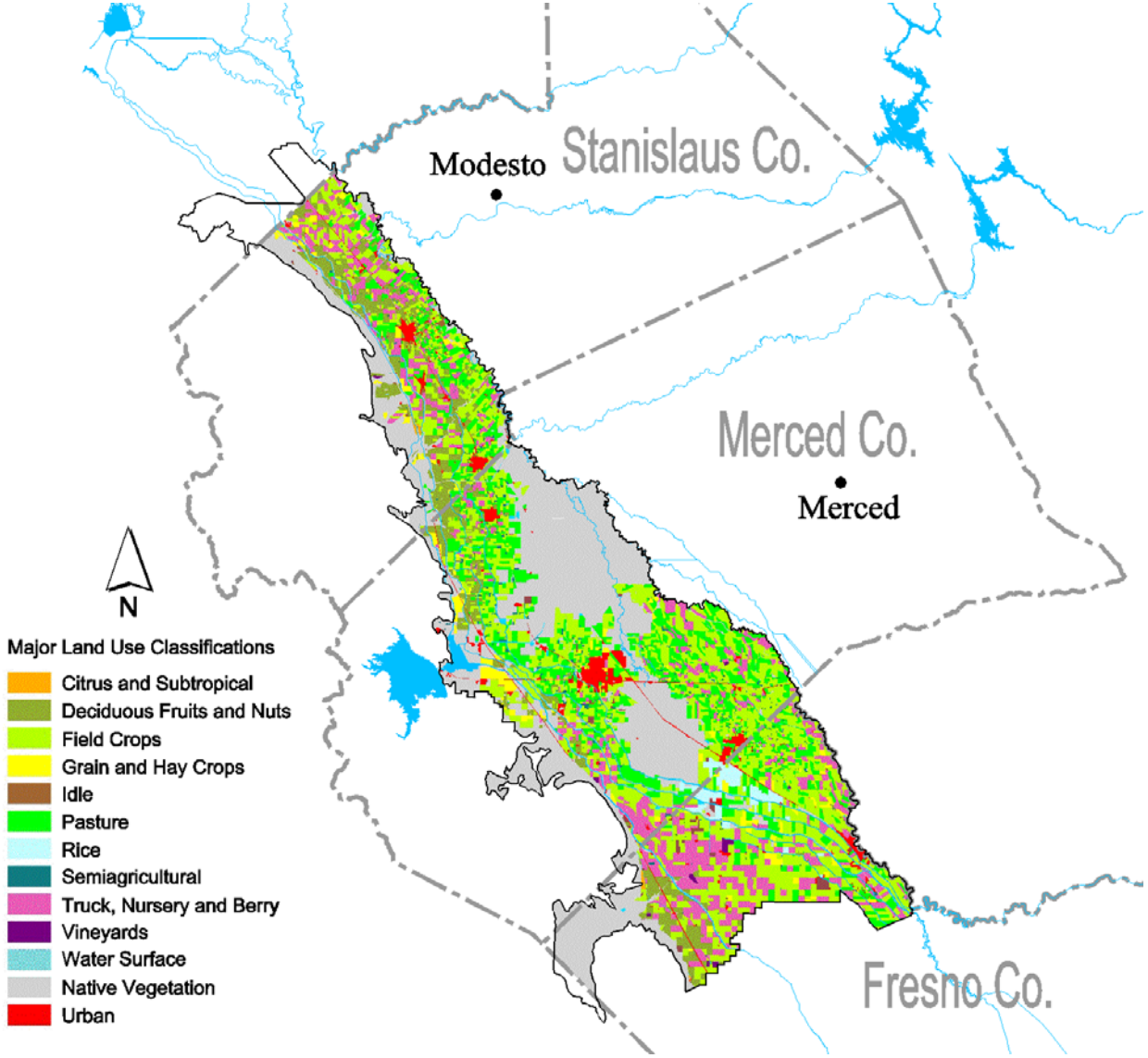


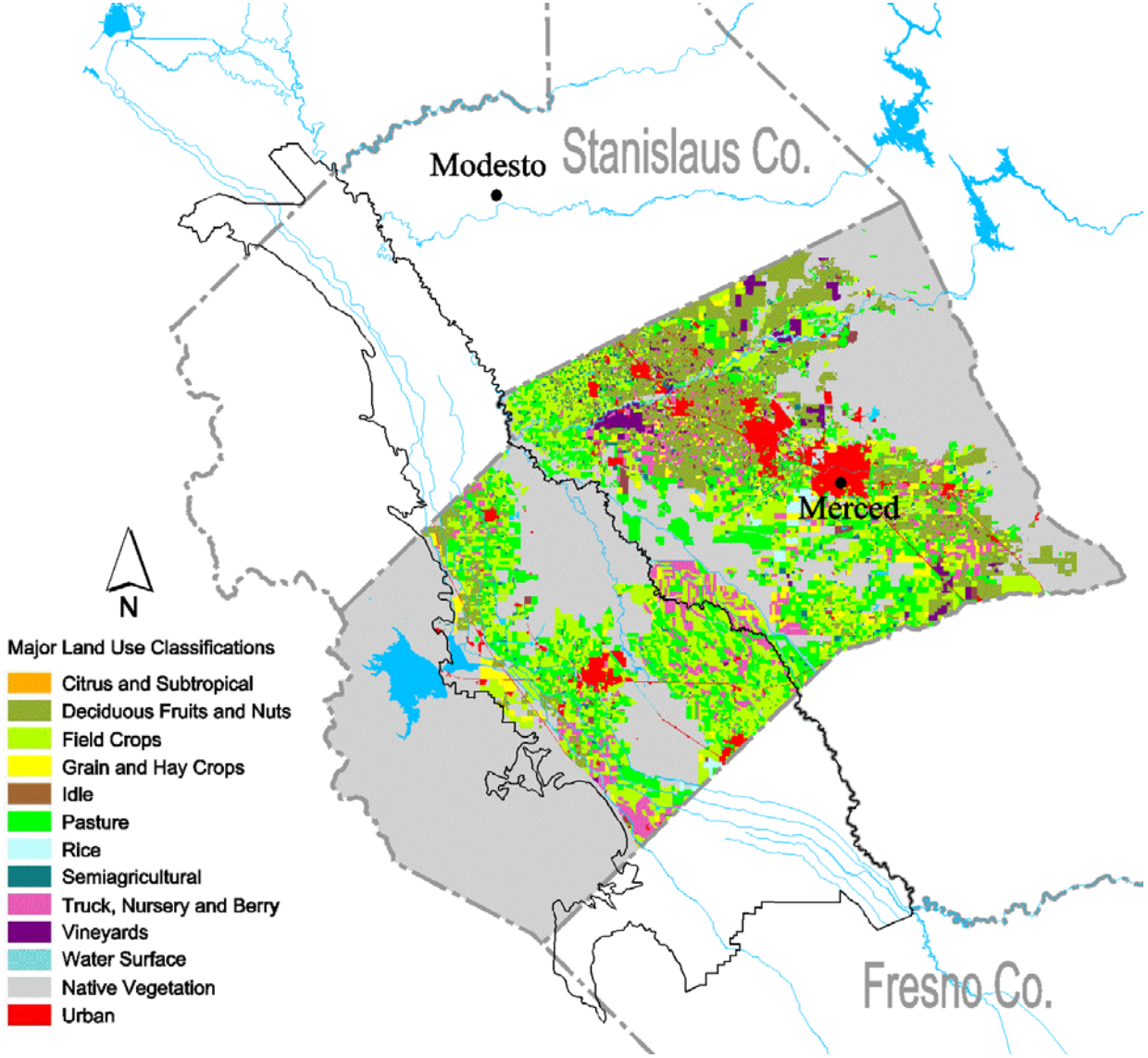
Determine Water Demands

- Agricultural Demand
- M & I Demand
- Environmental Demand (Wetlands/Refuges)

Ag Applied/Net Water Demand by DAU by County

- Calculation methods similar to what was used by other Districts


Modesto
Stanislaus Co.
Merced Co.
Merced
Fresno Co.
N
Major Land Use Classifications
Citrus and Subtropical
Deciduous Fruits and Nuts
Field Crops
Grain and Hay Crops
Idle
Pasture
Rice
Semiagricultural
Truck, Nursery and Berry
Vineyards
Water Surface
Native Vegetation
Urban


Modesto
Stanislaus Co.
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Major Land Use Classifications
Citrus and Subtropical
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Field Crops
Grain and Hay Crops
Idle
Pasture
Rice
Semiagricultural
Truck, Nursery and Berry
Vineyards
Water Surface
Native Vegetation
Urban

Monthly Pan Evaporation Crop Coefficients for the San Joaquin Valley1 for 1998

	Crop Coefficients and Percentage of Month																							
	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
Crops	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%	Coef	%
Grain					0.21	80%	0.40	100%	0.74	100%	0.95	100%	0.95	100%	0.70	100%	0.41	10%						
Rice															0.80	100%	0.85	100%	0.99	100%	1.00	100%	0.90	100%
Cotton													0.12	100%	0.36	100%	0.91	100%	0.98	100%	0.78	100%	0.40	100%
Sugar Beets	0.31	100%	0.55	100%	0.85	100%	0.92	100%	0.91	100%	0.89	100%	0.84	100%	0.75	100%	0.58	50%						
Corn															0.15	50%	0.46	100%	0.92	100%	0.84	100%	0.58	60%
Sudan Grass													0.60	100%	0.88	100%	0.88	100%	0.88	100%	0.88	60%		
Dry Beans															0.30	50%	0.88	100%	0.81	100%	0.39	100%		
Safflower									0.32	90%	0.62	100%	0.79	100%	0.84	100%	0.84	100%	0.82	100%	0.25	32%		
Other Field															0.14	100%	0.35	100%	0.80	100%	0.85	100%	0.67	56%
Alfalfa	0.70	50%									0.70	100%	0.76	100%	0.76	100%	0.76	100%	0.76	100%	0.73	100%	0.73	100%
Alfalfa Seed																	0.76	100%	0.76	100%	0.76	100%	0.73	100%
Carrots													0.25	25%	0.45	100%	0.65	100%	0.75	25%				
Pasture	0.70	50%									0.70	100%	0.76	100%	0.76	100%	0.76	100%	0.76	100%	0.76	100%	0.73	100%
Mkt Tomatoes									0.20	14%	0.21	100%	0.39	100%	0.82	100%	0.88	100%	0.76	26%				
Meadow Pasture																								
Meadow Pasture - X																								
Proc Tomatoes									0.20	14%	0.20	100%	0.24	100%	0.53	100%	0.90	100%	0.83	100%	0.67	40%		
Potatoes									0.30	100%	0.63	100%	0.95	100%	0.80	100%	0.42	15%						
Cucurbits											0.15	67%	0.30	100%	0.76	100%	0.84	100%	0.38	70%				
Onions & Garlic			0.17	50%	0.31	100%	0.60	100%	0.84	100%	0.90	100%	0.90	100%	0.90	100%	0.82	100%	0.60	100%				
Other Truck	0.72	100%	0.80	100%	0.60	70%															0.30	50%	0.45	100%
Almonds	0.40	100%							0.30	60%	0.35	100%	0.60	100%	0.70	100%	0.73	100%	0.83	100%	0.58	100%	0.35	100%
Pistachios	0.68	100%	0.55	100%									0.46	100%	0.57	100%	0.66	100%	0.73	100%	0.75	100%	0.73	100%
Prunes	0.68	100%	0.55	50%							0.35	50%	0.46	100%	0.57	100%	0.66	100%	0.73	100%	0.75	100%	0.73	100%
Walnuts	0.68	100%	0.55	100%									0.46	100%	0.57	100%	0.66	100%	0.73	100%	0.75	100%	0.73	100%
Deciduous Orchards	0.57	100%									0.35	90%	0.57	100%	0.66	100%	0.73	100%	0.74	100%	0.75	100%	0.69	100%
Kiwi	0.45	100%	0.25	50%									0.11	50%	0.30	100%	0.55	100%	0.63	100%	0.64	100%	0.61	100%
Subtropical Fruit	0.56	100%									0.56	100%	0.56	100%	0.56	100%	0.52	100%	0.52	100%	0.52	100%	0.52	100%
Grapes	0.22	100%	0.20	50%							0.10	25%	0.17	100%	0.44	100%	0.55	100%	0.66	100%	0.56	100%	0.38	100%
Eucalyptus	0.56	100%	0.56	100%	0.56	100%	0.60	100%	0.59	100%	0.56	100%	0.56	100%	0.56	100%	0.52	100%	0.52	100%	0.52	100%	0.52	100%

Fresno State Pan Evaporation

San Joaquin District

Water Year	Flood Irrigated Pasture Pan Evaporation, in inches												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1987	4.51	2.15	0.96	1.36	2.49	3.54	7.09	9.40	9.95	10.21	9.11	7.06	67.83
1988	4.38	2.01	1.23	1.49	2.62	4.94	5.06	7.84	9.02	10.80	8.93	6.77	65.09
1989	4.74	2.52	1.16	1.22	1.63	3.76	6.22	9.44	10.59	9.87	9.05	5.88	66.09
1990	5.32	2.04	1.13	1.61	2.49	3.79	5.93	7.34	9.80	10.80	8.47	6.97	65.69
1991	5.38	2.68	1.49	1.50	3.07	3.93	6.83	8.45	9.21	9.74	9.03	7.09	68.40
1992	4.86	2.52	1.66	0.97	2.31	3.23	6.80	9.72	10.11	9.87	10.61	8.18	70.84
1993	4.65	2.20	1.37	1.30	1.91	3.59	6.14	9.40	9.73	10.25	9.64	7.35	67.53
1994	4.52	2.75	1.24	1.38	1.86	3.89	5.70	7.84	11.37	10.21	8.97	6.92	66.64
1995	5.09	2.23	0.93	1.22	1.45	3.60	5.14	7.21	9.00	10.49	9.76	7.94	64.06
1996	5.23	3.03	1.26	1.45	1.88	4.06	7.25	9.23	10.37	11.20	9.63	7.08	71.67
1997	5.11	2.01	1.12	1.15	2.12	4.80	8.24	10.75	10.49	10.85	9.44	6.80	72.88
1998	4.49	2.26	0.82	1.56	1.64	3.41	5.17	6.04	9.44	10.26	9.23	6.81	61.14
1999	4.47	2.21	1.42	1.16	2.14	4.06	5.49	8.63	10.66	10.62	9.06	7.33	67.25
2000	4.40	2.91	1.77	1.57	2.20	4.15	6.24	8.83	9.59	10.06	9.38	6.99	68.07
2001	3.71	2.23	1.48	1.44	1.77	4.92	6.19	9.43	11.00	9.36	9.88	7.79	69.20
Avg4	4.43	2.22	1.16	1.24	2.07	3.82	6.03	8.72	10.02	10.25	9.11	6.94	66.02
Max	5.38	3.03	1.77	1.71	3.07	5.73	8.24	10.75	12.45	11.79	10.61	8.18	72.88
Min	3.63	1.53	0.40	0.53	0.91	2.55	3.99	6.04	7.60	9.00	7.52	5.88	59.09

Potential Monthly Evapotranspiration for the San Joaquin Valley1 for 1998
(in inches)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	
Pan Evaporation Data	**4.49**	**2.26**	**0.82**	**1.56**	**1.64**	**3.41**	**5.17**	**6.04**	**9.44**	**10.26**	**9.23**	**6.81**	**61.14**	
	Potential Monthly Evapotranspiration, in inches.												**TOTAL**	
Crops	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**(in.)**	**(ft.)**
Grain			0.14	0.62	1.21	3.24	4.91	4.23	0.39				14.74	1.23
Rice								4.83	8.02	10.16	9.23	6.13	38.37	3.20
Cotton							0.62	2.17	8.59	10.06	7.20	2.72	31.36	2.61
Sugar Beets	1.39	1.24	0.70	1.44	1.49	3.03	4.34	4.53	2.74				20.90	1.74
Corn								0.45	4.34	9.44	7.76	2.37	24.36	2.03
Sudan Grass							3.10	5.32	8.31	9.03	4.88		30.64	2.55
Dry Beans								0.91	8.31	8.31	3.60		21.13	1.76
Safflower					0.47	2.11	4.08	5.07	7.93	8.42	0.74		28.82	2.40
Other Field								0.85	3.30	8.21	7.85	2.56	22.77	1.90
Alfalfa	1.57					2.39	3.93	4.59	7.17	7.80	6.74	4.97	39.16	3.26
Alfalfa Seed									7.17	7.80	7.02	4.97	26.96	2.25
Carrots							0.32	2.72	6.13	1.92			11.09	0.92
Pasture	1.57					2.39	3.93	4.59	7.17	7.80	7.02	4.97	39.44	3.29
Mkt Tomatoes					0.05	0.72	2.02	4.95	8.31	2.03			18.08	1.51
Meadow Pasture													0.00	0.00
Meadow Pasture - X														
Proc Tomatoes					0.05	0.68	1.24	3.20	8.49	8.52	2.47		24.65	2.05
Potatoes					0.49	2.15	4.91	4.83	0.59				12.97	1.08
Cucurbits						0.34	1.55	4.59	7.93	2.73			17.14	1.43
Onions & Garlic		0.19	0.25	0.94	1.38	3.07	4.65	5.44	7.74	6.16			29.82	2.49
Other Truck	3.23	1.81	0.34								1.39	3.06	9.83	0.82
Almonds	1.80				0.30	1.19	3.10	4.23	6.89	8.52	5.36	2.38	33.77	2.81
Pistachios	3.05	1.24					2.38	3.44	6.23	7.49	6.93	4.97	35.73	2.98
Prunes	3.05	0.62				0.60	2.38	3.44	6.23	7.49	6.93	4.97	35.71	2.98
Walnuts	3.05	1.24					2.38	3.44	6.23	7.49	6.93	4.97	35.73	2.98
Deciduous Orchards	2.56					1.07	2.95	3.99	6.89	7.60	6.93	4.70	36.69	3.06
Kiwi	2.02	0.28					0.28	1.81	5.19	6.47	5.91	4.15	26.11	2.18
Subtropical Fruit	2.51					1.91	2.90	3.38	4.91	5.34	4.80	3.54	29.29	2.44
Grapes	0.99	0.23				0.09	0.88	2.66	5.19	6.77	5.17	2.59	24.57	2.05
Eucalyptus	2.51	1.27	0.46	0.94	0.97	1.91	2.90	3.38	4.91	5.34	4.80	3.54	32.93	2.74

[1]Fresno Pan Evaporation Station.

1998 ETAW Calculation for Cotton in Merced County DAU 216 *

	Oct 97	Nov 97	Dec 97	Jan 98	Feb 98	Mar 98	Apr 98	May 98	Jun 98	Jul 98	Aug 98	Sep 98
Beginning Month Soil Moisture Storage	0.00 in.	0.00 in.	1.08 in.	2.03 in.	3.51 in.	6.90 in.	6.90 in.	6.81 in.	6.90 in.	0.00 in.	0.00 in.	0.00 in.
Soil Evaporation	0.10 in.	0.40 in.	0.70 in.	0.60 in.	0.50 in.	1.10 in.	1.30 in.	1.10 in.	0.90 in.	0.70 in.	0.50 in.	0.30 in.
ET	0.00 in.	0.00 in.	0.00 in.	0.00 in.	0.00 in.	0.00 in.	0.62 in.	2.17 in.	8.59 in.	10.06 in.	7.20 in.	2.72 in.
Deficit Irrigation Reduction Factor for ET	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Soil Moisture Storage	-0.10 in.	-0.40 in.	0.38 in.	1.43 in.	3.01 in.	5.80 in.	6.28 in.	4.64 in.	-1.69 in.	-10.06 in.	-7.20 in.	-2.72 in.
Precipitation Infiltration	0.00 in.	1.48 in.	1.65 in.	2.08 in.	5.93 in.	1.17 in.	0.53 in.	2.73 in.	0.28 in.	0.00 in.	0.00 in.	0.00 in.
Soil Moisture Storage	-0.10 in.	1.08 in.	2.03 in.	3.51 in.	8.94 in.	6.97 in.	6.81 in.	7.37 in.	-1.41 in.	-10.06 in.	-7.20 in.	-2.72 in.
ETAW	0.00 in.	0.00 in.	0.00 in.	0.00 in.	0.00 in.	0.00 in.	0.00 in.	0.00 in.	1.41 in.	10.06 in.	7.20 in.	2.72 in.
End of Month Soil Moisture Storage	0.00 in.	1.08 in.	2.03 in.	3.51 in.	8.94 in.	6.97 in.	6.81 in.	7.37 in.	0.00 in.	0.00 in.	0.00 in.	0.00 in.
Cummulative ETAW	**0.00 in.**	**0.00 in.**	**0.00 in.**	**0.00 in.**	**0.00 in.**	**0.00 in.**	**0.00 in.**	**0.00 in.**	**1.41 in.**	**11.47 in.**	**18.67 in.**	**21.39 in.**

* Fresno Evaporation Station and Los Banos Precipitation Station.

Crop Type	Cotton
Available Soil Moisture	6.90 in.
Effective Rooting Depth	48.00 in.

1998 ETAW =	**1.8 AF/ac**
1998 Potential ET =	**2.6 AF/ac**
1998 EP =	**0.8 AF/ac**

Agricultural Land and Water Use for 1998

DAU #: 216 **PSA:** VALLEY WESTSIDE

DAU Name: West Side *MERCED COUNTY* **HR:** SAN JOAQUIN RIVER

Crop	Unit ET of Applied Water (acre-feet/acre)	Unit Applied Water (acre-feet/acre)				Net Irrigated Acreage1 (1,000's of acres)				ET of Applied Water (1,000's of acre-feet)				Applied Water (1,000's of acre-feet)			
		Surface	Mixed	Ground	Total	Surface	Mixed	Ground	Total	Surface	Mixed	Ground	Total	Surface	Mixed	Ground	Total
GRAIN	0.1		0.1		0.70 0.0		17.0		17.0		1.7		1.7		2.4		2.4
RICE	3.1		5.0		0.62 0.0		1.0		1.0		3.1		3.1		5.0		5.0
COTTON	1.8		2.3		0.80 0.0		44.6		44.6		80.3		80.3		100.4		100.4
SUGAR BEETS	0.5		0.7		0.74 0.0		5.0		5.0		2.5		2.5		3.4		3.4
CORN	1.5		2.2		0.67 0.0		15.3		15.3		23.0		23.0		34.3		34.3
SUNFLOWERS					0.0												
DRY BEANS	1.3		1.9		0.68 0.0		2.8		2.8		3.6		3.6		5.4		5.4
SAFFLOWER	0.9		0.9		1.00 0.0		0.1		0.1		0.1		0.1		0.1		0.1
OTHER FIELD	1.3		2.1		0.63 0.0		7.7		7.7		10.0		10.0		15.9		15.9
ALFALFA	2.3		3.6		0.63 0.0		38.5		38.5		88.6		88.6		140.5		140.5
PASTURE	2.7		4.0		0.67 0.0		12.5		12.5		33.8		33.8		50.1		50.1
PROC TOMATOES	2.1		2.8		0.75 0.0		3.2		3.2		6.7		6.7		9.0		9.0
MKT TOMATOES	1.5		2.1		0.72 0.0		2.1		2.1		3.2		3.2		4.4		4.4
POTATOES					0.65 0.0		0.0				-				-		
CUCURBITS	1.4		2.2		0.65 0.0		8.2		8.2		11.5		11.5		17.7		17.7
ONIONS & GARLIC	2.5		3.3		0.75 0.0		0.5		0.5		1.3		1.3		1.7		1.7
OTHER TRUCK	0.8		1.2		0.65 0.0		2.6		2.6		2.1		2.1		3.2		3.2
ALMONDS/PISTACHIOS	1.8		2.4		0.76 0.0		4.4		4.4		7.9		7.9		10.4		10.4
PRUNES					0.0												
WALNUTS					0.0												
OTHER DECIDUOUS	1.9		2.4		0.78 0.0		6.3		6.3		12.0		12.0		15.3		15.3
SUBTROPICAL	1.4		1.8		0.80 0.0		0.0				0.0				0.0		
GRAPES	1.0		1.4		0.74 0.0		1.1		1.1		1.1		1.1		1.5		1.5
Total Crop Acreage						**0.0**	**172.9**	**0.0**	**172.9**	**0.0**	**292.5**	**0.0**	**292.5**	**0.0**	**420.7**	**0.0**	**420.7**
Double Crop Acreage						**0.0**	**6.5**	**0.0**	**6.5**								
Total Irrigated Land Area						**0.0**	**166.4**	**0.0**	**166.4**								

M & I Applied/Net Water Demand by DAU by County

- Calculation methods similar to what was used by other Districts
- Uses census data, city water delivery records, and estimates for self-supplied industrial supplies.
- Applied water use has sub-totals by single-family interior/exterior use, commercial, etc. Net water use has not divided into sub-totals.

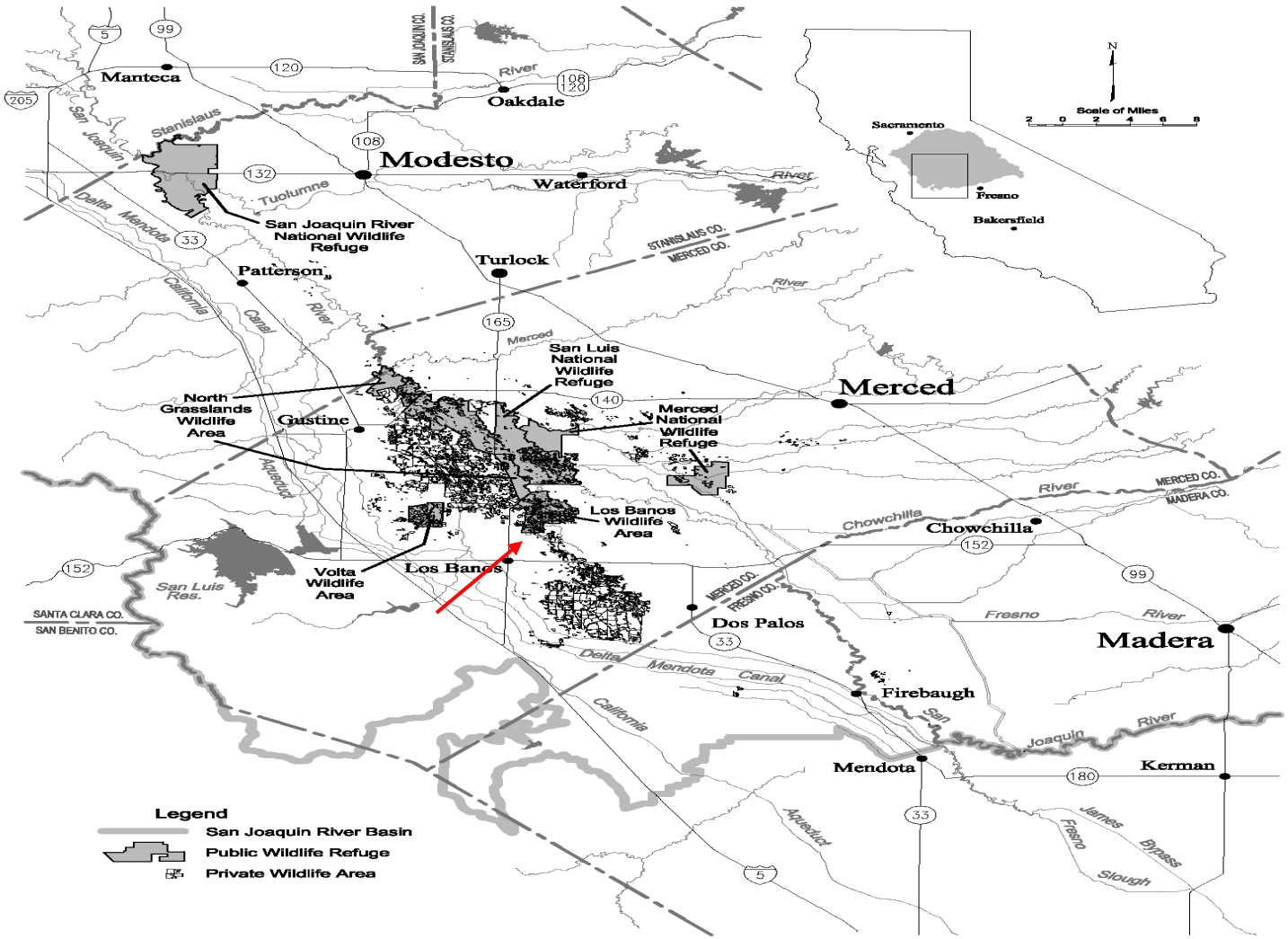
San Joaquin River Basin - 1998

Valley West Side PSA

	STA216	MER216	FRE216	PA 606	Stanislaus Co	Merced Co	Fresno Co
Self-Supplied M&I AW	**2,265**	**2,239**	**574**	**5,078**	**2,265**	**2,239**	**574**
Public-Supplied M&I AW	**5,723**	**10,247**	**2,211**	**18,181**	**5,723**	**10,247**	**2,211**
Total M&I AW	**7,988**	**12,486**	**2,785**	**23,259**	**7,988**	**12,486**	**2,785**
AW - Single Family Residential - Interior	1,518	2,372	529	4,419	1,518	2,372	529
AW - Single Family Residential - Exterior	2,317	3,621	808	6,745	2,317	3,621	808
AW - Multi-Family Residential - Interior	1,598	2,497	557	4,652	1,598	2,497	557
AW - Multi-Family Residential - Exterior	959	1,498	334	2,791	959	1,498	334
AW - Commercial	559	874	195	1,628	559	874	195
AW - Industrial	799	1,249	279	2,326	799	1,249	279
AW - Urban Landscape	240	375	84	698	240	375	84
AW - Energy Production							
AW - Groundwater Recharge							
ETAW	**2,796**	**4,370**	**975**	**8,141**	**2,796**	**4,370**	**975**
Urban Population	17,494	32,659	5,467	55,620	17,494	32,659	5,467
Non-Urban Population	**6,381**	**10,091**	**3,758**	**20,230**	**6,381**	**10,091**	**3,758**
Total DAU Population	**23,875**	**42,750**	**9,225**	**75,850**	**23,875**	**42,750**	**9,225**

Wetlands Applied/Net Water Demand by DAU by County

- Calculation methods similar to what was used by other Districts



San Joaquin River Region Public and Private Wildlife Refuges

WILDLIFE AREA WATER MANAGEMENT SURVEY
WATER YEAR 1998

1. Wildlife Area: Los Banos Wildlife Area

2. Water supply for WY 1998 (10/01/97 - 9/30/98): 21,088 acre-feet

3. Source of water supply for WY 1998: Grassland WD, San Luis Canal Co., Pumping of Agricultural Operational Spill

4. Wildlife Area Management for WY 1998

Period of Water Use & Water Used (af/acre)

HABITAT	Area (acres)	Flooded Pond or Irrigated	Average Pond Depth (feet)	1997			1998									Source of Water	Estimated Water Use for Entire Period (acre-ft)	Return Flows for Entire Period (acre-ft)
				Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept			
watergrass	613	pond	,5'-1.5'	2	0.5	0.5	0.5	0.5	0	0	1	1	1	0.25	0.75	GWD, SLCC, AG spill	4,904	490
swamp timothy	1040	pond	.5'-1.5'	1	0.5	0.5	0.5	0.5	0	1	1	0.5	0	0	1	" "	6,760	676
semi-permanent	466	pond	1'-2.5'	1	0.5	0.5	0	0	0.5	1	1	1	1	1	1	" "	3,728	372
permanent	430	pond	1'-2,5'	0.5	0.5	0	0	0.5	0.5	0.5	1	1	1.5	1.5	1	" "	3,655	365
cropland	432	irrigated	na	0	1	0	0	0	0.5	0.5	1	1	1	0.5	0.5	" "	2,592	259
riparian	82	pond	1'-4'													" "	0	0
naturalized upland	1352	irrigated	na	0	0	0	0	0	0	0	0.5	0.5	0	0	0	" "	1,352	135

Habitat Area: **Los Banos Wildlife Area**
Water Year: **1998**

INPUT DATA SHEET

All data input data are highlighted in green.

Effective P

Habitat Type	Flood-up/ Drawdown Date	Monthly Calender of Flood-up, Drawdown, and Irrigation												Acreage	Habitat Water Depth	Soil Saturation Depth
		O	N	D	J	F	M	A	M	J	J	A	S	Ac	in	
Cropland	Mar-Sept & Nov		I				I	I	I	I	I	I	I	432	0	0
Swamp Timothy	Apr-Jun & Sept-Feb	M	M	M	M	D		F	M	D			F	1040	12	
Watergrass	May-Feb	M	M	M	M	D			F	M	M	M	M	613	12	
Naturalized Upland	May-Jun								I	I				1352	0	
Semi-Permanent Wetlands	Mar-Dec	M	M	D			F	M	M	M	M	M	M	466	24	0
Permanent	Feb-Nov	M	D			F	M	M	M	M	M	M	M	430	24	0

FOOTNOTES

F FLOOD-UP
D DRAWDOWN
M MAINTAIN FLOODED FIELD
I IRRIGATION
C CROPPED

Closed System Used to account for no outflow and/or no supply
Habitat Coefficients Coefficients convert Evaporative Index (Pan Evaporation or CIMIS Eto) to representative crop/habitat ET
Circulation Rate This accounts for habitat flows used to control waterfowl disease. A typical value could be 1cfs/20acres, or .05 cfs/ac.
Soil Percolation Rate This is the average soil percolation rate by habitat in terms of inches per day.

Irrigation Irrigation on watergrass is typically applied in June and July to encourage gowth and seed production for waterfowl forage.

***** CIMIS Eto data is from Los Banos #56 Station/PPT is from LOS BANOS Station

Effective PPT

	O	N	D	J	F	M	A	M	J	J	A	S	
Effective	0.00 in.	1.48 in.	1.65 in.	2.08 in.	5.93 in.	1.17 in.	0.53 in.	2.73 in.	0.28 in.	0.00 in.	0.00 in.	0.00 in.	15.85

Adjusted Evap

Cimis	4.04	1.59	1.13	0.88	1.44	3.23	4.82	5.76	7.38	8.52	7.78	5.35	
Pan	5.05	1.9875	1.4125	1.1	1.8	4.0375	6.025	7.2	9.225	10.65	9.725	6.6875	64.9

Pan evaporation is estimated as 125% of Cimis Eto

	O	N	D	J	F	M	A	M	J	J	A	S	
Pan Evap (inches)*	5.05	1.99	1.41	1.1	1.8	4.04	6.03	7.2	9.23	10.7	9.73	6.69	64.9
Precipitation (inches)*	0	1.48	1.65	2.08	5.93	1.17	0.53	2.73	0.28	0	0	0	15.85

Irrigation Depth	Irrigation Efficiency	Habitat Coefficients												Soil Percolation Rate	Circulation Rate	Closed System (Y or N)											
		O	N	D	J	F	M	A	M	J	J	A	S	in/day	CFS/AC	O	N	D	J	F	M	A	M	J	J	A	S
6	0.8		0.39				0.99	0.84	0.55	0.45	0.22	0.88	0.84	0.05	0.01			Y	Y	Y							
		0.88	0.88	0.88	0.88	0.44		0.88	0.88	0.44			0.88	0.05	0.01			Y	Y	Y							
		0.88	0.88	0.88	0.88	0.44			0.88	0.88	0.88	0.88	0.88	0.05	0.01			Y	Y	Y							
6	0.8								0.88	0.88	0.44			0.05	0.01			Y	Y	Y							
		0.88	0.88	0.44			0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.05	0.01			Y	Y	Y							
		0.88	0.44			0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.05	0.01			Y	Y	Y							

Los Banos Wildlife Area
Water Year 1998 Summary

Habitat Type	Flood-up/ Drawdown Date	Acreage	Habitat Coefficient	Unit ET	ET Volume	Precip. Volume	Flood-up Volume		Percolation		Circulation		Habitat Irrigation	**Applied Water**	**ETAW**	Unit Applied Water	Unit ETAW
							Habitat Water Depth	Flood-up Volume	Soil Percolation Rate	Volume	Circulation Rate	Volume					
		Ac		In	AF	AF	in	AF	in/day	AF	cfsAc	AF	AF	AF	AF	AF/AC	AF/AC
Cropland	Mar-Sept & Nov	432			1,238	569		-		-		-	2,160	2,160	1,041	5.0	2.4
Swamp Timothy	Apr-Jun & Sept-Feb	1,040			2,666	1,373		2,080		938		3,135	-	7,529	1,972	7.2	1.9
Watergrass	May-Feb	613			2,425	809		613		711		2,603	-	5,812	2,043	9.5	3.3
Naturalized Upland	May-Jun	1,352			2,157	1,787		-		-		-	1,690	1,690	1,817	1.3	1.3
Semi-Permanent Wetlands	Mar-Dec	466			2,094	615		932		540		2,543	-	5,845	1,830	12.5	3.9
Permanent	Feb-Nov	430			1,936	568		860		504		2,088	-	4,215	1,679	9.8	3.9
Total		4,333			12,516	5,721		4,485		2,693		10,369		**27,251**	**10,382**	6.3	2.4

Los Banos WA	DAU	County
	216	Merced

	AF	TAF
SURFACE SUPPLY	21,088	21.088
GROUNDWATER SUPPLY	6,163	6.163
APPLIED WATER	27,251	27.251
RETURN FLOW	2,297	2.297
ETAW	10,382	10.382
DEEP PERCOLATION	14,572	14.572
NET WATER USE/DEMAND	12,679	12.679
DEPLETION	10,382	10.382

*Surface Supply from refuge manager survey
*Groundwater Supply = AW - Surface Supply
*Return Flows from refuge manager survey
*Deep Percolation = AW - RF - ETAW
*Net Water Demand = ETAW + Losses (Conveyance & Evap) + RETURN FLOWS
*Depletion = Net Water Demand - Return Flows

Ag Applied/Net Water Demands Added to DAU by County Sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
30				**Sub-Total (Prime Supply)**			856.6							
31				Reuse of Agricultural Applied Water			0.0				**TOTAL SURFACE SUPPLY**	**461,595**	**158,203**	**1,494**
32				Reuse of Wildlife Refuge Applied Water			0.0				**APPLIED WATER DEMAND (CONSUMPTION)**	**420,700**	**371,851**	**12,486**
33				Reclaimed Waste Water			0.0				**APPLIED WATER (GW BANKING)**	**0**	**0**	**0**
34				Desalinization of Ocean / Brackish Water			0.0				**GW SUPPLY (AW-NET SURFACE SUPPLY)**	**10,448**	**213,648**	**11,241**
35				**Total Supply**			**856.6**				**TOTAL APPLIED WATER**	**472,042**	**371,851**	**12,735**
36														
37							**TAF**				**DEMANDS**	**Ag**	**Wildlife**	**M & I**
38	E			**Evapotranspiration of Applied Water (ETAW)**							**ETAW**			
39	T			Agricultural ETAW			292.2				Evapotranspiration of Applied Water (ETAW)	292,240	90,328	4,370
40	A			Wildlife Refuges			90.3				High Water Use Industries (HWUI)			0
41	W			Municipal & Industrial Urban/Non-Urban ETAW			4.4							
42				Municipal & Industrial HWUI			0.0			**Adj Factors**	**Conveyance and Miscellaneous Losses (CML)**			
43	+			**Conveyance and Miscellaneous Losses (CML)**						1.3%	Evaporation (Est. % of Total Ag Surface Supply)	6,001		
44				Conveyance Loss (Evaporation)			6.0			3.0%	Riparian ET (Est. % of Total Ag Surface Supply)	13,848		
45	C			Conveyance Loss (Riparian ET)			13.9			2.0%	Misc Ag ET (Est. % of Total Ag Applied Water)	8,414		
46	M			Miscellaneous Agricultural ET			8.4			10.2%	GW Bank Recharge E+ET (Est. % of AW for GW Recharge)	0		
47	L			GW Bank Recharge E+ET			0.0			2.0%	M&I System (Est. % of Total M&I Applied Water)			250
48				M&I System Losses			0.3							
49	+			**Other Water Demands (OWD)**							**Other Water Demands (OWD)**			
50				Cooling Water			0.0				Cooling Water			0
51	O			Oil Production			0.0				Oil Production			0
52	W			Direct GW Banking Recharge			0.0				Direct GW Banking Recharge	0		0
53	D													
54				**Total ETAW + CML + OWD**			**415.5**				**Total ETAW + CML + OWD**	**320,503**	**90,328**	**4,620**

M & I Applied/Net Water Demands Added to DAU by County Sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
30				**Sub-Total (Prime Supply)**			856.6							
31				Reuse of Agricultural Applied Water			0.0				**TOTAL SURFACE SUPPLY**	**461,595**	**158,203**	**1,494**
32				Reuse of Wildlife Refuge Applied Water			0.0				**APPLIED WATER DEMAND (CONSUMPTION)**	**420,700**	**371,851**	**12,486**
33				Reclaimed Waste Water			0.0				**APPLIED WATER (GW BANKING)**	**0**	**0**	**0**
34				Desalinization of Ocean / Brackish Water			0.0				**GW SUPPLY (AW-NET SURFACE SUPPLY)**	**10,448**	**213,648**	**11,241**
35				**Total Supply**			**856.6**				**TOTAL APPLIED WATER**	**472,042**	**371,851**	**12,735**
36														
37							**TAF**				**DEMANDS**	**Ag**	**Wildlife**	**M & I**
38	E			**Evapotranspiration of Applied Water (ETAW)**							**ETAW**			
39	T			Agricultural ETAW			292.2				Evapotranspiration of Applied Water (ETAW)	292,240	90,328	4,370
40	A			Wildlife Refuges			90.3				High Water Use Industries (HWUI)			0
41	W			Municipal & Industrial Urban/Non-Urban ETAW			4.4							
42				Municipal & Industrial HWUI			0.0			**Adj Factors**	**Conveyance and Miscellaneous Losses (CML)**			
43	+			**Conveyance and Miscellaneous Losses (CML)**						1.3%	Evaporation (Est. % of Total Ag Surface Supply)	6,001		
44				Conveyance Loss (Evaporation)			6.0			3.0%	Riparian ET (Est. % of Total Ag Surface Supply)	13,848		
45	C			Conveyance Loss (Riparian ET)			13.9			2.0%	Misc Ag ET (Est. % of Total Ag Applied Water)	8,414		
46	M			Miscellaneous Agricultural ET			8.4			10.2%	GW Bank Recharge E+ET (Est. % of AW for GW Recharge)	0		
47	L			GW Bank Recharge E+ET			0.0			2.0%	M&I System (Est. % of Total M&I Applied Water)			250
48				M&I System Losses			0.3							
49	+			**Other Water Demands (OWD)**							**Other Water Demands (OWD)**			
50				Cooling Water			0.0				Cooling Water			0
51	O			Oil Production			0.0				Oil Production			0
52	W			Direct GW Banking Recharge			0.0				Direct GW Banking Recharge	0		0
53	D													
54				**Total ETAW + CML + OWD**			**415.5**				**Total ETAW + CML + OWD**	**320,503**	**90,328**	**4,620**

Wetlands Applied/Net Water Demands Added to DAU by County Sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
30				**Sub-Total (Prime Supply)**			856.6							
31				Reuse of Agricultural Applied Water			0.0				**TOTAL SURFACE SUPPLY**	**461,595**	**158,203**	**1,494**
32				Reuse of Wildlife Refuge Applied Water			0.0				**APPLIED WATER DEMAND (CONSUMPTION)**	**420,700**	**371,851**	**12,486**
33				Reclaimed Waste Water			0.0				**APPLIED WATER (GW BANKING)**	**0**	**0**	**0**
34				Desalinization of Ocean / Brackish Water			0.0				**GW SUPPLY (AW-NET SURFACE SUPPLY)**	**10,448**	**213,648**	**11,241**
35				**Total Supply**			**856.6**				**TOTAL APPLIED WATER**	**472,042**	**371,851**	**12,735**
36														
37							**TAF**				**DEMANDS**	**Ag**	**Wildlife**	**M & I**
38	E			**Evapotranspiration of Applied Water (ETAW)**							**ETAW**			
39	T			Agricultural ETAW			292.2				Evapotranspiration of Applied Water (ETAW)	292,240	90,328	4,370
40	A			Wildlife Refuges			90.3				High Water Use Industries (HWUI)			0
41	W			Municipal & Industrial Urban/Non-Urban ETAW			4.4							
42				Municipal & Industrial HWUI			0.0			**Adj Factors**	**Conveyance and Miscellaneous Losses (CML)**			
43	+			**Conveyance and Miscellaneous Losses (CML)**						1.3%	Evaporation (Est. % of Total Ag Surface Supply)	6,001		
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46	M			Miscellaneous Agricultural ET			8.4			10.2%	GW Bank Recharge E+ET (Est. % of AW for GW Recharge)	0		
47	L			GW Bank Recharge E+ET			0.0			2.0%	M&I System (Est. % of Total M&I Applied Water)			250
48				M&I System Losses			0.3							
49	+			**Other Water Demands (OWD)**							**Other Water Demands (OWD)**			
50				Cooling Water			0.0				Cooling Water			0
51	O			Oil Production			0.0				Oil Production			0
52	W			Direct GW Banking Recharge			0.0				Direct GW Banking Recharge	0		0
53	D													
54				**Total ETAW + CML + OWD**			**415.5**				**Total ETAW + CML + OWD**	**320,503**	**90,328**	**4,620**

CVP Supplies by DAU by County

-Use CVP Report of Operations to Determine CVP Deliveries by Entity

- Use COMP Program to Combine Individual Deliveries into DAU Totals

- COMP Program Can Convert Between Calendar and Water Year Totals

Paper version of CVP report

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL VALLEY OPERATIONS OFFICE

REPORT OF OPERATIONS

October 1999

Contact Person:
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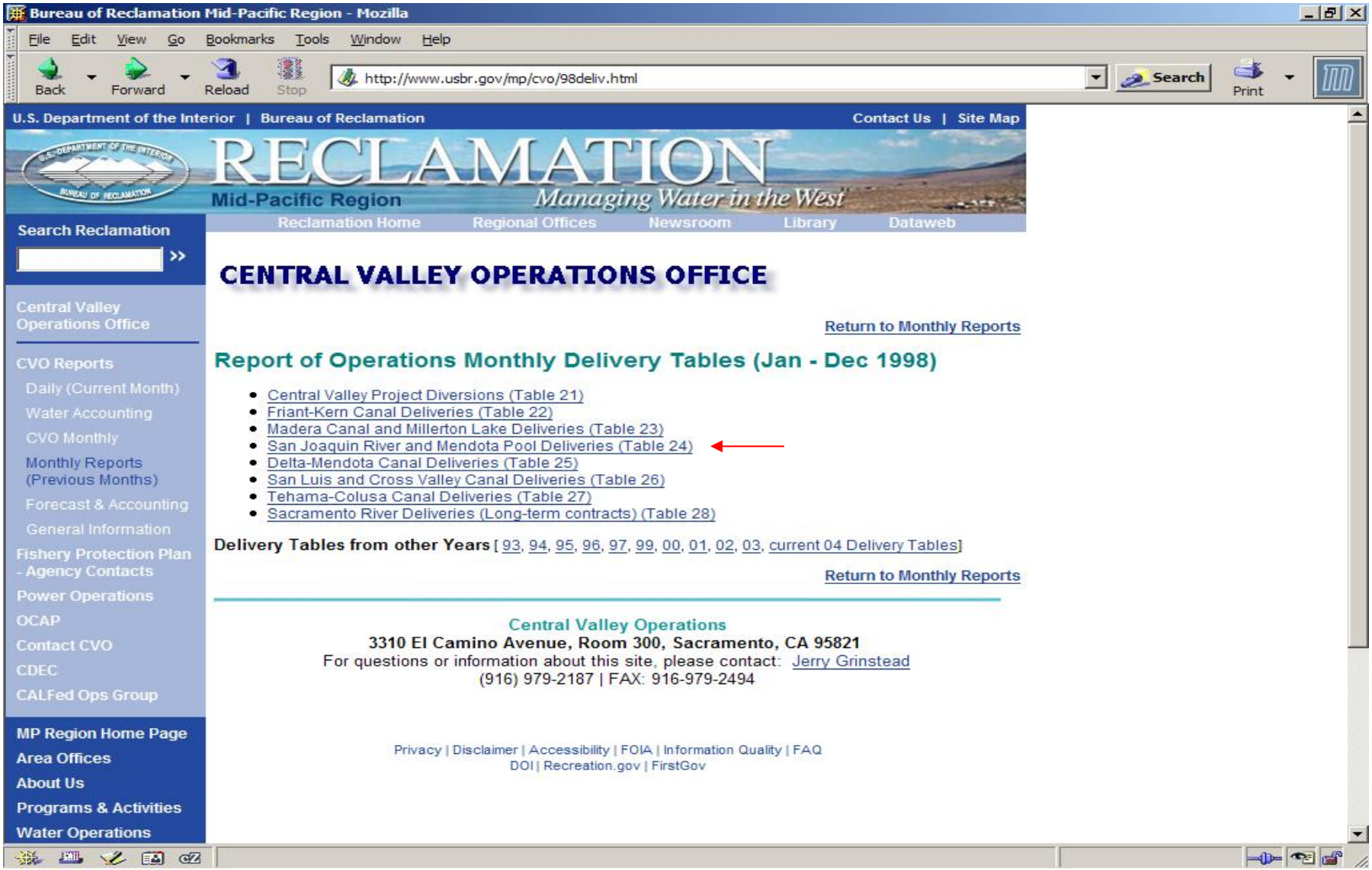
Web version of CVP report
http://www.usbr.gov/mp/cvo/98deliv.html



San Joaquin River and Mendota Pool Deliveries
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U.S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

San Joaquin and Mendota Pool

Monthly Deliveries in AF 1998

Water User	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Central California ID	717	2228	18351	6757	10102	53780	92090	86529	56126	16759	10091	1677	355207
Columbia Canal Co	0	970	8011	4483	3574	6502	10604	10090	5701	3088	26	38	53087
Firebaugh Canal Co	311	0	904	1285	1866	5828	5976	5647	3464	2543	1307	313	29444
San Luis Canal Co	0	0	8969	6834	13578	22863	37671	33404	18362	10617	2857	2100	157255
Fresno Slough WD	0	0	0	0	0	0	280	443	109	135	0	0	967
Hughes, Melvin	0	0	0	0	0	0	0	20	10	0	0	0	30
James ID	0	69	0	0	0	0	459	8054	4370	0	122	0	13074
Laguna WD	0	0	0	0	0	0	400	400	0	176	0	0	976
Dudley & Indart *	0	0	0	0	0	0	489	218	26	0	0	0	733
Mid-Valley WD	0	0	0	0	0	0	656	944	192	0	88	371	2251
Terra Linda (Goodman)	0	300	0	0	0	0	555	1600	529	287	41	0	3312
Tranquility ID	0	0	0	0	0	0	2098	4006	716	473	0	0	7293
Wilson, J.W.	0	0	0	47	0	239	1	35	20	0	0	0	342
Grassland WD -W1430													
Grassland (CCID)	5377	355	173	25	57	271	694	291	21405	24234	25876	8090	86848
USFW - W1431													
Kesterson NWR - 76.05 L	6200	4200	0	0	0	0	0	0	0	3106	5189	0	18695
State Fish & Game W1429													
Mendota Wildlife	824	0	0	0	0	0	407	1399	3079	6887	2892	2115	17603
Dept. Fish & Game													
Traction Ranch	212	0	0	0	0	0	291	649	446	1242	730	319	3889
DWR - F&W - W1139													
Kern National Wildlife	1101	0	0	0	0	0	0	1613	3077	3831	3551	848	14021
Monthly Total	14742	8122	36408	19431	29177	89483	152671	155342	117632	73378	52770	15871	765027

Done

Comp program results copied to CVP summary worksheet

SAN JOAQUIN AND MENDOTA POOL USBR DELIVERIES

DAU 216 CENTRAL CALIFORNIA I.D.

0 (ACRE FEET)

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1969	0	0	0	0	0	11240	49015	88778	88538	92699	75269	47524	453063
1970	17217	3943	432	0	10825	38445	57237	61824	66866	77277	74862	38555	447483
1971	11716	10322	22	752	16362	51481	44129	71007	74534	78785	79128	43442	481680
1972	22183	9054	0	2161	15898	45474	46770	61312	73936	81300	75297	39525	472910
1973	18569	1105	390	0	1478	3361	49168	72781	75215	80527	76405	39654	418653
1974	19590	7301	63	966	15398	45778	40828	72472	75093	75626	74218	43585	470918
1975	22209	6653	0	7185	15369	32763	54868	69773	74327	75663	72880	41106	472796
1976	13032	6101	0	15750	26414	32320	41646	70587	77583	79069	74494	44765	481761
1977	22151	0	0	1898	17070	37852	33010	28958	47710	78121	73148	40283	380201
1978	15146	1282	0	400	4167	7137	13470	70154	89017	87054	87761	41793	417381
1979	24536	8844	0	0	11540	29072	49237	72491	75374	90213	87995	39874	489176
1980	23866	6282	3402	889	15142	24768	52649	68545	73002	83633	84214	45941	482333
1981	20956	11146	1153	4816	19524	19436	48500	73604	79559	92246	78074	35647	484661
1982	16965	4033	0	270	16280	21622	24033	92174	78778	88368	89938	46690	479151
1983	18549	1468	0	0	2180	8434	29977	66202	86846	91205	87508	43562	435931
1984	22704	3556	0	1515	29670	37409	45906	70057	76139	85274	82205	37123	491558
1985	19613	864	0	198	19855	54932	36815	49068	58392	65608	57305	46235	408885
1986	22480	996	0	3362	6224	11879	39227	69877	76448	66635	60089	20142	377359
1987	2042	16301	725	5494	15137	24798	34676	46772	53952	63723	59004	11637	334261
1988	127	6539	93	2919	20583	27626	18058	38709	51595	64456	58928	24136	313769
1989	6678	0	0	3124	14486	33778	30131	43600	56087	60372	58243	32269	338768
1990	1737	0	31	4105	18850	32650	34175	34874	58039	84021	79264	35408	383154
1991	23313	4621	361	8413	21921	23792	17078	30353	47269	64002	58489	24383	323995
1992	378	19777	293	117	5722	25069	21738	32415	49595	52173	50357	19743	277377
1993	5644	13258	847	0	781	25278	27503	46468	47234	55617	63740	29548	315918
1994	19155	18732	13038	1489	13487	40516	27122	16126	49091	64253	43821	5800	312630
1995	4313	7117	62	62	35689	14870	24529	30203	71099	87225	91189	46703	413061
1996	36050	20232	6585	3326	18838	25211	46475	51846	66391	79540	74054	28186	456734
1997	31354	3325	5205	59	10539	59742	28656	51292	63020	76716	67598	29441	426947
1998	26375	7726	480	717	2228	18351	6757	10102	53780	92090	86529	56126	361261
1999	16759	10091	2417	8007	18202	34427	22832	55161	58581	76096	62273	34307	399153
2000	20205	14962	-3539	121	17229	24263	32085	58835	72950	71342	62950	28943	400346
2001	24159	11353	10474	4537	24614	25979	27923	60604	71105	70255	61677	10258	402938
33 YEAR TOTAL	549771	236984	42534	82652	481702	949753	1156223	1837024	2217145	2531184	2368906	1152334	13606211
33 YEAR MEAN	16660	7181	1289	2505	14597	28780	35037	55667	67186	76703	71785	34919	412309

James ID & KNWR / CVC98WY / DMC98WY / FKC98WY / MAD98WY / MIL98WY / ONEI98WY / SFD98WY / SLC98WY / **SJMP98WY** / ByDAUByCo

CVP Totals by Canal and DAU

WY 1998 CVP Deliveries
CMP File Output

Public Water Agency	DAU	WY 1998 af	County	
SJR & Mendota Pool:				
Central California ID	216	**361,261**	Multiple	
Columbia Canal Co.	215	**51,121**		
Firebaugh Canal Co.	216	**27,570**	Fresno	
Fresno Slough WD	235	**1,169**		
Grassland WD	**216**	**60,438**		
Melvin Hughes	237	**30**		
James ID	237	**13,219**		
Laguna WD	216	**800**	Stanislaus	
Marchini Bros.	235	**733**		
Mendota WA	**235**	**11,860**		
Mid Valley WD	235	**1,830**		
San Luis Canal Co.	216	**156,852**	Merced	
Traction Ranch Goodman	235	**3,088**		
Tranquility ID	237	**7,376**		
JW Wilson	215	**342**		
F&G Los Banos	**216**	**1,328**		
F&G Traction Ranch	**235**	**3,425**		
Kesterson NWR	**216**	**10,400**		
SJR & Mendota Pool Totals	**215**	**51,463**		**51,463**
	216	**618,649**		**618,649**
	235	**22,105**		
	237	**20,625**		712842
San Luis Canal:				
City of Avenal	**245**	**2,345**		
Broadview WD	216	**17**	Fresno	
City of Coalinga	**245**	**4,070**		
City of Dos Palos	**216**	**1,193**		
City of Huron	**244**	**946**		
Pacheco WD	216	**4,727**	Multiple	
Panoche WD Ag	216	**42,470**	Multiple	
San Luis WD Ag	216	**45,727**	Multiple	
Westlands WD	244	**985,445**		
Kern NWR	**255**	**12,223**		
San Luis Canal Totals	**216**	**94,134**		**94,134**

WY 1998 CVP Deliveries
CMP File Output Less M&I & Refuges

DAU	Total af	Counties	% of County in DAU by Ag Acreage	Total by Co. af
62	17,633	San Benito	100.0%	17,633
185	**17,355**	Santa Clara	100.0%	17,355
213	168,766	Madera	100.0%	168,766
214	**120**	Madera	100.0%	120
215	58,377	Madera	100.0%	58,377
216	**849,454**	Stanislaus	26.7%	226,754
		Merced	39.4%	335,091
		Fresno	33.9%	287,609
233	**1,978**	Fresno	100.0%	1,978
234	3,342	Fresno	100.0%	3,342
235	**6,820**	Fresno	99.6%	6,796
		Kings	0.4%	24
237	20,625	Fresno	86.1%	17,765
		Kings	13.9%	2,860
240	**25,307**	Fresno	54.1%	13,683
		Tulare	45.9%	11,624
242	**145,565**	Kings	12.5%	18,206
		Tulare	87.5%	127,359
243	247,530	Tulare	100.0%	247,530
244	**985,445**	Fresno	87.7%	864,402
		Kern	0.0%	-
		Kings	12.3%	121,043
245	**-**	Fresno	57.3%	-
		Kern	6.6%	-
		Kings	36.1%	-
254	51,446	Kern	100.0%	51,446
255	**-**	Kern	100.0%	-
256	116,312	Kern	100.0%	116,312
257	26,406	Kern	49.0%	12,948
		Tulare	51.0%	13,458
258	117,742	Kern	100.0%	117,742

Less M&I and/or Refuge Water Deliveries

DAU	Agency	Delivery
62	County of San Benito	17633

DAU 216 CVP Delivery Breakdown by WD Irrigated Acreage in Each County

WY 1998 CVP Deliveries
CMP File Output

Public Water Agency	DAU	WY 1998 af	County
SJR & Mendota Pool:			
Central California ID	216	361,261	Multiple
Columbia Canal Co.	215	51,121	
Firebaugh Canal Co.	216	27,570	Fresno
Fresno Slough WD	235	1,169	
Grassland WD	**216**	**60,438**	
Melvin Hughes	237	30	
James ID	237	13,219	
Laguna WD	216	800	Stanislaus
Marchini Bros.	235	733	
Mendota WA	**235**	**11,860**	
Mid Valley WD	235	1,830	
San Luis Canal Co.	216	156,852	Merced
Traction Ranch Goodman	235	3,088	
Tranquility ID	237	7,376	
JW Wilson	215	342	
F&G Los Banos	**216**	**1,328**	
F&G Traction Ranch	**235**	**3,425**	
Kesterson NWR	**216**	**10,400**	712842
SJR & Mendota Pool Totals	**215**	**51,463**	
	216	**618,649**	
	235	**22,105**	
	237	**20,625**	712842

WY 1998 DAU 216 CVP Ag Deliveries by Canal by WD by County

Canal System	Water District	Total Delivery (af)	County	% of IA in WD in County	Delivery by County
SJR & Mendota Pool:	Central California ID	361,261	Stanislaus	13.4%	48,409
SJR & Mendota Pool:	Central California ID	361,261	Merced	52.1%	188,217
SJR & Mendota Pool:	Central California ID	361,261	Fresno	34.5%	124,635
SJR & Mendota Pool:	Firebaugh Canal Co.	27,570	Fresno	100.0%	27,570
SJR & Mendota Pool:	Laguna WD	800	Stanislaus	100.0%	800
SJR & Mendota Pool:	San Luis Canal Co.	156,852	Merced	100.0%	156,852
San Luis Canal:	Broadview WD	17	Fresno	100.0%	17
San Luis Canal:	Pacheco WD	4,727	Merced	85.0%	4,018
San Luis Canal:	Pacheco WD	4,727	Fresno	15.0%	709
San Luis Canal:	Panoche WD Ag	42,470	Merced	4.1%	1,741
San Luis Canal:	Panoche WD Ag	42,470	Fresno	95.9%	40,729
San Luis Canal:	San Luis WD Ag	45,727	Merced	49.5%	22,635
San Luis Canal:	San Luis WD Ag	45,727	Fresno	50.5%	23,092
O'Neill Forebay:	San Luis WD Ag	12,289	Merced	49.5%	6,083
O'Neill Forebay:	San Luis WD Ag	12,289	Fresno	50.5%	6,206
Delta-Mendota Canal:	Broadview WD	11,550	Fresno	100.0%	11,550
Delta-Mendota Canal:	Central California ID	42,242	Stanislaus	13.4%	5,660
Delta-Mendota Canal:	Central California ID	42,242	Merced	52.1%	22,008
Delta-Mendota Canal:	Central California ID	42,242	Fresno	34.5%	14,573
Delta-Mendota Canal:	Centinella WD	762	Stanislaus	100.0%	762
Delta-Mendota Canal:	Del Puerto WD	72,183	Stanislaus	65.6%	47,352
Delta-Mendota Canal:	Del Puerto WD	72,183	San Joaquin	14.3%	10,322
Delta-Mendota Canal:	Del Puerto WD	72,183	Merced	20.1%	14,509
Delta-Mendota Canal:	Eagle Field WD	2,672	Merced	50.7%	1,355
Delta-Mendota Canal:	Eagle Field WD	2,672	Fresno	49.3%	1,317
Delta-Mendota Canal:	Firebaugh Canal Comp	11,378	Fresno	100.0%	11,378

Pivot table results with CVP deliveries by County by Canal System

Sum of Delivery by County		
County	Canal System	Total
Stanislaus	Delta-Mendota Canal:	85,842
	SJR & Mendota Pool:	49,209
Stanislaus Total		135,051
San Joaquin	Delta-Mendota Canal:	12,756
San Joaquin Total		12,756
Merced	Delta-Mendota Canal:	43,856
	O'Neill Forebay:	6,083
	San Luis Canal:	28,394
	SJR & Mendota Pool:	345,069
Merced Total		423,402
Fresno	Delta-Mendota Canal:	55,254
	O'Neill Forebay:	6,206
	San Luis Canal:	64,547
	SJR & Mendota Pool:	152,205
Fresno Total		278,212
	Delta-Mendota Canal: Sum	197,707
	O'Neill Forebay: Sum	12,289
	San Luis Canal: Sum	92,941
	SJR & Mendota Pool: Sum	546,483

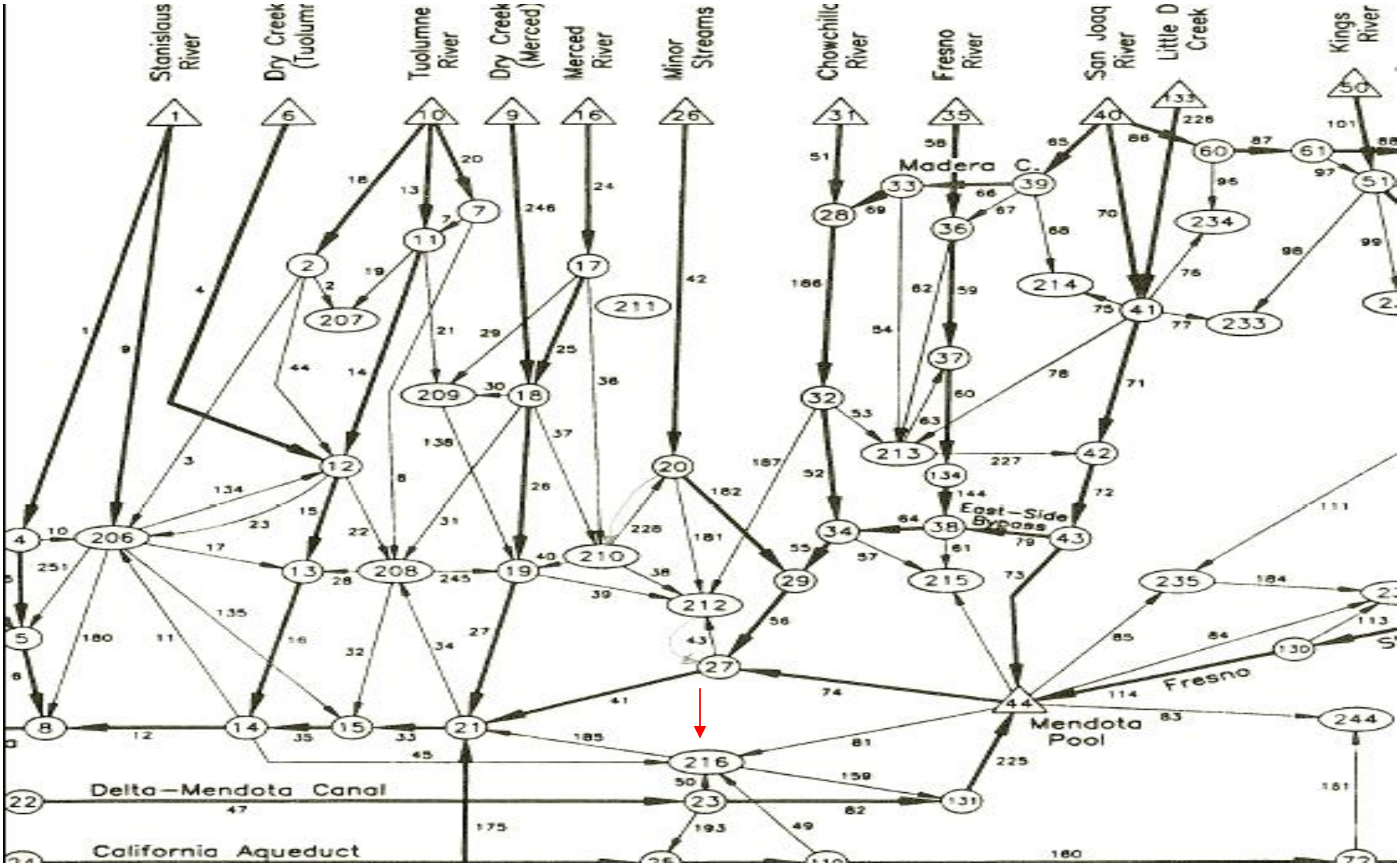
CVP Supplies Added to DAU by County Water Balance

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	HR:			San Joaquin River	Co:		Merced	Status						
2	PSA:			Valley West Side	DAU:		216	X	Draft		SUPPLIES	Ag	Wildlife	M & I
3	Period:			1998 WY - ACTUAL	PA:		606		Done		Local Surface			
4											San Joaquin River	36,496	0	0
5							TAF				Salt Slough	0	902	0
6			Local Surface Water (Prime Supply)										0	
7			Agricultural				36.5							
8			Wildlife Refuges				0.9			Adj Factors	Total Local Surface Supply	36,496	902	0
9			Municipal & Industrial				0.0			0.0%	Reuse of Local Surface Supply Return Flows	0		
10			Imports/Transfers by Local Agency								Total Prime Local Surface Supply	36,496	902	0
11			Agricultural				0.0							
12			Wildlife Refuges				0.0				Imports/Transfers by Local Agency	0	0	0
13			Municipal & Industrial				0.0							
14			State Water Project								SWP (all types)	1,696	0	0
15			Agricultural				1.7							
16	W		Wildlife Refuges				0.0				CVP:			
17	A		Municipal & Industrial				0.0				Delta-Mendota Canal	43,856	84,858	65
18	T		Central Valley Project								O'Neill Forebay	6,083	277	236
19	E		Agricultural				423.4				San Luis Canal	28,394	72,166	1,193
20	R		Wildlife Refuges				157.3				SJR & Mendota Pool	345,069	0	0
21			Municipal & Industrial				1.5							
22	S		Other Federal											
23	U		Agricultural				0.0				Other Federal	0	0	0
24	P		Wildlife Refuges				0.0							
25	P		Municipal & Industrial				0.0				Reuse of Wildlife Refuge Applied Water		0	
26	L		Ground Water								Reclaimed Waste Water			0
27	Y		Agricultural				10.5				Desalinization of Ocean / Brackish Water	0		0

Local Surface Supplies by DAU by County

- Use Local Water District Annual Reports to Determine River Deliveries by Area
- Use SWAM Schematic to Combine Water District Deliveries into DAU Totals
- Use % Irrigated Acreage by County to Distribute DAU Totals by County

Surface Water Allocation Model (SWAM) Schematic



DAU 216 San Joaquin River Local Diversions

- Had to come up with regression equations for smaller WDs and riparian diversions.
- Other local surface worksheets also have some estimated values.

REGRESSION EQUATIONS FOR DAU 216 DIVERSIONS

PATTERSON PRECIP. (in.)	WESTLEY PRECIP.	YEAR	NEWMAN-PATTERSON	TWIN OAKS IRR CO.	PATTERSON WD	PATTERSON TUOL. R.	W. STAN TUOL R. ID	EL SOL MAZE RD.	YOMAZE RD. WD	STAN. R.	DAU 216 TOTAL
8.42	8.31	1990	$2,000	$10,900	34,772	$15,700	66,697	$9,300	$14,600	$6,000	159,969
9.37	8.79	1991	$2,000	$9,700	40,154	$15,000	60,583	$9,000	$14,600	$6,000	157,037
10.87	9.86	1992	$2,000	$8,200	27,198	$13,900	44,803	$8,300	$14,600	$6,000	125,001
17.53	19.01	1993	$2,000	$3,800	18,923	$8,900	45,388	$2,300	$14,600	$6,000	101,911
9.16	8.81	1994	$2,000	$10,000	32,452	$15,200	57,398	$9,000	$14,600	$6,000	146,650
17.49	18.72	1995	$2,000	$3,800	20,373	$8,900	47,744	$2,500	$14,600	$6,000	105,917
		1996									
		1997									
	21.89	1998	$2,000	$1,300	27,214	$5,100	36,017	$400	$14,600	$6,000	92,631
		1999									
	10.70	2000	$2,000	$7,200	41,772	$13,800	49,424	$7,800	$14,600	$6,000	142,596
	10.80	2001	$2,000	$7,100	42,138	$13,700	46,637	$7,700	$14,600	$6,000	139,875

SJR Summary Sheet

Swam Ch#	Description	1998	X	1999	X	2000	X	2001	X
	SJR nr Newman USGS 11274000	4,295,180				894,570		568,730	
	Orestimba Cr. DWR B08735	87,098	X			22,406	X	36,303	X
	Del Puerto Cr USGS 11274630	28,752	X			3,538	X	1,533	X
	SJR @Pttrsn Brdg DWR B07200	4,803,070	X			1,082,520	X	737,320	X
33	1/2 Spge btwn Merced & Tuol R@	(392,040)				(162,007)		(130,755)	
	SJR @Pttrsn Brdg DWR B07200	4,803,070				1,082,520		737,320	
	Tuolumne R.@Mth TUOLNEW.WK4	2,314,767	X			988,830	X	457,023	X
	TID Laterals 6+7 Spills	8,857	X			16,244	X	13,712	X
	TID Laterals 5 Spills	32,345	X			31,814	X	23,845	X
	TID Laterals 3 Spills	17,480	X			6,889	X	6,719	X
	TID Pump Spills (aka Lateral No. 2)	10,422	X			6,408	X	5,303	X
45	DAU 216 Diversions	92,631	X			142,596	X	139,875	X
34	DAU 208 Diversions	$2,400	X			$17,100	X	$16,900	X
	SJR @Maze Rd Bridge DWR B07040	7,457,470	X			2,140,300	X	1,231,860	X
	Stanislaus R.@Mth STANINEW.WK4	1,284,745	X			608,974	X	359,121	X
180	MoID Butler &Lat 4 Spills MOIDSPL2.WK4	448	X			5,217	X	3,027	X
11	DAU 206 Diversions	$0	X			$6,000	X	$5,900	X
	DAU 205 Diversions	$0	X			$2,500	X	$2,500	X
	SJR nr Vernalis USGS 11303500	8,491,300	X			2,846,000	X	1,732,190	X
35	1/2 Spge btwn Merced & Tuol R.@	(365,559)				(167,291)		(144,713)	
12	Seepage btwn Tuol & Stan R.@	251,363				(100,009)		(146,582)	
32	Total DAU 208 Spls to SJR (TID)@	69,104				61,355		49,579	
41	Total Spg btwn Chow & Merced R@	(70,940)				(3,630)		(60,890)	

Distribute DAU Totals into County Totals

RIVER SYSTEM	DAU	County	% of IA by DAU by County	1998	2000	2001
		Merced	24%	125,257	261,507	248,046
		Stanislaus	76%	405,493	374,763	355,472
MERCED	209	TOTAL		77,985	80,656	80,394
		Merced	56%	43,828	59,524	59,331
		Stanislaus	44%	34,157	21,132	21,063
TUOLUMNE	209	TOTAL		1,000	1,000	2,000
		Merced	56%	562	738	1,476
		Stanislaus	44%	438	262	524
MERCED	210	Merced		455,502	487,542	468,064
MERCED	212	Merced		8,000	14,900	14,600
MINOR STREAMS	212	Merced		90,764	94,596	81,926
SAN JOAQUIN	212	Merced		1,900	1,900	1,900
CHOWCHILLA	213	Madera		104,290	83,553	42,463
FRESNO	213	Madera		0	41,968	35,545
SAN JOAQUIN	213	Madera		2,080	2,320	2,500
SAN JOAQUIN	214	Madera		4,550	5,080	5,460
CHOWCHILLA	215	Madera		25,411	0	4,178
SAN JOAQUIN	**216**	TOTAL		92,631	142,596	139,875
		Stanislaus	27%	24,732	24,669	24,198
		Merced	**39%**	**36,496**	89,693	87,981
		Fresno	34%	31,402	28,234	27,695
KINGS	233	Fresno		493,709	430,798	318,772
SAN JOAQUIN	233	Fresno		1,560	1,740	1,870
SAN JOAQUIN	234	Fresno		4,810	5,360	5,770
KINGS	235	Fresno		2,736	1,917	910
KINGS	236	TOTAL		456,973	338,018	183,349
		Fresno	91%	413,560	314,357	170,514
		Kings	4%	16,908	13,521	7,334
		Tulare	6%	26,504	10,141	5,500

Local Surface Supplies Added to DAU by County Water Balance

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	HR:			San Joaquin River	Co:		Merced	Status						
2	PSA:			Valley West Side	DAU:		216	X	Draft		SUPPLIES	Ag	Wildlife	M & I
3	Period:			1998 WY - ACTUAL	PA:		606		Done		Local Surface			
4											San Joaquin River	36,496	0	0
5							TAF				Salt Slough	0	902	0
6				Local Surface Water (Prime Supply)									0	
7				Agricultural			36.5							
8				Wildlife Refuges			0.9			Adj Factors	Total Local Surface Supply	36,496	902	0
9				Municipal & Industrial			0.0			0.0%	Reuse of Local Surface Supply Return Flows	0		
10				Imports/Transfers by Local Agency							Total Prime Local Surface Supply	36,496	902	0
11				Agricultural			0.0							
12				Wildlife Refuges			0.0				Imports/Transfers by Local Agency	0	0	0
13				Municipal & Industrial			0.0							
14				State Water Project							SWP (all types)	1,696	0	0
15				Agricultural			1.7							
16	W			Wildlife Refuges			0.0				CVP:			
17	A			Municipal & Industrial			0.0				Delta-Mendota Canal	43,856	84,858	65
18	T			Central Valley Project							O'Neill Forebay	6,083	277	236
19	E			Agricultural			423.4				San Luis Canal	28,394	72,166	1,193
20	R			Wildlife Refuges			157.3				SJR & Mendota Pool	345,069	0	0
21				Municipal & Industrial			1.5							
22	S			Other Federal										
23	U			Agricultural			0.0				Other Federal	0	0	0
24	P			Wildlife Refuges			0.0							
25	P			Municipal & Industrial			0.0				Reuse of Wildlife Refuge Applied Water		0	
26	L			Ground Water							Reclaimed Waste Water			0
27	Y			Agricultural			10.5				Desalinization of Ocean / Brackish Water	0		0

Other Areas of DAU by County Water Balance

- Seepage and Other Delivery System Losses
- Total Supplies > Ag Applied Water Demand
- Distribution of Applied Water Not Used to Meet ETAW + System Losses + Outflow

	J	K	L	M	N
31		**TOTAL SURFACE SUPPLY**	**461,595**	**158,203**	**1,494**
32		**APPLIED WATER DEMAND (CONSUMPTION)**	**420,700**	**371,851**	**12,486**
33		**APPLIED WATER (GW BANKING)**	**0**	**0**	**0**
34		**GW SUPPLY (AW-NET SURFACE SUPPLY)**	**10,448**	**213,648**	**11,241**
35		**TOTAL APPLIED WATER**	**472,042**	**371,851**	**12,735**
36					
37		**DEMANDS**	**Ag**	**Wildlife**	**M & I**
38		**ETAW**			
39		Evapotranspiration of Applied Water (ETAW)	292,240	90,328	4,370
40		High Water Use Industries (HWUI)			0
41					
42	**Adj Factors**	**Conveyance and Miscellaneous Losses (CML)**			
43	1.3%	Evaporation (Est. % of Total Ag Surface Supply)	6,001		
44	3.0%	Riparian ET (Est. % of Total Ag Surface Supply)	13,848		
45	2.0%	Misc Ag ET (Est. % of Total Ag Applied Water)	8,414		
46	10.2%	GW Bank Recharge E+ET (Est. % of AW for GW Recharge)	0		
47	2.0%	M&I System (Est. % of Total M&I Applied Water)			250
48					
49		**Other Water Demands (OWD)**			
50		Cooling Water			0
51		Oil Production			0
52		Direct GW Banking Recharge	0		0
53					
54		**Total ETAW + CML + OWD**	**320,503**	**90,328**	**4,620**
55	changed on 8/19/03				
56	5.0%	**Ag Conveyance Loss (Seepage to Deep Perc)**	23,080		

	J	K	L	M	N
58		**AW Incidental GW Recharge**	**0**	**0**	**0**
59					
60	**Distr. Factors**	**Percolation/Outflow (AW-ETAW-IL-Seepage)**	**128,460**	**281,523**	**8,116**
61	0.0%	Ag AW Percolation to Ground Water	0		
62	0.0%	Ag AW Percolation to Salt Sink	0		
63	0.0%	Ag Outflow to Other DAUs within County/PSA	0		
64	100.0%	Ag Outflow to Other Counties/PSAs	128,460		
65	0.0%	Ag Outflow E + ET and to Salt Sink	0		
66	56.9%	Wildlife Refuge Percolation to Ground Water		160,313	
67	0.0%	Wildlife Refuge Percolation to Salt Sink		0	
68	43.1%	Wildlife Refuge Outflow to Other Counties/PSAs		121,210	
69	0.0%	Wildlife Refuge Outflow E + ET and to Salt Sink			
70	100.0%	M&I Percolation to Ground Water			8,116
71	0.0%	M&I Outflow to Other DAUs within County/PSA			0
72	0.0%	M&I Outflow to Other Counties/PSAs			0
73	0.0%	M&I Outflow E + ET and to Salt Sink			0
74					
75			**Ag**	**Wildlife**	**M & I**

Summary Page of DAU by County Balance to Use with Evelyn's Balance

	PA Name:	
	PA #	**606**
Agriculture		
1	AW - Crop Production	1023.0
2	AW - Groundwater Recharge	0.0
3	ETAW	731.4
4	E + ET of Groundwater Recharge	0.0
5	Deep Percolation of Applied Water	0.0
6	Deep Percolation of Applied Water to Salt Sink	0.0
7	Deep Percolation of Groundwater Recharge	0.0
8	Reuse of Return Flow within Region	0.0
9	Return Flow and Deep Percolation to OR, NV, MX	0.0
10	Return Flow for Delta Outflow	0.0
11	Return Flow to Salt Sink	0.0
12	Return Flow to Developed Supply	291.6
13	Return Flow E + ET	0.0
14	Agricultural Applied Water Use	1023.0
15	Agricultural Net Water Use (AW - Reuse)	1023.0
16	Agricultural Net Water Use (ETAW + Irr Losses + Outflow)	1023.0
17	Agricultural Depletion	731.4
18	Conveyance E + ET	60.6
19	Conveyance Return Flow and Deep Percolation to OR, NV, MX	0.0
20	Conveyance Return Flows for Delta Outflow	0.0
21	Conveyance Return Flows to Salt Sink	0.0
22	Conveyance Return Flows to Developed Supply	0.0
23	Conveyance Seepage (Reuse)	0.0
24	Conveyance Deep Percolation	46.7
25	Conveyance Deep Percolation to Salt Sink	
26	Conveyance Loss Applied Water Use	107.3
27	Conveyance Loss Net Water Use (AW - Reuse)	60.6
28	Conveyance Loss Net Water Use (ETAW + Irr Losses + Outflow)	60.6
29	Conveyance Loss Depletion	60.6

- Questions?