

Table 1: September Ranch Watershed Recharge Estimates

"AVERAGE" Rainfall Years 1996 and 1997

	WY 1996 Precip at San Clemente (inches)	Precip over SR (84.9%) (inches)	Precip - 70% ET (inches) (a)	Runoff (inches) after ET (CN 62) (b)	Recharge (Precip-ET- Runoff)*Area (AF)	WY 1997 Precip at San Clemente (inches)	Precip over SR (84.9%) (inches)	Precip - 70% ET (inches)	Runoff (inches) after ET (CN 62)	Recharge (Precip-ET- Runoff)*Area (AF)
OCT	0.00	0.00	0.00	0.00	0.0	1.22	1.04	0.31	0.00	14.5
NOV	0.09	0.08	0.02	0.00	1.1	3.30	2.80	0.84	0.00	39.3
DEC	4.87	4.13	1.24	0.00	58.0	7.83	6.65	1.99	-0.10	88.6
JAN	4.25	3.61	1.08	0.00	50.6	8.61	7.31	2.19	-0.20	93.2
FEB	7.97	6.77	2.03	-0.10	90.2	0.29	0.25	0.07	0.00	3.5
MAR	2.06	1.75	0.52	0.00	24.5	0.08	0.07	0.02	0.00	1.0
APR	1.28	1.09	0.33	0.00	15.2	0.10	0.08	0.03	0.00	1.2
MAY	1.84	1.56	0.47	0.00	21.9	0.05	0.04	0.01	0.00	0.6
JUN	0.02	0.02	0.01	0.00	0.2	0.04	0.03	0.01	0.00	0.5
JUL	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0
AUG	0.00	0.00	0.00	0.00	0.0	0.15	0.13	0.04	0.00	1.8
SEP	0.02	0.02	0.01	0.00	0.2	0.00	0.00	0.00	0.00	0.0
TOTAL	22.40	19.02	5.71	-0.10	262.0	21.67	18.40	5.52	-0.30	244.0

"BELOW AVERAGE" Rainfall Years 1987 through 1989

	WY 1987 Precip at San Clemente (inches)	Precip over SR (84.9%) (inches)	Precip - 85% ET (inches)	Runoff (inches) after ET (CN 62)	Recharge (Precip-ET- Runoff)*Area (AF)	WY 1988 Precip at San Clemente (inches)	Precip over SR (84.9%) (inches)	Precip - 85% ET (inches)	Runoff (inches) after ET (CN 62)	Recharge (Precip-ET- Runoff)*Area (AF)	WY 1989 Precip at San Clemente (inches)	Precip over SR (84.9%) (inches)	Precip - 85% ET (inches)	Runoff (inches) after ET (CN 62)	Recharge (Precip-ET- Runoff)*Area (AF)
OCT	0.00	0.00	0.00	0.00	0.0	1.13	0.96	0.14	0.00	6.7	0.00	0.00	0.00	0.00	0.0
NOV	0.53	0.45	0.07	0.00	3.2	0.76	0.65	0.10	0.00	4.5	1.42	1.21	0.18	0.00	8.5
DEC	0.98	0.83	0.12	0.00	5.8	4.37	3.71	0.56	0.00	26.0	4.18	3.55	0.53	0.00	24.9
JAN	2.19	1.86	0.28	0.00	13.0	1.87	1.59	0.24	0.00	11.1	1.37	1.16	0.17	0.00	8.2
FEB	4.05	3.44	0.52	0.00	24.1	0.58	0.49	0.07	0.00	3.5	1.84	1.56	0.23	0.00	11.0
MAR	2.65	2.25	0.34	0.00	15.8	0.11	0.09	0.01	0.00	0.7	2.24	1.90	0.29	0.00	13.3
APR	0.36	0.31	0.05	0.00	2.1	1.64	1.39	0.21	0.00	9.8	0.60	0.51	0.08	0.00	3.6
MAY	0.26	0.22	0.03	0.00	1.5	0.51	0.43	0.06	0.00	3.0	0.35	0.30	0.04	0.00	2.1
JUN	0.00	0.00	0.00	0.00	0.0	0.10	0.08	0.01	0.00	0.6	0.00	0.00	0.00	0.00	0.0
JUL	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0
AUG	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0
SEP	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0	0.80	0.68	0.10	0.00	4.8
TOTAL	11.02	9.36	1.40	0.00	65.6	11.07	9.40	1.41	0.00	65.9	12.80	10.87	1.63	0.00	76.2

"BELOW AVERAGE" Rainfall Years 1990 through 1991

	WY 1990 Precip at San Clemente (inches)	Precip over SR (84.9%) (inches)	Precip - 85% ET (inches)	Runoff (inches) after ET (CN 62)	Recharge (Precip-ET- Runoff)*Area (AF)	WY 1991 Precip at San Clemente (inches)	Precip over SR (84.9%) (inches)	Precip - 85% ET (inches)	Runoff (inches) after ET (CN 62)	Recharge (Precip-ET- Runoff)*Area (AF)
OCT	1.17	0.99	0.15	0.00	7.0	0.00	0.00	0.00	0.00	0.0
NOV	1.23	1.04	0.16	0.00	7.3	0.42	0.36	0.05	0.00	2.5
DEC	0.08	0.07	0.01	0.00	0.5	1.99	1.69	0.25	0.00	11.8
JAN	3.19	2.71	0.41	0.00	19.0	0.18	0.15	0.02	0.00	1.1
FEB	3.61	3.06	0.46	0.00	21.5	2.11	1.79	0.27	0.00	12.6
MAR	1.82	1.55	0.23	0.00	10.8	11.38	9.66	1.45	-0.40	49.1
APR	0.58	0.49	0.07	0.00	3.5	0.30	0.25	0.04	0.00	1.8
MAY	1.06	0.90	0.13	0.00	6.3	0.45	0.38	0.06	0.00	2.7
JUN	0.00	0.00	0.00	0.00	0.0	0.01	0.01	0.00	0.00	0.1
JUL	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.0
AUG	0.00	0.00	0.00	0.00	0.0	0.03	0.03	0.00	0.00	0.2
SEP	0.35	0.30	0.04	0.00	2.1	0.00	0.00	0.00	0.00	0.0
TOTAL	13.09	11.11	1.67	0.00	77.9	16.87	14.32	2.15	-0.40	81.7

(a) ET = Evapotranspiration

(b) CN 62 = Curve No. 62, from Soil Conservation Service Technical Release 55, *Urban Hydrology for Small Watersheds*, Second Edition, June 1986.

Based on analysis by Whitson Engineers and peer review by Monterey Bay Engineers, Inc. dated 27 June 1996

Table 2: September Ranch GIS Storage Volume and Area Estimates

Period		Cross-sectional Area along M-M' (sq. ft.)	GW Storage [Porosity 13.95% QOA1, 7% QOA2] (acre-ft)	Combined Saturated Surface Area (acres)	Surface Area of SR Watershed (acres)
Normal Rainfall Period		13.95%	0.07		
1997_December	Qoa1	0	167	38	
	Qoa2	83434	102	41	
	<i>Totals</i>	<i>83434</i>	<i>269</i>	<i>48</i>	
1998_March	Qoa1	7126	217	47	
	Qoa2	91184	106	43	
	<i>Totals</i>	<i>98310</i>	<i>323</i>	<i>52</i>	
1998_June	Qoa1	3219	220	48	
	Qoa2	90969	106	43	
	<i>Totals</i>	<i>94187</i>	<i>327</i>	<i>53</i>	
1998_September	Qoa1	538	192	44	
	Qoa2	88881	105	42	
	<i>Totals</i>	<i>89419</i>	<i>297</i>	<i>50</i>	<i>561</i>
Below Average Rainfall Period					
1998_December	Qoa1	786	183	43	
	Qoa2	87944	104	34	
	<i>Totals</i>	<i>88730</i>	<i>287</i>	<i>49</i>	
1999_March	Qoa1	2723	193	44	
	Qoa2	89419	105	36	
	<i>Totals</i>	<i>92142</i>	<i>297</i>	<i>50</i>	
1999_June	Qoa1	226	185	43	
	Qoa2	87610	104	34	
	<i>Totals</i>	<i>87836</i>	<i>289</i>	<i>50</i>	
1999_September	Qoa1	0	170	39	
	Qoa2	83574	102	31	
	<i>Totals</i>	<i>83574</i>	<i>273</i>	<i>48</i>	
Other					
1996_November	Qoa1	0	1390	44	
	Qoa2	86566	1499	42	
	<i>Totals</i>	<i>86566</i>	<i>2889</i>	<i>51</i>	

Table 3: Carmel Valley Aquifer Subunit 3 Recharge and Storage Estimates

Monterey Peninsula Water Management District -- Carmel Valley Simulation Model (CVSIM3)
 No-Project Simulation with Cal-Am Annual Demand < 15,285 AF and without Los Padres Maintenance Dredging
 Selected Monthly Values for Subunit 3 of Carmel Valley Alluvial Aquifer: WY 1958 - 2002
 (All Values in Acre-Feet)

Annual Summaries	Total Storage	Surface Inflow	Surface Recharge	Subsurface Inflow	Surface Outflow	Non Cal-Am Pumping	Cal-Am Pumping	Subsurface Outflow	Riparian ET
1981	18900	55915	8176	2781	47740	1028	8409	887	304
1982	19333	164966	7488	2781	157478	980	8013	887	301
1983	19519	362943	7161	2781	355782	972	7783	887	301
1984	18903	40825	7636	2789	33189	1026	8471	889	301
1985	18445	25460	6265	2781	19196	1028	8123	887	309
1986	18979	135799	7451	2781	128348	994	7759	887	302
1987	17781	16692	5476	2781	11216	1034	8312	887	326
1988	16768	9312	6176	2789	3136	1029	8375	889	329
1989	15913	10135	7383	2781	2752	1019	8648	887	328
1990	14286	7950	5396	2781	2554	965	8049	887	329
1991	15400	28360	10370	2781	17990	999	7803	887	305
1992	17646	47628	8999	2788	38629	1026	8287	889	315
1993	18742	125671	9077	2781	116594	1026	8129	887	301
1994	17374	12340	4720	2780	7621	1039	8214	887	329
1995	19191	176795	11368	2781	165428	977	7631	887	301
1996	18946	98549	8090	2997	90459	997	8014	889	301
1997	18482	100324	7085	2781	93240	1025	8426	887	304
1998	19486	286762	7664	2781	279098	972	7508	887	301
1999	18615	53738	5091	2781	48647	1017	8202	887	307
2000	18720	82587	8676	2789	73911	1024	8216	889	302
2001	18493	56898	8718	2781	48180	1027	8347	887	310

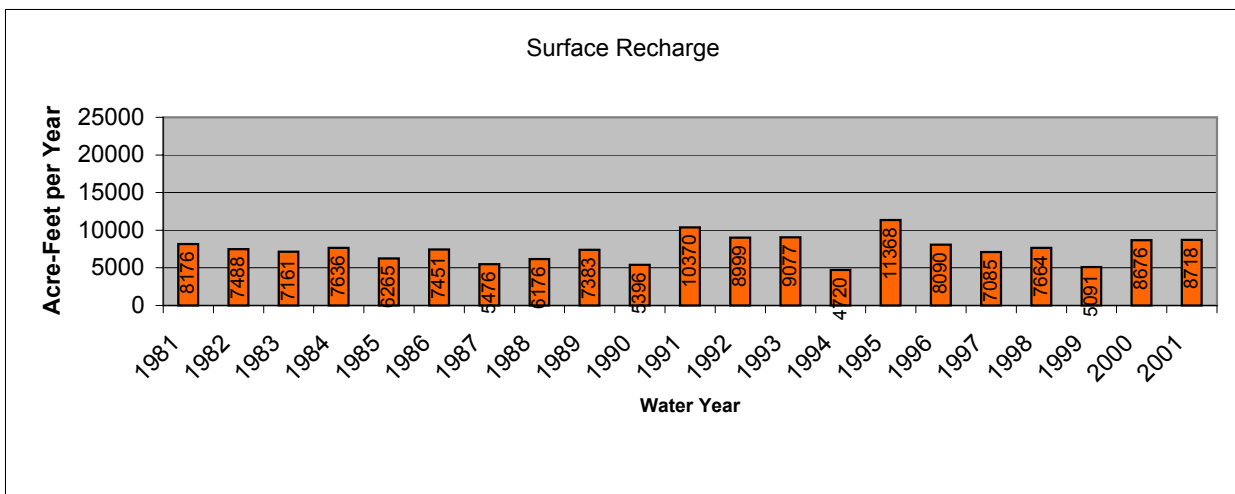
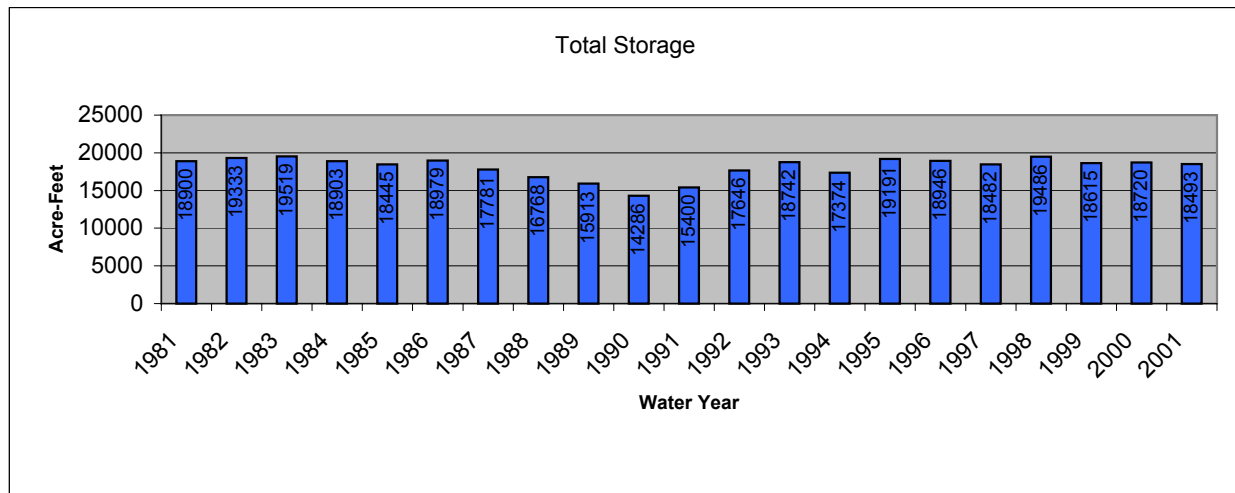


Table 4: Predicted Drawdown in the SRA Based on 57.21 AFY Pumping

Inflow based on precip data from San Clemente Dam (MPWMD), reduced by 15.1% and applied to 561 acres of the SR watershed. Accounting for 70% ET, inflow is 30% of adjusted rainfall over the 561 acre area

Sy =Flow Volume/(Unit delta H * Unit Area) Fetter (p118)
 Drawdown delta h = Flow volume /(Sy*Area)
 Sy = 0.33 (based on Neumann soln. of 1992 Well C data)
 Average Aquifer Area (Acre) in drought year 45 Todd 92, K/J 04
 Initial (Normal yr) Aquifer Storage 275 K/J 04

Water Year	Calendar Year	Quarter	Flow In [pos] (AF)	Flow Out [neg] (AF)	Total Flow (AF)	Predicted Quarterly Drawdown [negative sign means downward] (ft)	Cumulative Drawdown (ft)	
Below Average Precipitation Period 1987 through 1991								
1987								
	Oct-Dec	1986	4	9.0	-14.3	-5.3	-0.36	-0.36
	Jan-Mar	1987	1	52.9	-14.3	38.6	2.60	2.24
	Apr-Jun	1987	2	3.6	-14.3	-10.7	-0.72	1.52
	Jul-Sep	1987	3	0.0	-14.3	-14.3	-0.96	0.56
	1987 Water Year Annual			65.5	-57.20	8.3		0.56
1988								
	Oct-Dec	1987	4	37.2	-14.3	22.9	1.54	1.54
	Jan-Mar	1988	1	15.3	-14.3	1.0	0.07	1.61
	Apr-Jun	1988	2	13.4	-14.3	-0.9	-0.06	1.55
	Jul-Sep	1988	3	0.0	-14.3	-14.3	-0.96	0.59
	1988 Water Year Annual			65.9	-57.20	8.7		0.59
1989								
	Oct-Dec	1988	4	33.4	-14.3	19.1	1.29	1.29
	Jan-Mar	1989	1	32.5	-14.3	18.2	1.23	2.51
	Apr-Jun	1989	2	5.7	-14.3	-8.6	-0.58	1.93
	Jul-Sep	1989	3	4.8	-14.3	-9.5	-0.64	1.29
	1989 Water Year Annual			76.4	-57.20	19.2		1.29
1990								
	Oct-Dec	1989	4	14.8	-14.3	0.5	0.03	0.03
	Jan-Mar	1990	1	51.3	-14.3	37.0	2.49	2.53
	Apr-Jun	1990	2	9.8	-14.3	-4.5	-0.30	2.22
	Jul-Sep	1990	3	2.1	-14.3	-12.2	-0.82	1.40
	1990 Water Year Annual			78.0	-57.20	20.8		1.40
1991								
	Oct-Dec	1990	4	14.3	-14.3	0.0	0.00	0.00
	Jan-Mar	1991	1	62.8	-14.3	48.5	3.27	3.27
	Apr-Jun	1991	2	4.6	-14.3	-9.7	-0.65	2.61
	Jul-Sep	1991	3	0.2	-14.3	-14.1	-0.95	1.66
	1990 Water Year Annual			81.9	-57.20	24.7		1.66

Table 4: Predicted Drawdown in the SRA Based on 57.21 AFY Pumping

Water Year	Calender Year	Quarter	Flow In [pos] (AF)	Flow Out [neg] (AF)	Total Flow (AF)	Predicted Quarterly Drawdown [negative sign means downward] (ft)	Cumulative Drawdown (ft)
"Average" or Normal Precipitation Water Years 1996,							
1996							
Oct-Dec	1995	4	59.1	-14.3	44.8	3.02	2.95
Jan-Mar	1996	1	165.4	-14.3	151.1	10.18	13.13
Apr-Jun	1996	2	37.4	-14.3	23.1	1.55	14.68
Jul-Sep	1996	3	0.2	-14.3	-14.1	-0.95	13.73
1996 Water Year Annual			262.1	-57.20	204.9		13.73
1997							
Oct-Dec	1996	4	142.4	-14.3	128.1	8.63	22.36
Jan-Mar	1997	1	97.6	-14.3	83.3	5.61	27.97
Apr-Jun	1997	2	2.3	-14.3	-12.0	-0.81	27.16
Jul-Sep	1997	3	1.8	-14.3	-12.5	-0.84	26.32
1997 Water Year Annual			244.0	-57.20	186.8		26.32

Table 5: SRA / CVA Leakage Calculations.

Summary Results from GIS Mapping and Calculations.

Based on Water levels of water years 1997, 1999 in the SRA with 110 AFY pumping

Flux Q (AFQ)	Water Bearing Zone	Down- gradient Water level (ft - MSL)	Down- gradient height of water h1 (ft)	Upgra-dient Water level (ft - MSL)	Upgra-dient height of water h2 (ft)	Total Ground- water Leakage Path L (ft)	Total Cross- Section Width W (ft)	GW Gradient I (ft/ft) [Brookdale to Well D]	Cross- Section Area A (sq ft)	Equation	Quarter
		[Brookdale Well]	[Brookdale Well]	[Well D]	[Well D]						
Water-Year 1997 - Average Precipitation ~ 21.67" rainfall (San Clemente Res)											
Overall Assumption: No Change in Storage in the SRA. Flux area profile based on Cross-section MM'.											
0.0000	QOA ₁	39.26	0	41.47	0	1570	1650		0	Dupuit	Oct - Dec 1997
0.0000	QOA ₁	39.26		41.47		1570			0	Darcy	
-0.0046	QOA ₂	39.26		41.47		1570		-0.0014	83434	Darcy	
-0.0046	Total										
-0.4995	QOA ₁	44.8	1.8	54.17	11.17	1570	1650			Dupuit	Jan - Mar 1998
-0.3327	QOA ₁	44.8		54.17		1570			7126	Darcy	
-0.0213	QOA ₂	44.8		54.17		1570		-0.0060	91184	Darcy	
-0.5208	Total										
-0.1026	QOA ₁	43.22	0.22	48	5	1570	1650		3219	Dupuit	Apr - Jun 1998
-0.0767	QOA ₁	43.22		48		1570			3219	Darcy	
-0.0108	QOA ₂	43.22		48		1570		-0.0030	90969	Darcy	
-0.1134	Total										
-0.0257	QOA ₁	42.15	0	45.5	2.5	1570	1650			Dupuit	Jul - Sep 1998
-0.0090	QOA ₁	42.15		45.5		1570			538	Darcy	
-0.0074	QOA ₂	42.15		45.5		1570		-0.0021	88881	Darcy	
-0.0331	Total										
-0.6278	Total QOA1 flux AFY										
-0.0441	Total QOA2 flux AFY										
-0.6719	Total Flux AFY										
										negative sign means discharge from SRA to CVA	

Table 5: SRA / CVA Leakage Calculations.

Summary Results from GIS Mapping and Calculations.

Based on Water levels of water years 1997, 1999 in the SRA with 110 AFY pumping

Flux Q (AFQ)	Water Bearing Zone	Down-gradient Water level (ft - MSL)	Down-gradient height of water h1 (ft)	Upgra-dient Water level (ft - MSL)	Upgra-dient height of water h2 (ft)	Total Ground-water Leakage Path L (ft)	Total Cross-Section Width W (ft)	GW Gradient I (ft/ft) [Brookdale to Well D]	Cross-Section Area A (sq ft)	Equation	Quarter
		[Brookdale Well]	[Brookdale Well]	[Well D]	[Well D]						
Water-Year 1999 - Below Average Precipitation ~ 17.41" Rainfall (San Clemente Res)											
0.0000	QOA ₁	42.72	0	45.3	0	1570	1650		0	Dupuit	Oct - Dec 1998
0.0000	QOA ₁	42.72		45.3		1570			0	Darcy	
-0.0057	QOA ₂	42.72		45.3		1570		-0.0016	87944	Darcy	
-0.0057	Total										
-0.0566	QOA ₁	43.26	0.26	46.72	3.72	1570	1650			Dupuit	Jan - Mar 1999
-0.0469	QOA ₁	43.26		46.72		1570			2723	Darcy	
-0.0077	QOA ₂	43.26		46.72		1570		-0.0022	89419	Darcy	
-0.0643	Total										
-0.0180	QOA ₁	41.89	0	45.09	2.09	1570	1650			Dupuit	Apr - Jun 1999
-0.0036	QOA ₁	41.89		45.09		1570			226	Darcy	
-0.0070	QOA ₂	41.89		45.09		1570		-0.0020	87610	Darcy	
-0.0249	Total										
0.0000	QOA ₁	35.3	0	41.84	0	1570	1650			Dupuit	Jul - Sep 1999
0.0000	QOA ₁	35.3		41.84		1570			0	Darcy	
-0.0136	QOA ₂	35.3		41.84		1570		-0.0042	83574	Darcy	
-0.0136	Total										

-0.0746 Total QOA1 flux AFY

-0.0340 Total QOA2 flux AFY

-0.1085 Total Flux AFY

negative sign means discharge from SRA to CVA

Table 5: SRA / CVA Leakage Calculations.

Summary Results from GIS Mapping and Calculations.

Based on Water levels of water years 1997, 1999 in the SRA with 110 AFY pumping

Flux Q (AFQ)	Water Bearing Zone	Down-gradient	Down-gradient	Upgra-dient	Upgra-dient	Total	Total Cross-Section Width W (ft)	GW Gradient	Cross-Section Area	Equation	Quarter
		Water level (ft - MSL) [Brookdale Well]	height of water h1 (ft) [Brookdale Well]	Water level (ft - MSL) [Well D]	height of water h2 (ft) [Well D]	Ground-water Leakage Path L (ft)		I (ft/ft) [Brookdale to Well D]	A (sq ft)		
Water-Year 1989 - Drought Year ~ 12.80" Rainfall (San Clemente Res)											
Overall Assumption: Theoretical case of steep groundwater gradient that could have occurred in years 1986 through 1991											
0.0000	QOA ₁	28	0	37.5	0	750	1650			Dupuit	Jul - Sep 1998
0.0000	QOA ₁	28		37.5		750			0	Darcy	
-0.0408	QOA ₂	28		37.5		750		-0.0127	82314	Darcy	
-0.0408	Total										

0.0000 Total QOA1 flux AFY
 -0.1631 Total QOA2 flux AFY
 -0.1631 Total Flux AFY negative sign means discharge from SRA to CVA

Equations Used:

Upper Alluvium QOA₁ Unconfined Groundwater - Dupuit Flux

Equation: $q=K(h_1^2-h_2^2)/2L$ (Dupuit Flux) q=flow per unit width

h_1 & h_2 are height of water table above the top of QOA₂ = 43 feet - MSL

Equation: $Q=wK(h_1^2-h_2^2)/2L$ Q=total flux, w=width of cross-sectional area

Assumption: K value of QOA₁ >> QOA₂

Older Alluvium QOA₂, Deeper Groundwater with fixed cross-sectional

Equation: $Q=KiA$ (Darcy Flux)

"Range" of Hydraulic Conductivity (gal/day/ft²)

QOA1 K 28.00 (Todd 97)
 Minimum QOA2 K 0.14 (Todd 97)
 Maximum QOA2 K 1.40 (Freeze and Cherry, not used in calculations above !)

conversion factor - gal/day to AF per qtr = 2.79E-04

Table 6: Areas Tributary to Aquifer Subunits 1 and 2

Township (South)	Range (East)	Section Numbers
16	4	All
17	4	All
16	3	All
17	3	All
17	2	All
16	2	1 – 5, 8-12, 13-17, 20-24, 25-29, 32-36

Table 7: MPWMD 2002 Pumping Data in AQ3 and AQ4

Aquifer Subunit	Total Pumped and Reported to MPWMD (AFA)(excludes Cal-Am)	Total Reported as STATE to SWRCB (AFA)	Total Not Reported to SWRCB (AFA)
3	1,161	513	648
4	786	570	216

Table 8: Summary of Riparian and Pre-1914 Appropriative Water Rights in Carmel River Watershed Aquifer Subunits 3 and 4

ApplID	Record Type	Status	Owner	AppFiledDate	Permit	Permit Issue Date	Complete Use	License	LicenseDate	SourName	TribName	POD1	POD2	POD3	POD4	POD5	POD6	POD7	County	MaxUseAnn	MaxStorage	MaxDir/Div	POD/Dir	Rpt Method	Source Area	QuanDiv	InfoSource	QuanApp	QuanRes	Comments	MPWMD 2002 Production (AF)	Estimated Max Annual Use (AF/yr)							
S014459	STATE	Active	ARROYO CARMEL HOMEOWNERS ASSOCIATION	Aug. 3, 1995						CARMEL RIVER	PACIFIC OCEAN	SW	SW	18	16	S	01	E	M	Monterey	20.9											14.84	20.9						
A030442			Berube (JEM Partners)																					WM	AQ3	48.40	Application	41.2	41.2	Note: ApplID A030442 owner is JEM PARTNERS in CARIV data	0	41.2							
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	NE	SE	17	16	S	01	E	M	Monterey	3900	16.1												1137					
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	NE	SW	17	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	SE	NW	22	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	SW	NW	22	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	SW	NW	23	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	NE	SW	23	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	NW	SW	24	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	SE	SW	24	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	SW	SW	24	16	S	01	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	SW	SW	19	16	S	02	E	M	Monterey	3900	16.1																	
A030715	APPLC	Active	CALIFORNIA-AMERICAN WATER COMPANY	Jun. 17, 1998						CARMEL RIVER SUBTERRANEAN STREAM	PACIFIC OCEAN	SW	SW	19	16	S	02	E	M	Monterey	3900	16.1																	
S015251	STATE	Active	CARMEL VALLEY RANCH, INC	Jun. 30, 2000						CARMEL RIVER SUB STR	PACIFIC OCEAN	NW	NE	25	16	S	1	E	M	Monterey	281.3	40	1.22										340 AF reserved, Table 13 WRD 1632, 525 AF per Table 12 Riparian, 4/1 to 11/15 primary diversion season,	220.91	281.30				
A030065	APPLC	Active	CROW, GEORGE	Feb. 27, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SE	NW	22	16	S	01	E	M	Monterey	3.5	7850	GPD	7850	GPD	WM	AQ3	1.40	Well Report	3.5	1.4	1.4 AFA Reserved - Table 13, WRD 1632, 3.5 AFA riparian per Table 12, 5/1 to 10/01 primary diversion, George and Julia Crow							
S013914	STATE	Active	CROW, JULIA	Jul. 21, 1992						CARMEL RIVER	PACIFIC OCEAN	SE	NW	22	16	S	01	E	M	Monterey	0	0	.155											2.71	1.4				
S014408	STATE	Active	CROW, THOMAS	Jul. 5, 1995						CARMEL RIVER	PACIFIC OCEAN	SE	NW	22	16	S	01	E	M	Monterey			.17												15.46	12.7			
A030066	APPLC	Active	CROW, TOM	Feb. 27, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SE	NW	22	16	S	01	E	M	Monterey	12.7	14225	GPD	14225	GPD	WM	AQ3	13.95	Well Report	12.7	12.7	12.7 AFA Reserved - Table 13, WRD 1632, 7 AFA riparian per Table 12, 5/1 to 10/01 primary diversion	7.53						
S014525	STATE	Active	CYPRESS GREENS ASSOCIATES LTD	Dec. 26, 1995						CARMEL RIVER	PACIFIC OCEAN	SW	NW	18	16	S	01	E	M	Monterey	8		.22													8			
S014524	STATE	Active	CYPRESS GREENS ASSOCIATES LTD	Dec. 26, 1995						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	SE	NW	18	16	N	01	E	M	Monterey			.33													0			
S014523	STATE	Active	CYPRESS GREENS ASSOCIATES LTD	Dec. 26, 1995						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	SE	NW	18	16	S	01	E	M	Monterey	2		.22													2			
S014522	STATE	Active	CYPRESS GREENS ASSOCIATES LTD	Dec. 26, 1995						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	NW	SW	18	16	S	01	E	M	Monterey	13		.33													13			
S014530	STATE	Active	GAMBOA, WILLIAM	Dec. 29, 1995						CARMEL RIVER	PACIFIC OCEAN	NW	SW	18	16	S	01	E	M	Monterey																0			
S014529	STATE	Active	GAMBOA, WILLIAM	Dec. 29, 1995						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	NW	SW	18	16	N	01	E	M	Monterey																0			
S014526	STATE	Active	GAMBOA, WILLIAM	Dec. 26, 1995						CARMEL RIVER	PACIFIC OCEAN	SW	NW	18	16	S	01	E	M	Monterey																0			
S015286	STATE	Active	HACIENDA CARMEL COMMUNITY ASSOCIATION	Aug. 2, 1999						CARMEL RIVER	CARMEL RIVER	NE	SW	17	16	S	01	E	M	Monterey	35.7	0	.05												50 AFA Riparian per WRD 1632, Tables 12 & 13, 4/15 to 11/15 (primary diversion)	9	50		
S014584	STATE	Active	HOMESTEAD HOMEOWNERS ASSOCIATION	Jun. 6, 1996						CARMEL RIVER	PACIFIC OCEAN	NW	NE	25	16	S	01	E	M	Monterey			.13													8.07	94.12 based on max div		
S014371	STATE	Active	JEM PARTNERS LLC CA GENERAL PARTNERSHIP	Apr. 3, 1995						CARMEL RIVER	PACIFIC OCEAN	NW	NE	23	16	S	01	E	M	Monterey	48		.18													Location not consistent with September Ranch	99.37	99.37	
A030442A	APPLC	Active	JEM PARTNERS LLC CA GENERAL PARTNERSHIP	May. 5, 1995						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	SW	NW	23	16	S	01	E	M	Monterey	37.2	0	.051													Location not consistent with September Ranch			
A030067	APPLC	Active	KAUFMAN, ROY	Feb. 27, 1992	020831	Mar. 29, 1996	*****			CARMEL RIVER SUB STR	PACIFIC OCEAN	SW	NW	22	16	S	01	E	M	Monterey	150	.63															160 AFA reserved per Table 13, 150 AFA Riparian per WRD 1632, Table 12, 4/15 to 11/15 primary diversion		Appears to have riparian right although APPLC
S015082	STATE	Active	KOREAN BUDDHIST SAMBOSA TEMPLE	Jun. 16, 2000						CARMEL RIVER	PACIFIC OCEAN	SW	SW	24	16	S	01	E	M	Monterey			11520	GPD	11520	GPD										0.28	12.90 based on max div		
S014583	STATE	Active	KOREAN BUDDHIST SAMBOSA TEMPLE	Jun. 6, 1996						CARMEL RIVER	PACIFIC OCEAN	SW	SW	24	16	S	01	E	M	Monterey			.09														65.16 based on max div		
---			Lutes																																70.00	70.00			
S013803	STATE	Active	NICHOLSON, ALOYS	Mar. 26, 1992						UNST	CARMEL RIVER	NE	NW	30	16	S	02	E	M	Monterey	0	0	.303														2.2		
---			Odello																																	195.9			
S014390	STATE	Active	PATTERSON, WILLIAM	May. 15, 1995						CARMEL RIVER	PACIFIC OCEAN	NW	SW	22	16	S	01	E	M	Monterey			24480	GPD	24480	GPD												27.42 based on max div	

Table 8: Summary of Riparian and Pre-1914 Appropriative Water Rights in Carmel River Watershed Aquifer Subunits 3 and 4

ApplID	Record Type	Status	Owner	AppFileDate	Permit	Permit Issue Date	Complete Use	License	LicenseDate	SourName	TribName	POD1	POD2	POD3	POD4	POD5	POD6	POD7	County	MaxUseAnn	MaxStorage	MaxDir/Div	POD/Dir	Rpt Method	Source Area	QuanDiv	InfoSource	QuanApp	QuanRes	Comments	MPWMD 2002 Production (AF)	Estimated Max Annual Use (AF/yr)		
---			Pt. Sur Corp.																							4.90 Protest	--		0.0 AFA reserved per Table 13, 4.9 AFA Riparian per WRD 1632, table 12, 1/1 to 12/31		0.00			
S015326	STATE	Active	QUAIL LODGE INC	Aug. 7, 2000						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	SE	SE	17	16	S	01	E	M	Monterey	115	0	.89	CFS	.89	CFS				254 AFA Riparian per WRD 1632, Tables 12 & 13, 4/1 to 11/15 (primary diversion)	42.8	254		
S015325	STATE	Active	QUAIL LODGE INC	Aug. 7, 2000						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	NW	NE	21	16	S	01	E	M	Monterey	8520	0	.89	CFS	.89	CFS				254 AFA Riparian per WRD 1632, Tables 12 & 13, 4/1 to 11/15 (primary diversion)				
S015324	STATE	Active	QUAIL LODGE INC	Aug. 7, 2000						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	NW	NE	21	16	S	01	E	M	Monterey	57.3	1.34	CFS	1.34	CFS				254 AFA Riparian per WRD 1632, Tables 12 & 13, 4/1 to 11/15 (primary diversion)					
S015323	STATE	Active	QUAIL LODGE INC	Aug. 7, 2000						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	NW	NE	21	16	S	01	E	M	Monterey	8.1	.11	CFS	.11	CFS				254 AFA Riparian per WRD 1632, Tables 12 & 13, 4/1 to 11/15 (primary diversion)					
			Riparian - Dec1632																															
			Quinn Properties																												3/1 to 10/15	40		
A030111	APPLC	Active	RANCHO CANADA DE LA SEGUNDA, INC	Apr. 22, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	NE	SW	17	16	S	01	E	M	Monterey	700	2.36	CFS	2.36	CFS	WM	AQ4	Well Rerport	700.0	700.0	700 AFA Riparian per WRD 1632, Tables 12 & 13, 4/15 to 11/15 primary diversion		700	
A030111	APPLC	Active	RANCHO CANADA DE LA SEGUNDA, INC	Apr. 22, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SW	SW	17	16	S	01	E	M	Monterey	700	2.36	CFS	2.36	CFS	WM	AQ4				700 AFA Riparian per WRD 1632, Tables 12 & 13, 4/15 to 11/15 primary diversion			
A030111	APPLC	Active	RANCHO CANADA DE LA SEGUNDA, INC	Apr. 22, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	NE	SE	18	16	S	01	E	M	Monterey	700	2.36	CFS	2.36	CFS	WM	AQ4				700 AFA Riparian per WRD 1632, Tables 12 & 13, 4/15 to 11/15 primary diversion			
A030111	APPLC	Active	RANCHO CANADA DE LA SEGUNDA, INC	Apr. 22, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SW	SE	18	16	S	01	E	M	Monterey	700	2.36	CFS	2.36	CFS	WM	AQ4				700 AFA Riparian per WRD 1632, Tables 12 & 13, 4/15 to 11/15 primary diversion			
A030149	APPLC	Active	QUAIL LODGE INC (Rancho San Carlos)	Jun. 30, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SE	SE	17	16	S	01	E	M	Monterey	115	0	.7	CFS	.7	CFS	WM	AQ4	Well Report	150.0		Note: listed owner is Rancho San Carlos on WRD1623 & MPWMD-T13. 268 AFA reserved per Table 13, WRD1632		268
A030150	APPLC	Active	QUAIL LODGE INC (Rancho San Carlos)	Jun. 30, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SE	SE	18	16	S	01	E	M	Monterey	60	0	.3	CFS	.3	CFS	WM	AQ3	Well Report	120.0		Note: listed owner is Rancho San Carlos on WRD1623 & MPWMD-T13. 268 AFA reserved per Table 13, WRD1632		
A030075	APPLC	Active	RANCHO SIN FRNOS LLC	Mar. 11, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SW	NE	22	16	S	01	E	M	Monterey	11.2	.09	CFS	.09	CFS	NA	NA	82.00 Estimate	98.6	82.0	10/31 primary diversion		82	
S013802	STATE	Active	STERTEN, BETH	Apr. 13, 1992						CARMEL RIVER	PACIFIC OCEAN	NW	NE	22	16	S	01	E	M	Monterey	0	0	.089	CFS	.089	CFS				5.1 AFA per Table 13, 6 AFA Riparian per WRD 1632, Table 12 5/1 to 9/30 (primary diversion)		5.1		
---			Syndicate Camp																													0.80 Protest	0.8	
D030555R	SMDOM	Active	TEMPLEMAN, EDWARD	Jul. 30, 1996		Jul. 30, 2006	000589R	Jul. 24, 2001		CARMEL RIVER	PACIFIC OCEAN	NE	SW	22	16	S	01	E	M	Monterey	.2	0	3000	GPD	3000	GPD				0.7 AFA reserved per Table 13 WRD 1632		0.7		
A030058	APPLC	Active	WILLIAMS, R & J 1980 JOINT TRUST	Jan. 15, 1992						CARMEL RIVER SUB STR	PACIFIC OCEAN	SE	SE	33	16	S	02	E	M	Monterey	7.6	0	.025	CFS	.025	CFS	WM	AQ3	1.50 Well Report	7.6	1.5	1.5 AFA reserved per Table 13, 38 AFA Riparian per WRD 1632, Table 12 4/1 to 11/1 primary diversion		1.5
D027633R	SMDOM	Active	WISTRICH, HARRY	Jan. 17, 1983			000327R	Jun. 25, 1997		CARMEL RIVER	PACIFIC OCEAN	SW	NE	23	16	S	01	E	M	Monterey	.9	0	4000	GPD	4000	GPD	LU	AQ3	0.88 Well Report	1.5	0.9	0.9 AFA reserved per Table 13, WRD 1632; Appl ID = A027633 in WRD1632 & MPWMD-T13		0.9
S015295	STATE	Active	WOLTER PROPERTIES LIMITED PARTNERSHIP	Sep. 16, 2002						CARMEL RIVER UNDERFLOW	PACIFIC OCEAN	SE	NE	21	16	S	01	E	M	Monterey	96	.42	CFS	.42	CFS								96	
			Subtotal																													3563.67		
			Sum of Other Reported Pumpers (assumed riparian) in AQ3 from MPWMD data																													648.15	+20% from actual for unreported/underreported riparians	
			Sum of Other Reported Pumpers (assumed riparian) in AQ4 from MPWMD data																													216.4	+20% from actual for unreported/underreported riparians	
			Total Estimated Maximum Annual Use (AFA)																													4557.85 Total	AQ3 = 60% AQ4 = 40%	

Table 9: Sustainable Yield Calculations

	Available Groundwater In the SRA ¹ (AFY)	Averaged Usage of Other SRA Users (AFY)	Project Sustainable Yield ² (AFY)
Average Precipitation Period	244 – 262	0.76	243 – 261
Below Average Precipitation	65 - 81	0.76	64 – 80

Notes: 1- Based on total recharge within the September Ranch watershed; 2 – Project sustainable yield is the amount of naturally available groundwater in the SRA minus the current total usage by other SRA users.