

**California Department of Fish and Game (CDFG) Alternative (Alternative 5) Evaluation Conducted by
Dr. Sabrina Cook (PBS&J) in Support of Responses to Comments on the El Sur Water Right Application
No. 30166 Draft EIR**

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The potential effects of the CDFG Alternative were analyzed for limiting flow conditions. Records of daily flow rates at the USGS gauge for the baseline period of record were assessed to determine when and how often the CDFG Alternative limiting conditions (bypass flows) occurred. If flow did not exceed the CDFG Alternative bypass flow requirements, diversions could not occur. If flow did exceed the CDFG Alternative bypass flow requirements, diversions were assumed to occur at the maximum allowable diversion rate (2.79 cfs). These were compared with baseline diversion records and proposed project application diversion requests. Effects of diversion limits for DO and salinity conditions could not be analyzed because sufficient long term records for these parameters do not exist.

Table A5-1 shows the number of days in each month that diversions would be allowed under the CDFG Alternative (days with flow at the USGS gauge greater than 40 cfs from June through November and greater than 132 cfs from December through May). On average, pumping would be allowed during less than 20 percent of the year. From June through October, when irrigation is critical no pumping would be allowed for the entire season during 45 percent of years and overall, only 9 percent of days would pumping be allowed. From July through October, the Water Rights Application irrigation season, 60 percent of the time no irrigation would be allowed under the CDFG Alternative.

Table A5-2 shows the CDFG Alternative potential diversions based on the number of days diversions would be allowed and the diversion rate of 2.79 cfs, with an overall annual maximum cap of 557.5 AF. Table A5-3 compares the CDFG Alternative diversions with calculated required diversions for optimum pasture growth (Table 2-3 of the DEIR). Negative values (in parenthesis) indicated an irrigation deficit compared to the required irrigation. Overall, the CDFG Alternative would not meet required irrigation amounts

Table A5-4 compares the CDFG Alternative to the proposed project. No reasonable comparison for winter months is feasible because the Water Rights Application does not provide sufficient detail. However, the critical irrigation and flow conditions are during the dry weather season and these months are presented in Table A5-4. Generally, the CDFG Alternative would substantially reduce diversions during the dry season compared to the maximum monthly, maximum irrigation season, and 20-year rolling average proposed project diversion. This is primarily because no diversions would be allowed during the majority of the dry season (Table A5-1).

The CDFG Alternative would also typically substantially reduce diversions compared to baseline conditions for most dry season months and on an annual basis. However, wet season diversions could increase compared to baseline. Refer to Tables A5-5(a) and A5-5(b).

Table A5-1 Number of Days Irrigation Diversions Allowed By the CDFG Alternative

Year	132 cfs Interim Bypass Flow at USGS Gauge						40 cfs Interim Bypass Flow at USGS Gauge					
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
	days	days	days	days	days	days	days	days	days	days	days	days
1985	3	0	4	6	0	0	0	0	0	0	0	10
1986	0	6	24	31	16	0	14	0	0	0	0	0
1987	1	0	6	6	0	0	0	0	0	0	0	0
1988	2	5	0	0	0	0	0	0	0	0	0	1
1989	0	0	0	8	0	0	0	0	0	0	2	2
1990	0	1	3	0	0	0	0	0	0	0	0	0
1991	2	0	0	21	4	0	0	0	0	0	1	0
1992	8	1	18	21	0	0	0	0	0	0	2	0
1993	0	30	28	31	2	0	30	0	0	0	0	2
1994	0	0	9	0	0	0	0	0	0	0	0	1
1995	1	28	23	30	26	14	30	26	0	0	0	0
1996	23	12	29	31	14	1	30	1	0	0	1	14
1997	8	31	28	3	0	0	0	0	0	0	0	4
1998	1	26	28	31	29	31	30	31	20	0	0	2
1999	0	9	15	14	23	0	0	0	0	0	0	2
2000	0	10	29	31	6	0	28	2	0	0	7	0
2001	11	8	18	19	0	0	0	0	0	0	0	7
2002	18	13	1	2	0	0	0	0	0	0	0	10
2003	6	24	0	3	3	2	24	0	0	0	0	0
2004	9	7	13	12	0	0	0	0	0	0	8	2

Table A5-2 Amount of Irrigation Diversions Allowed By the CDFG Alternative

Year	132 cfs Interim Bypass Flow at USGS Gauge						40 cfs Interim Bypass Flow at USGS Gauge						Annual	July to October
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		
	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF
1985	17	0	22	33	0	0	0	0	0	0	0	55	127	0
1986	0	33	133	172	89	0	77	0	0	0	0	0	504	0
1987	6	0	33	33	0	0	0	0	0	0	0	0	72	0
1988	11	28	0	0	0	0	0	0	0	0	0	6	44	0
1989	0	0	0	44	0	0	0	0	0	11	11	11	66	11
1990	0	6	17	0	0	0	0	0	0	0	0	0	22	0
1991	11	0	0	116	22	0	0	0	0	6	0	0	155	6
1992	44	6	100	116	0	0	0	0	0	11	0	0	277	11
1993	0	166	155	172	11	0	166	0	0	0	0	11	558	0
1994	0	0	50	0	0	0	0	0	0	0	0	6	55	0
1995	6	155	127	166	144	77	166	144	0	0	0	0	558	144
1996	127	66	160	172	77	6	166	6	0	0	6	77	558	11
1997	44	172	155	17	0	0	0	0	0	0	0	22	410	0
1998	6	144	155	172	160	172	166	172	111	0	0	11	558	282
1999	0	50	83	77	127	0	0	0	0	0	0	11	349	0
2000	0	55	160	172	33	0	155	11	0	0	39	0	558	50
2001	61	44	100	105	0	0	0	0	0	0	0	39	349	0
2002	100	72	6	11	0	0	0	0	0	0	0	55	243	0
2003	33	133	0	17	17	11	133	0	0	0	0	0	343	0
2004	50	39	72	66	0	0	0	0	0	44	11	11	282	44

Red values: maximum allowable annual diversion limit

Table A5-3 CDFG Alternative Irrigation Compared to Irrigation Requirements (Table 2-3 of the DEIR)

Year	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Annual	July to October
	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF
1985	(29)	(53)	22	(85)	(146)	(209)	(203)	(158)	(137)	(69)	0	16	(1051)	(364)
1986	(41)	33	133	48	(67)	(210)	(111)	(152)	(97)	(121)	(100)	(33)	(718)	(470)
1987	6	(11)	(4)	(106)	(184)	(202)	(188)	(171)	(141)	(99)	(40)	0	(1140)	(451)
1988	(12)	(55)	(131)	(85)	(141)	(191)	(196)	(171)	(135)	(114)	(11)	6	(1237)	(431)
1989	(33)	(13)	(35)	(85)	(153)	(210)	(181)	(158)	(96)	(72)	(51)	(77)	(1164)	(377)
1990	0	6	(46)	(119)	(106)	(210)	(204)	(178)	(146)	(126)	(86)	(16)	(1232)	(536)
1991	(52)	(36)	0	0	(121)	(185)	(188)	(156)	(135)	(84)	(91)	0	(1048)	(466)
1992	17	6	89	(63)	(195)	(213)	(220)	(164)	(146)	(121)	(98)	0	(1108)	(529)
1993	0	166	115	54	(151)	(193)	(38)	(178)	(135)	(141)	(51)	(8)	(684)	(505)
1994	(8)	0	(73)	(97)	(133)	(193)	(173)	(158)	(146)	(118)	0	1	(1099)	(422)
1995	6	67	127	96	1	(71)	(54)	(27)	(146)	(139)	(112)	(18)	(698)	(424)
1996	127	66	120	41	(60)	(187)	(38)	(152)	(135)	(91)	(12)	77	(550)	(391)
1997	44	74	26	(121)	(217)	(202)	(196)	(177)	(164)	(113)	0	22	(1024)	(454)
1998	6	144	155	141	80	(17)	(14)	7	(23)	(97)	(2)	(3)	(335)	(116)
1999	0	50	83	18	(17)	(166)	(181)	(158)	(130)	(129)	(46)	(72)	(747)	(463)
2000	0	55	115	54	(116)	(210)	(18)	(141)	(137)	0	(25)	(82)	(573)	(303)
2001	61	44	57	61	(187)	(210)	(181)	(151)	(128)	(118)	(10)	39	(723)	(407)
2002	69	21	(57)	(107)	(110)	(176)	(181)	(152)	(141)	(114)	(34)	55	(928)	(441)
2003	(26)	111	(82)	(22)	(105)	(191)	(55)	(165)	(152)	(120)	(32)	0	(840)	(469)
2004	29	39	(49)	(83)	(173)	(188)	(185)	(161)	(175)	(18)	(18)	11	(971)	(372)
Mean	8	36	28	(23)	(115)	(182)	(140)	(146)	(132)	(100)	(41)	(4)	(893)	(420)

(x) = irrigation deficit (negative number)

Table A5-5(a) CDFG Alternative Irrigation Compared to Proposed Project Monthly Maximum

Year	May	Jun	Jul	Aug	Sep	Oct	Nov	Annual	July to October
	AF	AF	AF	AF	AF	AF	AF	AF	AF
1985	(318)	(318)	(230)	(230)	(230)	(230)	(263)	(1073)	(735)
1986	(318)	(241)	(230)	(230)	(230)	(230)	(318)	(696)	(735)
1987	(318)	(318)	(230)	(230)	(230)	(230)	(318)	(1128)	(735)
1988	(318)	(318)	(230)	(230)	(230)	(230)	(312)	(1156)	(735)
1989	(318)	(318)	(230)	(230)	(230)	(219)	(307)	(1134)	(724)
1990	(318)	(318)	(230)	(230)	(230)	(230)	(318)	(1178)	(735)
1991	(318)	(318)	(230)	(230)	(230)	(224)	(318)	(1045)	(729)
1992	(318)	(318)	(230)	(230)	(230)	(219)	(318)	(923)	(724)
1993	(318)	(152)	(230)	(230)	(230)	(230)	(307)	(643)	(735)
1994	(318)	(318)	(230)	(230)	(230)	(230)	(312)	(1145)	(735)
1995	(241)	(152)	(86)	(230)	(230)	(230)	(318)	(643)	(591)
1996	(312)	(152)	(224)	(230)	(230)	(224)	(241)	(643)	(724)
1997	(318)	(318)	(230)	(230)	(230)	(230)	(296)	(790)	(735)
1998	(146)	(152)	(58)	(119)	(230)	(230)	(307)	(643)	(453)
1999	(318)	(318)	(230)	(230)	(230)	(230)	(307)	(851)	(735)
2000	(318)	(163)	(219)	(230)	(230)	(191)	(318)	(643)	(685)
2001	(318)	(318)	(230)	(230)	(230)	(230)	(279)	(851)	(735)
2002	(318)	(318)	(230)	(230)	(230)	(230)	(263)	(957)	(735)
2003	(307)	(185)	(230)	(230)	(230)	(230)	(318)	(857)	(735)
2004	(318)	(318)	(230)	(230)	(230)	(186)	(307)	(918)	(691)
Mean	(305)	(267)	(213)	(224)	(230)	(224)	(302)	(896)	(707)

Assuming May, June, and November diversions at maximum sustained 30-day average of 5.34 cfs or 318 acre-feet

NA - cannot be determined

(x) = deficit, negative number

Table A5-5(b) CDFG Alternative Irrigation Compared to Baseline

Year	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Annual	July to October
	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF
1985	17	0	22	33	(240)	(272)	(231)	(210)	(32)	0	0	55	(857)	(472)
1986	0	33	133	172	(17)	(339)	(112)	(199)	(127)	0	(52)	0	(508)	(515)
1987	6	0	33	33	0	(274)	(264)	(205)	(196)	(10)	0	0	(878)	(675)
1988	11	28	0	(239)	(21)	(265)	(68)	(71)	(99)	(215)	(76)	6	(1009)	(453)
1989	0	0	0	44	(36)	(71)	(92)	(79)	(161)	(134)	11	11	(506)	(455)
1990	0	6	17	(50)	(143)	(62)	(60)	(173)	(269)	(199)	(64)	0	(998)	(702)
1991	(6)	0	0	116	(30)	(196)	(191)	(135)	(116)	(170)	6	(57)	(779)	(607)
1992	44	6	100	116	(267)	(257)	(116)	(99)	(241)	(119)	11	0	(823)	(564)
1993	0	166	155	171	(148)	(178)	(36)	(218)	(147)	(87)	0	11	(435)	(655)
1994	0	0	50	0	(111)	(139)	(102)	(102)	(181)	(33)	0	6	(613)	(418)
1995	6	155	127	166	57	(5)	(59)	(12)	(201)	(111)	0	0	(305)	(549)
1996	127	66	160	172	(51)	(158)	(4)	(178)	(190)	(129)	(3)	77	(416)	(661)
1997	44	172	155	(101)	(149)	(123)	(93)	(97)	(121)	(98)	0	22	(389)	(410)
1998	6	144	155	172	160	151	26	48	1	(71)	(5)	11	89	(162)
1999	0	50	82	77	42	(89)	(106)	(177)	(127)	(90)	0	11	(326)	(500)
2000	0	55	160	172	(4)	(205)	26	(105)	(192)	(34)	39	0	(155)	(421)
2001	61	44	100	105	(39)	(188)	(174)	(116)	(158)	(21)	0	39	(348)	(469)
2002	100	72	6	11	(161)	(174)	(135)	(104)	(105)	(88)	0	55	(523)	(432)
2003	33	133	0	17	10	(133)	(72)	(125)	(142)	(102)	(37)	0	(417)	(573)
2004	50	39	72	(27)	(253)	(199)	(156)	(162)	(177)	(96)	44	11	(854)	(546)
Mean	25	58	76	58	(70)	(159)	(101)	(126)	(149)	(90)	(6)	13	(553)	(512)

(x) = deficit, negative number

Water Surface Elevation

Water surface elevation effects were calculated based on the relationship of 0.33-inch reduction in water surface elevation within the ZOI per cfs pumped. This relationship was developed from SGI 2007 Study piezometer data. Table A5-1 shows the number of days pumping could occur during each month for each year under the CDFG Alternative. Months where pumping could occur for at least one day under the CDFG Alternative are highlighted in blue. No highlight indicates pumping would not be allowed under the CDFG Alternative. Assuming the maximum pumping rate allowed under the CDFG Alternative (2.79 cfs), Table A5-6 shows the potential effect on water surface elevation compared to baseline. A positive number indicates that the CDFG Alternative would have a higher water surface elevation compared to baseline. A negative number, numbers within parenthesis, indicates the CDFG Alternative would contribute to a lower water surface elevation compared to baseline.

Year	Jun	Jul	Aug	Sep	Oct	Nov
1985	1.51	1.24	1.13	0.18	0.00	0.00
1986	0.96	1.02	1.07	0.70	0.00	(0.63)
1987	1.52	1.42	1.10	1.09	0.05	0.00
1988	1.47	0.36	0.38	0.55	1.16	(0.50)
1989	0.39	0.50	0.42	0.89	(0.20)	(0.92)
1990	0.34	0.32	0.93	1.49	1.07	0.35
1991	1.09	1.02	0.73	0.64	(0.01)	0.00
1992	1.43	0.62	0.53	1.34	(0.28)	0.00
1993	0.07	1.09	1.17	0.82	0.47	(0.92)
1994	0.77	0.55	0.55	1.01	0.17	0.00
1995	(0.46)	0.29	0.83	1.12	0.60	(0.92)
1996	(0.01)	(0.01)	0.99	1.05	(0.23)	(0.87)
1997	0.68	0.50	0.52	0.67	0.53	(0.92)
1998	(0.81)	(0.17)	(0.26)	0.61	0.38	(0.89)
1999	0.49	0.57	0.95	0.70	0.49	0.00
2000	0.22	(0.23)	0.62	1.06	(0.74)	0.00
2001	1.04	0.93	0.62	0.87	0.11	(0.92)
2002	0.96	0.72	0.56	0.58	0.47	(0.92)
2003	(0.12)	1.10	0.67	0.79	0.55	(0.72)
2004	1.11	0.84	0.87	0.98	(0.41)	(0.92)
Diversion allowed at least one day for Alt 5 (x) = negative number; CDFG Alternative results in lower water surface elevation compared to baseline						

In Table A5-6, it is evident that the CDFG Alternative would typically reduce potential effects on water surface elevations compared to baseline (up to 1.49 inches), but this effect is mostly attributed to the limitation that no pumping would be allowed under most conditions in the dry season. In some years,

when the CDFG Alternative would allow pumping, the CDFG Alternative contributes to a greater reduction in water surface elevation (negative number) compared to baseline. During November, when baseline pumping is minimal, under the CDFG Alternative, higher pumping rates could also contribute to lower water surface elevation than baseline conditions.

Compared to the proposed project, the CDFG Alternative would reduce dry season effects on water surface elevations by 0.99 inches on average (average monthly July through October diversion), and up to 1.76 inches (maximum sustained 30-day average) during conditions when the CDFG Alternative would not allow pumping because of bypass flow criteria. During conditions where pumping would be allowed, the CDFG Alternative would improve water surface elevations during sustained maximum pumping conditions (0.84 inches) and only slightly during average July through October months (0.07 inches).

CDFG Alternative (Alt 5) El Sur Ranch Monthly Pumping Reduction on BSR Flow Rates (cfs)

days	31	28	31	30	31	30	31	31	30	31	30	31	365		
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (cfs)	Annual (ac-ft)	July to October Irrigation (cfs)
1985	-	0.06	0.09	-	-	-	-	-	-	-	0.15	0.04	0.03	127	-
1986	0.09	0.38	0.45	0.24	-	0.21	-	-	-	-	-	-	0.11	504	-
1987	-	0.10	0.09	-	-	-	-	-	-	-	-	0.01	0.02	72	-
1988	0.07	-	-	-	-	-	-	-	-	-	0.01	0.03	0.01	44	-
1989	-	-	0.12	-	-	-	-	-	-	-	0.03	-	0.01	55	-
1990	0.01	0.05	0.00	-	-	-	-	-	-	-	-	-	0.01	22	-
1991	-	0.00	0.30	0.06	-	-	-	-	-	0.01	-	0.03	0.03	155	-
1992	0.01	0.29	0.30	-	-	-	-	-	-	0.03	-	0.12	0.06	277	0.01
1993	0.43	0.45	0.45	0.03	-	0.45	-	-	-	-	0.03	-	0.15	558	-
1994	-	0.14	-	-	-	-	-	-	-	-	0.01	-	0.01	55	-
1995	0.40	0.37	0.43	0.39	0.20	0.45	0.37	-	-	-	-	0.01	0.22	558	0.09
1996	0.17	0.46	0.45	0.21	0.01	0.45	0.01	-	-	0.01	0.21	0.33	0.19	558	0.01
1997	0.45	0.45	0.04	-	-	-	-	-	-	-	0.06	0.12	0.09	410	-
1998	0.37	0.45	0.45	0.43	0.45	0.45	0.45	0.29	-	-	0.03	0.01	0.28	558	0.18
1999	0.13	0.24	0.20	0.34	-	-	-	-	-	-	0.03	-	0.08	349	-
2000	0.14	0.46	0.45	0.09	-	0.42	0.03	-	-	0.10	-	-	0.14	558	0.03
2001	0.12	0.29	0.27	-	-	-	-	-	-	-	0.10	0.16	0.08	349	-
2002	0.19	0.02	0.03	-	-	-	-	-	-	-	0.15	0.26	0.05	243	-
2003	0.35	-	0.04	0.04	0.03	0.36	-	-	-	-	-	0.09	0.08	343	-
2004	0.10	0.21	0.17	-	-	-	-	-	-	0.12	0.03	0.13	0.06	282	0.03
1985-2004	0.15	0.22	0.22	0.09	0.03	0.14	0.04	0.01	0.00	0.01	0.04	0.07	0.09	304	0.02

Red annual values: total limited to 557.5 AF