

Attachment 7

Water Quality Modeling Results Summary

SAN JOAQUIN RIVER
RESTORATION PROGRAM



Location: Downstream end of Reach 4B1 [Right above where the Mariposa Bypass Returns]

Flow Range± 15% Fish Temp. Criteria: 64.0 °F

Table 1 - Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Feb 1-Feb 15	300	255-345	54.7	55.0	55.0	54.7	54.7
	700	595-805	54.1	54.7	55.1	--	52.9
	1000	850-1150	51.6	52.9	53.4	--	50.1
	2000	1700-2300	48.3	50.7	50.9	--	--
	4100	3485-4715	48.1	51.7	52.6	--	--

Table 2 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Feb 1-Feb 15	300	255-345	49	49	49	51	49
	700	595-805	6	6	6	0	6
	1000	850-1150	4	4	4	0	3
	2000	1700-2300	7	7	7	0	0
	4100	3485-4715	30	30	30	0	0
		Sum	96	96	96	51	58

Table 3 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Daily Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Feb 1-Feb 15	300	255-345	N/A	0.3	0.3	-0.1	0.0
	700	595-805	N/A	0.6	1.0	--	-1.2
	1000	850-1150	N/A	1.3	1.8	--	-1.6
	2000	1700-2300	N/A	2.4	2.5	--	--
	4100	3485-4715	N/A	3.6	4.5	--	--

Table 4 -Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Feb 15-Feb 28	300	255-345	57.8	58.0	58.1	58.0	57.7
	700	595-805	58.6	59.1	59.1	--	57.5
	1000	850-1150	59.1	60.6	60.5	--	56.9
	2000	1700-2300	59.5	62.3	62.5	--	--
	4100	3485-4715	51.0	54.9	55.8	--	--

Table 5 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Feb 15-Feb 28	300	255-345	33	33	33	35	33
	700	595-805	8	8	8	0	9
	1000	850-1150	1	1	1	0	1
	2000	1700-2300	1	1	1	0	0
	4100	3485-4715	26	26	26	0	0
		Sum	69	69	69	35	43

Table 6 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Feb 15-Feb 28	300	255-345	N/A	0.2	0.3	0.2	-0.1
	700	595-805	N/A	0.5	0.5	--	-1.1
	1000	850-1150	N/A	1.5	1.4	--	-2.2
	2000	1700-2300	N/A	2.8	3.0	--	--
	4100	3485-4715	N/A	3.9	4.8	--	--

Description of Metric: Bi-monthly average temperatures in tables 1 and 4 are average temperatures for the specified "Date Range". Average temperatures are calculated for specific flows, plus or minus 15 percent ("Flow Range"). Bi-monthly average temperatures are calculated from all days within the Date Range when the 7-day average flow is within the Flow Range. The number of days used to compute the average is provided in tables 2 and 5. As a point of reference, the total number of days for a two-week Date Range over the 24-year simulation is 336.

Color Legend:	
	User Selection
	Temperatures Exceeding "Fish Temp. Criteria"
	Increase in Temperature [Compared to Alt1B]
	Decrease in Temperature [Compared to Alt1B]

Location: Downstream end of Reach 4B1 [Right above where the Mariposa Bypass Returns]

Flow Range±		15%	Fish Temp. Criteria:					64.0 °F
Table 1 - Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)								
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A	
Mar 1-Mar 15	300	255-345	64.4	64.6	64.8	64.0	64.2	
	700	595-805	62.9	63.6	63.9	--	61.1	
	1000	850-1150	61.1	62.4	62.9	--	59.2	
	2000	1700-2300	55.8	58.8	59.1	--	--	
	4100	3485-4715	54.1	58.4	59.3	--	--	

Table 2 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Mar 1-Mar 15	300	255-345	55	55	55	57	54
	700	595-805	17	17	17	0	18
	1000	850-1150	6	6	6	0	7
	2000	1700-2300	3	3	3	0	0
	4100	3485-4715	29	29	29	0	0
		Sum	110	110	110	57	79





Table 3 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Daily Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Mar 1-Mar 15	300	255-345	N/A	0.2	0.4	-0.4	-0.2
	700	595-805	N/A	0.6	1.0	--	-1.9
	1000	850-1150	N/A	1.3	1.8	--	-1.9
	2000	1700-2300	N/A	2.9	3.3	--	--
	4100	3485-4715	N/A	4.3	5.3	--	--

Table 4 -Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Mar 15-Mar 31	300	255-345	66.3	66.6	67.0	64.6	65.0
	700	595-805	68.6	69.1	69.5	--	67.0
	1000	850-1150	68.6	69.5	69.7	--	66.3
	2000	1700-2300	61.3	63.0	63.2	--	--
	4100	3485-4715	58.2	62.8	63.6	--	--

Table 5 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Mar 15-Mar 31	300	255-345	8	8	8	15	10
	700	595-805	37	37	37	0	37
	1000	850-1150	54	54	54	0	57
	2000	1700-2300	1	1	1	0	0
	4100	3485-4715	41	41	41	0	0
		Sum	141	141	141	15	104

Table 6 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Mar 15-Mar 31	300	255-345	N/A	0.2	0.7	-1.7	-1.4
	700	595-805	N/A	0.5	0.9	--	-1.6
	1000	850-1150	N/A	0.9	1.1	--	-2.3
	2000	1700-2300	N/A	1.7	1.9	--	--
	4100	3485-4715	N/A	4.5	5.4	--	--

Description of Metric: Bi-monthly average temperatures in tables 1 and 4 are average temperatures for the specified "Date Range". Average temperatures are calculated for specific flows, plus or minus 15 percent ("Flow Range"). Bi-monthly average temperatures are calculated from all days within the Date Range when the 7-day average flow is within the Flow Range. The number of days used to compute the average is provided in tables 2 and 5. As a point of reference, the total number of days for a two-week Date Range over the 24-year simulation is 336.

Color Legend:	
	User Selection
	Temperatures Exceeding "Fish Temp. Criteria"
	Increase in Temperature [Compared to Alt1B]
	Decrease in Temperature [Compared to Alt1B]

Location: Downstream end of Reach 4B1 [Right above where the Mariposa Bypass Returns]

Flow Range± 15% Fish Temp. Criteria: 64.0 °F

Table 1 - Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Apr 1-Apr 15	300	255-345	72.6	73.2	73.6	71.0	71.9
	700	595-805	72.1	73.1	73.6	--	70.0
	1000	850-1150	70.1	71.4	71.8	--	67.4
	2000	1700-2300	69.7	72.3	72.4	--	--
	4100	3485-4715	61.3	66.2	67.2	--	--

Table 2 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Apr 1-Apr 15	300	255-345	5	5	5	13	5
	700	595-805	7	7	7	0	7
	1000	850-1150	16	16	16	0	16
	2000	1700-2300	122	122	122	0	0
	4100	3485-4715	30	30	30	0	0
		Sum	180	180	180	13	28





Table 3 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Daily Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Apr 1-Apr 15	300	255-345	N/A	0.6	1.0	-1.6	-0.7
	700	595-805	N/A	1.0	1.5	--	-2.1
	1000	850-1150	N/A	1.3	1.7	--	-2.7
	2000	1700-2300	N/A	2.6	2.7	--	--
	4100	3485-4715	N/A	4.9	5.9	--	--

Table 4 -Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Apr 15-Apr 30	300	255-345	73.2	73.9	74.3	71.1	72.7
	700	595-805	71.0	72.2	72.4	--	69.9
	1000	850-1150	71.6	72.9	73.4	--	69.0
	2000	1700-2300	70.7	73.5	73.6	--	--
	4100	3485-4715	67.2	71.2	71.8	--	--

Table 5 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Apr 15-Apr 30	300	255-345	1	1	1	13	1
	700	595-805	3	3	3	0	7
	1000	850-1150	6	6	6	0	13
	2000	1700-2300	78	78	78	0	0
	4100	3485-4715	77	77	77	0	0
		Sum	165	165	165	13	21

Table 6 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Apr 15-Apr 30	300	255-345	N/A	0.7	1.2	-2.1	-0.5
	700	595-805	N/A	1.1	1.4	--	-1.2
	1000	850-1150	N/A	1.4	1.9	--	-2.6
	2000	1700-2300	N/A	2.8	2.9	--	--
	4100	3485-4715	N/A	4.0	4.5	--	--

Description of Metric: Bi-monthly average temperatures in tables 1 and 4 are average temperatures for the specified "Date Range". Average temperatures are calculated for specific flows, plus or minus 15 percent ("Flow Range"). Bi-monthly average temperatures are calculated from all days within the Date Range when the 7-day average flow is within the Flow Range. The number of days used to compute the average is provided in tables 2 and 5. As a point of reference, the total number of days for a two-week Date Range over the 24-year simulation is 336.

Color Legend:	
	User Selection
	Temperatures Exceeding "Fish Temp. Criteria"
	Increase in Temperature [Compared to Alt1B]
	Decrease in Temperature [Compared to Alt1B]

Location: Downstream end of Reach 4B1 [Right above where the Mariposa Bypass Returns]

Flow Range±		15%	Fish Temp. Criteria:				64.0 °F
Table 1 - Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
May 1-May 15	300	255-345	75.5	76.1	77.1	72.7	73.6
	700	595-805	75.6	76.8	78.2	--	72.2
	1000	850-1150	74.4	76.1	76.4	--	70.9
	2000	1700-2300	72.7	75.5	75.8	--	--
	4100	3485-4715	68.1	72.3	72.8	--	--

Table 2 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
May 1-May 15	300	255-345	6	6	6	10	6
	700	595-805	1	1	1	0	5
	1000	850-1150	10	10	10	0	15
	2000	1700-2300	31	31	31	0	0
	4100	3485-4715	54	54	54	0	0
		Sum	102	102	102	10	26





Table 3 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Daily Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
May 1-May 15	300	255-345	N/A	0.6	1.6	-2.8	-1.8
	700	595-805	N/A	1.1	2.5	--	-3.4
	1000	850-1150	N/A	1.7	2.0	--	-3.5
	2000	1700-2300	N/A	2.8	3.1	--	--
	4100	3485-4715	N/A	4.2	4.7	--	--

Table 4 -Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
May 15-May 31	300	255-345	77.5	77.6	79.3	75.1	74.9
	700	595-805	80.0	80.9	81.4	--	78.0
	1000	850-1150	77.3	78.5	79.0	--	74.8
	2000	1700-2300	75.6	79.5	79.8	--	--
	4100	3485-4715	67.6	72.6	73.2	--	--

Table 5 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
May 15-May 31	300	255-345	6	6	6	8	6
	700	595-805	7	7	7	0	7
	1000	850-1150	12	12	12	0	13
	2000	1700-2300	19	19	19	0	0
	4100	3485-4715	3	3	3	0	0
		Sum	47	47	47	8	26

Table 6 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
May 15-May 31	300	255-345	N/A	0.1	1.8	-2.4	-2.5
	700	595-805	N/A	0.8	1.4	--	-2.0
	1000	850-1150	N/A	1.2	1.7	--	-2.5
	2000	1700-2300	N/A	4.0	4.3	--	--
	4100	3485-4715	N/A	5.0	5.6	--	--

Description of Metric: Bi-monthly average temperatures in tables 1 and 4 are average temperatures for the specified "Date Range". Average temperatures are calculated for specific flows, plus or minus 15 percent ("Flow Range"). Bi-monthly average temperatures are calculated from all days within the Date Range when the 7-day average flow is within the Flow Range. The number of days used to compute the average is provided in tables 2 and 5. As a point of reference, the total number of days for a two-week Date Range over the 24-year simulation is 336.

Color Legend:		User Selection
		Temperatures Exceeding "Fish Temp. Criteria"
		Increase in Temperature [Compared to Alt1B]
		Decrease in Temperature [Compared to Alt1B]

Location: Downstream end of Reach 4B1 [Right above where the Mariposa Bypass Returns]

Flow Range±		15%	Fish Temp. Criteria:				64.0 °F
Table 1 - Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Jun 1-Jun 15	300	255-345	82.7	82.9	83.2	82.0	81.9
	700	595-805	79.7	80.4	80.8	--	77.3
	1000	850-1150	79.0	80.2	80.4	--	76.2
	2000	1700-2300	75.9	79.8	80.2	--	--
	4100	3485-4715	--	--	--	--	--

Table 2 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Jun 1-Jun 15	300	255-345	12	12	12	13	12
	700	595-805	4	4	4	0	4
	1000	850-1150	18	18	18	0	19
	2000	1700-2300	16	16	16	0	0
	4100	3485-4715	0	0	0	0	0
		Sum	50	50	50	13	35





Table 3 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Daily Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Jun 1-Jun 15	300	255-345	N/A	0.2	0.6	-0.7	-0.7
	700	595-805	N/A	0.7	1.1	--	-2.5
	1000	850-1150	N/A	1.2	1.4	--	-2.8
	2000	1700-2300	N/A	3.9	4.3	--	--
	4100	3485-4715	N/A	--	--	--	--

Table 4 -Bi-Monthly AVERAGE of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Jun 15-Jun 30	300	255-345	85.2	85.5	85.6	84.9	84.8
	700	595-805	80.3	80.9	81.2	--	78.2
	1000	850-1150	83.7	84.7	84.8	--	81.1
	2000	1700-2300	81.5	84.7	84.8	--	--
	4100	3485-4715	--	--	--	--	--

Table 5 - No. of Data Points in Average (Days during 1980-2003 Simulation Period)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Jun 15-Jun 30	300	255-345	16	16	16	16	16
	700	595-805	8	8	8	0	8
	1000	850-1150	27	27	27	0	29
	2000	1700-2300	22	22	22	0	0
	4100	3485-4715	0	0	0	0	0
		Sum	73	73	73	16	53

Table 6 - DIFFERENCE from Alt1B in Bi-Monthly average of 7D-ADM Temperatures (°F)							
Date Range	Flow (cfs)	Flow Range	Alt1B	Alt1C	Alt1D	Alt3A	Alt4A
Jun 15-Jun 30	300	255-345	N/A	0.3	0.4	-0.3	-0.4
	700	595-805	N/A	0.6	0.9	--	-2.1
	1000	850-1150	N/A	1.0	1.1	--	-2.6
	2000	1700-2300	N/A	3.1	3.2	--	--
	4100	3485-4715	N/A	--	--	--	--

Description of Metric: Bi-monthly average temperatures in tables 1 and 4 are average temperatures for the specified "Date Range". Average temperatures are calculated for specific flows, plus or minus 15 percent ("Flow Range"). Bi-monthly average temperatures are calculated from all days within the Date Range when the 7-day average flow is within the Flow Range. The number of days used to compute the average is provided in tables 2 and 5. As a point of reference, the total number of days for a two-week Date Range over the 24-year simulation is 336.

Color Legend:		User Selection
		Temperatures Exceeding "Fish Temp. Criteria"
		Increase in Temperature [Compared to Alt1B]
		Decrease in Temperature [Compared to Alt1B]