

Appendix 11M4 Sutter Bypass Weir Spill Frequencies

**Table 1a. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Ord Ferry, Moulton Weir, and Colusa Weir Spill Results - Alternative 1A Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference
	> 0 cfs	67	65	-2 -3.0%	44	44	0 0.0%	30	29	-1 -3.3%	22	21	-1 -4.5%	8	7
> 1,000 cfs	65	64	-1 -1.5%	44	44	0 0.0%	30	29	-1 -3.3%	19	19	0 0.0%	8	7	-1 -12.5%
> 2,000 cfs	61	61	0 0.0%	44	44	0 0.0%	28	26	-2 -7.1%	18	16	-2 -11.1%	6	5	-1 -16.7%
> 3,000 cfs	59	58	-1 -1.7%	43	42	-1 -2.3%	26	23	-3 -11.5%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 4,000 cfs	59	58	-1 -1.7%	42	39	-3 -7.1%	24	21	-3 -12.5%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 6,000 cfs	54	53	-1 -1.9%	38	37	-1 -2.6%	20	20	0 0.0%	12	11	-1 -8.3%	4	3	-1 -25.0%
> 8,000 cfs	53	51	-2 -3.8%	36	32	-4 -11.1%	19	19	0 0.0%	10	10	0 0.0%	3	2	-1 -33.3%
> 10,000 cfs	50	49	-1 -2.0%	32	30	-2 -6.3%	17	17	0 0.0%	10	9	-1 -10.0%	2	2	0 0.0%

**Table 1b. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Weir Spill Results - Alternative 1A Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference
	> 0 cfs	71	70	-1 -1.4%	50	50	0 0.0%	38	37	-1 -2.6%	26	25	-1 -3.8%	15	13
> 1,000 cfs	70	70	0 0.0%	49	47	-2 -4.1%	37	34	-3 -8.1%	25	25	0 0.0%	14	13	-1 -7.1%
> 2,000 cfs	69	68	-1 -1.4%	48	45	-3 -6.3%	34	33	-1 -2.9%	23	22	-1 -4.3%	13	12	-1 -7.7%
> 3,000 cfs	68	68	0 0.0%	46	45	-1 -2.2%	32	31	-1 -3.1%	22	22	0 0.0%	13	11	-2 -15.4%
> 4,000 cfs	67	65	-2 -3.0%	44	44	0 0.0%	31	28	-3 -9.7%	22	21	-1 -4.5%	10	7	-3 -30.0%
> 6,000 cfs	62	62	0 0.0%	44	43	-1 -2.3%	29	27	-2 -6.9%	20	20	0 0.0%	8	7	-1 -12.5%
> 8,000 cfs	59	58	-1 -1.7%	42	42	0 0.0%	25	24	-1 -4.0%	17	15	-2 -11.8%	5	4	-1 -20.0%
> 10,000 cfs	57	56	-1 -1.8%	41	40	-1 -2.4%	24	21	-3 -12.5%	15	14	-1 -6.7%	4	4	0 0.0%

*Total Weir Spill Results include spills from Ord Ferry, Moulton Weir, Colusa Weir, and Tisdale Weir.

**Table 1c. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Sutter Bypass Flow Results - Alternative 1A Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference	No Action Alternative	Alternative 1A	Difference
	> 0 cfs	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82
> 1,000 cfs	81	81	0 0.0%	76	76	0 0.0%	69	69	0 0.0%	60	60	0 0.0%	47	47	0 0.0%
> 2,000 cfs	81	81	0 0.0%	67	67	0 0.0%	52	52	0 0.0%	41	41	0 0.0%	33	33	0 0.0%
> 3,000 cfs	81	81	0 0.0%	62	60	-2 -3.2%	49	48	-1 -2.0%	38	37	-1 -2.6%	24	23	-1 -4.2%
> 4,000 cfs	80	80	0 0.0%	59	58	-1 -1.7%	46	46	0 0.0%	32	31	-1 -3.1%	19	19	0 0.0%
> 6,000 cfs	76	76	0 0.0%	55	54	-1 -1.8%	40	38	-2 -5.0%	26	26	0 0.0%	13	13	0 0.0%
> 8,000 cfs	73	73	0 0.0%	47	47	0 0.0%	35	33	-2 -5.7%	23	22	-1 -4.3%	11	10	-1 -9.1%
> 10,000 cfs	68	68	0 0.0%	46	45	-1 -2.2%	33	30	-3 -9.1%	22	22	0 0.0%	9	8	-1 -11.1%

**Table 2a. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Ord Ferry, Moulton Weir, and Colusa Weir Spill Results - Alternative 1B Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference
	> 0 cfs	67	65	-2 -3.0%	44	44	0 0.0%	30	29	-1 -3.3%	22	21	-1 -4.5%	8	8
> 1,000 cfs	65	64	-1 -1.5%	44	44	0 0.0%	30	29	-1 -3.3%	19	19	0 0.0%	8	8	0 0.0%
> 2,000 cfs	61	61	0 0.0%	44	44	0 0.0%	28	25	-3 -10.7%	18	16	-2 -11.1%	6	5	-1 -16.7%
> 3,000 cfs	59	58	-1 -1.7%	43	42	-1 -2.3%	26	23	-3 -11.5%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 4,000 cfs	59	58	-1 -1.7%	42	39	-3 -7.1%	24	20	-4 -16.7%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 6,000 cfs	54	53	-1 -1.9%	38	37	-1 -2.6%	20	19	-1 -5.0%	12	10	-2 -16.7%	4	3	-1 -25.0%
> 8,000 cfs	53	51	-2 -3.8%	36	32	-4 -11.1%	19	19	0 0.0%	10	10	0 0.0%	3	3	0 0.0%
> 10,000 cfs	50	49	-1 -2.0%	32	31	-1 -3.1%	17	17	0 0.0%	10	9	-1 -10.0%	2	2	0 0.0%

**Table 2b. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Weir Spill Results - Alternative 1B Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference
	> 0 cfs	71	71	0 0.0%	50	50	0 0.0%	38	37	-1 -2.6%	26	25	-1 -3.8%	15	13
> 1,000 cfs	70	71	1 1.4%	49	46	-3 -6.1%	37	35	-2 -5.4%	25	24	-1 -4.0%	14	13	-1 -7.1%
> 2,000 cfs	69	69	0 0.0%	48	46	-2 -4.2%	34	34	0 0.0%	23	22	-1 -4.3%	13	12	-1 -7.7%
> 3,000 cfs	68	68	0 0.0%	46	46	0 0.0%	32	32	0 0.0%	22	22	0 0.0%	13	10	-3 -23.1%
> 4,000 cfs	67	65	-2 -3.0%	44	44	0 0.0%	31	28	-3 -9.7%	22	21	-1 -4.5%	10	8	-2 -20.0%
> 6,000 cfs	62	62	0 0.0%	44	42	-2 -4.5%	29	26	-3 -10.3%	20	19	-1 -5.0%	8	8	0 0.0%
> 8,000 cfs	59	59	0 0.0%	42	42	0 0.0%	25	24	-1 -4.0%	17	15	-2 -11.8%	5	4	-1 -20.0%
> 10,000 cfs	57	56	-1 -1.8%	41	41	0 0.0%	24	21	-3 -12.5%	15	14	-1 -6.7%	4	4	0 0.0%

*Total Weir Spill Results include spills from Ord Ferry, Moulton Weir, Colusa Weir, and Tisdale Weir.

**Table 2c. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Sutter Bypass Flow Results - Alternative 1B Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference	No Action Alternative	Alternative 1B	Difference
	> 0 cfs	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82
> 1,000 cfs	81	81	0 0.0%	76	76	0 0.0%	69	69	0 0.0%	60	61	1 1.7%	47	47	0 0.0%
> 2,000 cfs	81	81	0 0.0%	67	68	1 1.5%	52	52	0 0.0%	41	41	0 0.0%	33	33	0 0.0%
> 3,000 cfs	81	81	0 0.0%	62	60	-2 -3.2%	49	48	-1 -2.0%	38	37	-1 -2.6%	24	23	-1 -4.2%
> 4,000 cfs	80	80	0 0.0%	59	58	-1 -1.7%	46	46	0 0.0%	32	32	0 0.0%	19	19	0 0.0%
> 6,000 cfs	76	76	0 0.0%	55	54	-1 -1.8%	40	38	-2 -5.0%	26	26	0 0.0%	13	13	0 0.0%
> 8,000 cfs	73	73	0 0.0%	47	48	1 2.1%	35	33	-2 -5.7%	23	22	-1 -4.3%	11	10	-1 -9.1%
> 10,000 cfs	68	68	0 0.0%	46	45	-1 -2.2%	33	30	-3 -9.1%	22	22	0 0.0%	9	8	-1 -11.1%

**Table 3a. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Ord Ferry, Moulton Weir, and Colusa Weir Spill Results - Alternative 2 Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference
	> 0 cfs	67	65	-2 -3.0%	44	44	0 0.0%	30	29	-1 -3.3%	22	21	-1 -4.5%	8	7
> 1,000 cfs	65	64	-1 -1.5%	44	44	0 0.0%	30	29	-1 -3.3%	19	19	0 0.0%	8	7	-1 -12.5%
> 2,000 cfs	61	61	0 0.0%	44	44	0 0.0%	28	26	-2 -7.1%	18	16	-2 -11.1%	6	5	-1 -16.7%
> 3,000 cfs	59	58	-1 -1.7%	43	42	-1 -2.3%	26	23	-3 -11.5%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 4,000 cfs	59	58	-1 -1.7%	42	39	-3 -7.1%	24	21	-3 -12.5%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 6,000 cfs	54	53	-1 -1.9%	38	37	-1 -2.6%	20	20	0 0.0%	12	12	0 0.0%	4	3	-1 -25.0%
> 8,000 cfs	53	51	-2 -3.8%	36	32	-4 -11.1%	19	19	0 0.0%	10	10	0 0.0%	3	2	-1 -33.3%
> 10,000 cfs	50	49	-1 -2.0%	32	30	-2 -6.3%	17	17	0 0.0%	10	9	-1 -10.0%	2	2	0 0.0%

**Table 3b. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Weir Spill Results - Alternative 2 Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference
	> 0 cfs	71	70	-1 -1.4%	50	50	0 0.0%	38	36	-2 -5.3%	26	25	-1 -3.8%	15	14
> 1,000 cfs	70	70	0 0.0%	49	47	-2 -4.1%	37	34	-3 -8.1%	25	25	0 0.0%	14	13	-1 -7.1%
> 2,000 cfs	69	68	-1 -1.4%	48	45	-3 -6.3%	34	33	-1 -2.9%	23	22	-1 -4.3%	13	12	-1 -7.7%
> 3,000 cfs	68	68	0 0.0%	46	45	-1 -2.2%	32	31	-1 -3.1%	22	22	0 0.0%	13	12	-1 -7.7%
> 4,000 cfs	67	65	-2 -3.0%	44	44	0 0.0%	31	28	-3 -9.7%	22	21	-1 -4.5%	10	7	-3 -30.0%
> 6,000 cfs	62	62	0 0.0%	44	43	-1 -2.3%	29	27	-2 -6.9%	20	19	-1 -5.0%	8	7	-1 -12.5%
> 8,000 cfs	59	58	-1 -1.7%	42	42	0 0.0%	25	24	-1 -4.0%	17	15	-2 -11.8%	5	4	-1 -20.0%
> 10,000 cfs	57	56	-1 -1.8%	41	40	-1 -2.4%	24	21	-3 -12.5%	15	14	-1 -6.7%	4	4	0 0.0%

*Total Weir Spill Results include spills from Ord Ferry, Moulton Weir, Colusa Weir, and Tisdale Weir.

**Table 3c. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Sutter Bypass Flow Results - Alternative 2 Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference	No Action Alternative	Alternative 2	Difference
	> 0 cfs	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82
> 1,000 cfs	81	81	0 0.0%	76	76	0 0.0%	69	69	0 0.0%	60	60	0 0.0%	47	47	0 0.0%
> 2,000 cfs	81	81	0 0.0%	67	67	0 0.0%	52	52	0 0.0%	41	41	0 0.0%	33	33	0 0.0%
> 3,000 cfs	81	81	0 0.0%	62	60	-2 -3.2%	49	48	-1 -2.0%	38	37	-1 -2.6%	24	23	-1 -4.2%
> 4,000 cfs	80	80	0 0.0%	59	58	-1 -1.7%	46	46	0 0.0%	32	31	-1 -3.1%	19	19	0 0.0%
> 6,000 cfs	76	76	0 0.0%	55	54	-1 -1.8%	40	38	-2 -5.0%	26	26	0 0.0%	13	13	0 0.0%
> 8,000 cfs	73	73	0 0.0%	47	47	0 0.0%	35	33	-2 -5.7%	23	22	-1 -4.3%	11	10	-1 -9.1%
> 10,000 cfs	68	68	0 0.0%	46	45	-1 -2.2%	33	30	-3 -9.1%	22	22	0 0.0%	9	9	0 0.0%

**Table 4a. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Ord Ferry, Moulton Weir, and Colusa Weir Spill Results - Alternative 3 Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference
	> 0 cfs	67	66	-1 -1.5%	44	44	0 0.0%	30	29	-1 -3.3%	22	20	-2 -9.1%	8	8
> 1,000 cfs	65	65	0 0.0%	44	44	0 0.0%	30	28	-2 -6.7%	19	19	0 0.0%	8	8	0 0.0%
> 2,000 cfs	61	61	0 0.0%	44	44	0 0.0%	28	25	-3 -10.7%	18	16	-2 -11.1%	6	6	0 0.0%
> 3,000 cfs	59	59	0 0.0%	43	41	-2 -4.7%	26	22	-4 -15.4%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 4,000 cfs	59	59	0 0.0%	42	38	-4 -9.5%	24	20	-4 -16.7%	15	14	-1 -6.7%	5	4	-1 -20.0%
> 6,000 cfs	54	54	0 0.0%	38	36	-2 -5.3%	20	19	-1 -5.0%	12	10	-2 -16.7%	4	3	-1 -25.0%
> 8,000 cfs	53	51	-2 -3.8%	36	32	-4 -11.1%	19	19	0 0.0%	10	10	0 0.0%	3	3	0 0.0%
> 10,000 cfs	50	49	-1 -2.0%	32	31	-1 -3.1%	17	17	0 0.0%	10	9	-1 -10.0%	2	2	0 0.0%

**Table 4b. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Weir Spill Results - Alternative 3 Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference
	> 0 cfs	71	71	0 0.0%	50	51	1 2.0%	38	36	-2 -5.3%	26	24	-2 -7.7%	15	13
> 1,000 cfs	70	71	1 1.4%	49	47	-2 -4.1%	37	36	-1 -2.7%	25	24	-1 -4.0%	14	13	-1 -7.1%
> 2,000 cfs	69	69	0 0.0%	48	47	-1 -2.1%	34	34	0 0.0%	23	22	-1 -4.3%	13	11	-2 -15.4%
> 3,000 cfs	68	69	1 1.5%	46	47	1 2.2%	32	32	0 0.0%	22	22	0 0.0%	13	9	-4 -30.8%
> 4,000 cfs	67	66	-1 -1.5%	44	45	1 2.3%	31	28	-3 -9.7%	22	20	-2 -9.1%	10	8	-2 -20.0%
> 6,000 cfs	62	62	0 0.0%	44	43	-1 -2.3%	29	26	-3 -10.3%	20	20	0 0.0%	8	7	-1 -12.5%
> 8,000 cfs	59	59	0 0.0%	42	42	0 0.0%	25	23	-2 -8.0%	17	15	-2 -11.8%	5	4	-1 -20.0%
> 10,000 cfs	57	58	1 1.8%	41	40	-1 -2.4%	24	20	-4 -16.7%	15	14	-1 -6.7%	4	4	0 0.0%

*Total Weir Spill Results include spills from Ord Ferry, Moulton Weir, Colusa Weir, and Tisdale Weir.

**Table 4c. Count of Years That Exceed Flow Magnitude and Duration Thresholds Between 1922 and 2003
Total Sutter Bypass Flow Results - Alternative 3 Compared to No Action Alternative**

Number of years that contain events with consecutive days of spills (max 7 day gap to count as new event)	> 0 days			>10 days			> 20 days			> 30 days			> 45 days		
	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference	No Action Alternative	Alternative 3	Difference
	> 0 cfs	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82	0 0.0%	82	82
> 1,000 cfs	81	81	0 0.0%	76	76	0 0.0%	69	69	0 0.0%	60	61	1 1.7%	47	47	0 0.0%
> 2,000 cfs	81	81	0 0.0%	67	68	1 1.5%	52	52	0 0.0%	41	41	0 0.0%	33	33	0 0.0%
> 3,000 cfs	81	81	0 0.0%	62	60	-2 -3.2%	49	48	-1 -2.0%	38	37	-1 -2.6%	24	23	-1 -4.2%
> 4,000 cfs	80	80	0 0.0%	59	58	-1 -1.7%	46	46	0 0.0%	32	32	0 0.0%	19	19	0 0.0%
> 6,000 cfs	76	76	0 0.0%	55	54	-1 -1.8%	40	38	-2 -5.0%	26	25	-1 -3.8%	13	13	0 0.0%
> 8,000 cfs	73	73	0 0.0%	47	49	2 4.3%	35	32	-3 -8.6%	23	22	-1 -4.3%	11	9	-2 -18.2%
> 10,000 cfs	68	69	1 1.5%	46	45	-1 -2.2%	33	30	-3 -9.1%	22	21	-1 -4.5%	9	8	-1 -11.1%