## **Program Requirements Tab**

## **Attachment A.1: Measurable Benefits**

A.1 What measurable improvements to the Delta ecosystem or tributary to the Delta does the project provide? Where is the location of the improvement? If the project is not within the watershed of the Delta, what specific water rights or water contracts would be created or amended to ensure public benefits to the Delta ecosystem? Provide supporting documentation of the willingness of these water right or water contract holders to enter into such contracts or amendments. Explain how these changes would assure measurable improvements to the Delta ecosystem. See regulations section 6003(a)(1)(L).

WSIP Application Instructions, March, 2017

## <u>Response</u>

Table A.1-1 provides some of the key benefits (public and non-public) from the modeling results for Sites Reservoir. Public benefits are highlighted in yellow.

The most significant measurable improvement to a tributary to the Delta is the improvement in Sacramento River water temperatures that result from Sites Reservoir. The modeled temperature improvements are shown at multiple locations in the river in Table A.1-1 (see under EEA-2).

Measurable improvements to the Delta ecosystem would be provided through releases to the Yolo Bypass for ecosystem enhancement (see EEA-5 on Table A.1-1). Benefits in the Sacramento, Feather, and American River watersheds (tributaries to the Delta) are also provided (see EEA-1 through EEA-4 and EEA-6 through EEA-8). The locations of the improvements are specified in the table.

The project is within the watershed contributing to the Delta and can make releases to the Delta for public benefits.

		DCR 2015 without	DCR 2015 with	DCR 2015 v Reservoir min without	nus DCR 2015	WSIP 2030 without	WSIP 2030 with	WSIP 2030 v Reservoir min without	us WSIP 2030	WSIP 2070 without	WSIP 2070 with	WSIP 2070 v Reservoir min without	-
		Project	Project	Difference	Difference	Project	Project	Difference	Difference	Project	Project	Difference	Differen
	Ecosystem Enhancement Account (EEA) Actions												
L. Shasta Lake Co													
	ty of coldwater pool storage in Shasta Reservoir to increase the U.S. Bureau o		flexibility to pro	ovide suitable wa	ter temperature	s in the Sacran	ento River. Thi	s action would o	perationally tran	nslate into the i	ncrease of Shas	sta Reservoir Ma	iy storage
	l coldwater pool in storage, with particular emphasis on Below Normal, Dry a	and Critical water year types.	1	1	1	T	n			1	<del></del>		1
rinity Lake											l	ا ا	
	nth Storage (SW-01)											·	
May (T											l	ا ا	
	Full Simulation Period	1,835	1,845	10	0.6%	1,826	1,827	1	0.1%	1,689	1,693	5	0.3%
	Dry	1,646	1,649	3	0.2%	1,636	1,626	-11	-0.6%	1,453	1,471	17	1.2%
	Critical	1,119	1,135	16	1.4%	1,201	1,217	16	1.3%	1,016	1,024	9	0.9%
Septer	mber (TAF)												
F	Full Simulation Period	1,401	1,397	-4	-0.3%	1,320	1,312	-8	-0.6%	1,152	1,149	-3	-0.3%
D	Dry	1,150	1,146	-4	-0.3%	1,104	1,093	-11	-1.0%	903	913	10	1.1%
C	Critical	741	749	8	1.1%	800	807	7	0.9%	627	673	47	7.5%
hasta Lake													
End-of-Mon	nth Storage (SW-07)												
May (T	TAF)												
Fi	Full Simulation Period	3,952	4,023	71	1.8%	3,950	4,009	59	1.5%	3,681	3,761	80	2.2%
D	Dry	3,730	3,822	92	2.5%	3,663	3,765	101	2.8%	3,386	3,478	92	2.7%
	Critical	2,486	2,744	258	10.4%	2,787	2,953	166	6.0%	2,157	2,428	271	12.69
		,					· · ·						
	mber (TAF)												
Septer	mber (TAF) Full Simulation Period	2.655	2.779	124	4.7%	2.544	2.627	83	3.3%	2.262	2.321	59	2.6%
Septem	Full Simulation Period	2,655	2,779	124 140	4.7% 5.6%	2,544 2,457	2,627 2.514	83 57	3.3% 2.3%	2,262 2.167	2,321 2.224	59 56	
Septen Fu D C C Sacramento R de releases from	Full Simulation Period Dry Critical <mark>River Flows for Temperature Control</mark> n Shasta Dam of appropriate water temperatures, and subsequently from Ke	2,490 1,343 eswick Dam, to maintain mea	2,630 1,562 n daily water t	140 219 emperatures yea	5.6% <b>16.3%</b> r-round at levels	2,457 1,515 suitable for all	2,514 1,696 species and lif	57 181	2.3% <b>12.0%</b>	2,167 971	2,224 1,219	56 247	2.6% 25.5%
Septen Fi D C C Sacramento R de releases from Diversion Dam, v rinity River belo	Full Simulation Period Dry Critical River Flows for Temperature Control In Shasta Dam of appropriate water temperatures, and subsequently from Ke with particular emphasis on the months of highest potential water temperatory Div Lewiston	2,490 1,343 eswick Dam, to maintain mea	2,630 1,562 n daily water t	140 219 emperatures yea	5.6% <b>16.3%</b> r-round at levels	2,457 1,515 suitable for all	2,514 1,696 species and lif	57 181	2.3% <b>12.0%</b>	2,167 971	2,224 1,219	56 247	2.6% 25.5%
Septen Fi D C C C C C C C C C C C C C C C C C C	Full Simulation Period Dry Critical <b>River Flows for Temperature Control</b> <i>m Shasta Dam of appropriate water temperatures, and subsequently from Ke</i> <i>with particular emphasis on the months of highest potential water tempera</i> <b>pw Lewiston</b> mperature (SQ-33)	2,490 1,343 eswick Dam, to maintain mea	2,630 1,562 n daily water t	140 219 emperatures yea	5.6% <b>16.3%</b> r-round at levels	2,457 1,515 suitable for all	2,514 1,696 species and lif	57 181	2.3% <b>12.0%</b>	2,167 971	2,224 1,219	56 247	2.6% 25.5%
Septen Fi D C C C C C C C C C C C C C C C C C C	Full Simulation Period Dry Critical River Flows for Temperature Control In Shasta Dam of appropriate water temperatures, and subsequently from Ke with particular emphasis on the months of highest potential water temperat Dow Lewiston Imperature (SQ-33) p (Deg-F)	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July	2,630 1,562 n daily water t v through Nove	140 219 emperatures yea ember) during Bel	5.6% <b>16.3%</b> r-round at levels low Normal, Dry	2,457 1,515 suitable for all and Critical wo	2,514 1,696 species and lif ter year types.	57 181 e stages of anada	2.3% 12.0% romous salmonia	2,167 971 ds in the Sacrar	2,224 1,219 mento River bet	56 247 tween Keswick D	2.6% 25.59 pam and Re
Septen Fi D C Sacramento R de releases from Diversion Dam, or rinity River belo Monthly Ten Jul-Sep	Full Simulation Period Dry Critical <b>River Flows for Temperature Control</b> <i>n Shasta Dam of appropriate water temperatures, and subsequently from Ke</i> <i>with particular emphasis on the months of highest potential water tempera</i> <b>DW Lewiston</b> Imperature (SQ-33) p (Deg-F) Full Simulation Period	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3	2,630 1,562 n daily water t v through Nove 51.2	140 219 emperatures yea ember) during Ber -0.1	5.6% <b>16.3%</b> r-round at levels low Normal, Dry -0.2%	2,457 1,515 suitable for all and Critical wo 51.1	2,514 1,696 species and lif ter year types. 51.1	57 181 e stages of anada	2.3% <b>12.0%</b> romous salmonia -0.1%	2,167 971 ds in the Sacrar 51.9	2,224 1,219 mento River bet	56 247 tween Keswick D -0.2	2.6% 25.59 Dam and Re -0.3%
Septen Fi D C Sacramento R de releases from Diversion Dam, to rinity River belo Monthly Ten Jul-Sep	Full Simulation Period Dry Critical River Flows for Temperature Control In Shasta Dam of appropriate water temperatures, and subsequently from Ke with particular emphasis on the months of highest potential water temperator ow Lewiston Imperature (SQ-33) p (Deg-F) Full Simulation Period Dry	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6	2,630 1,562 n daily water t v through Nove	140 219 emperatures yea ember) during Bel	5.6% <b>16.3%</b> r-round at levels low Normal, Dry -0.2% -0.3%	2,457 1,515 suitable for all and Critical wo	2,514 1,696 species and lif ter year types. 51.1 51.7	57 181 e stages of anada 0.0 0.2	2.3% 12.0% romous salmonia	2,167 971 ds in the Sacrar	2,224 1,219 mento River bet	56 247 tween Keswick D	2.6% 25.59 Pam and Re -0.39 -0.49
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Septen Fi D C Sacramento R de releases from Diversion Dam, to rinity River belo Monthly Ter Jul-Sep Jul-Sep D C Lear Creek at Igo	Full Simulation Period Critical River Flows for Temperature Control In Shasta Dam of appropriate water temperatures, and subsequently from Ke with particular emphasis on the months of highest potential water temperat tow Lewiston Imperature (SQ-33) p (Deg-F) Full Simulation Period Dry Critical o	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6	2,630 1,562 n daily water t v through Nove 51.2 51.4	140 219 emperatures yea ember) during Ber -0.1 -0.1	5.6% <b>16.3%</b> r-round at levels low Normal, Dry -0.2% -0.3%	2,457 1,515 suitable for all and Critical wo 51.1 51.5	2,514 1,696 species and lif ter year types. 51.1 51.7	57 181 e stages of anada 0.0 0.2	2.3% <b>12.0%</b> romous salmonia -0.1% 0.3%	2,167 971 ds in the Sacrar 51.9 52.7	2,224 1,219 mento River bet 51.8 52.4	56 247 tween Keswick D -0.2 -0.2	2.6% 25.59 Pam and Re -0.39 -0.49
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Septen Fi D C Sacramento R de releases from Diversion Dam, fr rinity River belo Monthly Ter Jul-Sep C Iear Creek at Igo Monthly Ter Jul-Sep C C Iear Creek at Igo C C C C C C C C C C C C C C C C C C C	Full Simulation Period Dry Critical River Flows for Temperature Control m Shasta Dam of appropriate water temperatures, and subsequently from Ke with particular emphasis on the months of highest potential water temperat ow Lewiston Imperature (SQ-33) p (Deg-F) Full Simulation Period Dry Critical O Imperature (SQ-37) p (Deg-F) Full Simulation Period Dry Critical Er at Bonnyview Imperature (SQ-03) p (Deg-F) Full Simulation Period	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 55.7 53.0	2,630 1,562 n daily water t y through Nove 51.2 51.4 53.7 54.3 54.5 55.6 55.6	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 0.0	5.6% <b>16.3%</b> r-round at levels low Normal, Dry -0.2% -0.3% <b>-0.3%</b> -0.3% -0.3% 0.0%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 53.8 54.8 55.0	2,514 1,696 species and lif ter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% 0.0%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 58.1 54.8	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3	56 247 tween Keswick D -0.2 -0.2 -0.5 0.1 0.1 0.0 -0.3 -0.3	2.6% 25.55 Pam and Re -0.39 -0.49 -1.09 0.1% 0.1% -0.49
Septen Fi D C Sacramento R de releases from Diversion Dam, u rinity River belo Monthly Ter Jul-Sep C Iear Creek at Igo Monthly Ter Jul-Sep C C C C C C C C C C C C C C C C C C C	Full Simulation Period Dry Critical River Flows for Temperature Control n Shasta Dam of appropriate water temperatures, and subsequently from Kee with particular emphasis on the months of highest potential water temperato by Lewiston Imperature (SQ-33) p (Deg-F) Full Simulation Period Dry Critical 0 Imperature (SQ-37) p (Deg-F) Full Simulation Period Dry Critical Er at Bonnyview Imperature (SQ-03) p (Deg-F) Full Simulation Period Dry Critical	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 54.4 55.7 55.7 53.0 53.5	2,630 1,562 n daily water t y through Nove 51.2 51.4 53.7 54.3 54.5 55.6	140 219 emperatures yea ember) during Ber -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.1% 0.0% -0.2%	2,457 1,515 suitable for all and Critical wa 51.1 51.5 53.8 54.8 55.0 56.6	2,514 1,696 species and lif ter year types. 51.1 51.7 53.5 54.7 54.9 56.5	57 181 e stages of anada 0.0 0.2 -0.2 -0.1 -0.1 -0.1 -0.1	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 54.8 55.1	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.5	-0.3% -0.4% -1.0% -1.0% -0.1% -0.4% -0.8% -0.8% -0.9%
Septen Fi D C Sacramento R de releases from Diversion Dam, u rinity River belo Monthly Ter Jul-Sep C Iear Creek at Igo Monthly Ter Jul-Sep C C C C C C C C C C C C C C C C C C C	Full Simulation Period Dry Critical River Flows for Temperature Control m Shasta Dam of appropriate water temperatures, and subsequently from Ke with particular emphasis on the months of highest potential water temperat ow Lewiston Imperature (SQ-33) p (Deg-F) Full Simulation Period Dry Critical O Imperature (SQ-37) p (Deg-F) Full Simulation Period Dry Critical Er at Bonnyview Imperature (SQ-03) p (Deg-F) Full Simulation Period	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 55.7 53.0	2,630 1,562 n daily water t y through Nove 51.2 51.4 53.7 54.3 54.5 55.6 55.6	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.1% 0.0% -0.2% -0.2%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 55.0 56.6	2,514 1,696 species and lif ter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% 0.0%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 58.1 54.8	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3	56 247 tween Keswick D -0.2 -0.2 -0.5 0.1 0.1 0.0 -0.3 -0.3	2.6% 25.59 Pam and Re -0.39 -0.49 -0.49 -1.09 -0.1% -0.49 -0.49 -0.99
Septer Fi D C Sacramento R de releases from Diversion Dam, or rinity River belo Monthly Ter Jul-Sep C Monthly Ter Jul-Sep D C Monthly Ter Jul-Sep C C C C C C C C C C C C C C C C C C C	Full Simulation Period         Dry         Critical         River Flows for Temperature Control         m Shasta Dam of appropriate water temperatures, and subsequently from Ke         with particular emphasis on the months of highest potential water tempera         pw Lewiston         mperature (SQ-33)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         Imperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 54.4 55.7 55.7 53.0 53.5	2,630 1,562 n daily water t y through Nove 51.2 51.4 53.7 54.3 54.3 54.5 55.6 55.6 52.5 52.9	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.3% -0.3% -0.2% -0.1% 0.0% -0.2% -1.1%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 55.0 56.6 53.6 54.3	2,514 1,696 species and lif ter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6 53.6 54.1	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0 -0.1	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.3%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 54.8 55.1	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3 54.3 54.6	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.5	2.6% 25.59 Pam and Re -0.39 -0.49 -0.49 -1.09 -0.1% -0.49 -0.49 -0.89 -0.99
Septer Fi D C Sacramento R de releases from Diversion Dam, or rinity River belo Monthly Ter Jul-Sep C Monthly Ter Jul-Sep D C Monthly Ter Jul-Sep C C C C C C C C C C C C C C C C C C C	Full Simulation Period         Dry         Critical         River Flows for Temperature Control         m Shasta Dam of appropriate water temperatures, and subsequently from Ke         with particular emphasis on the months of highest potential water tempera         pw Lewiston         mperature (SQ-33)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         Imperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 54.4 55.7 55.7 53.0 53.5	2,630 1,562 n daily water t y through Nove 51.2 51.4 53.7 54.3 54.3 54.5 55.6 55.6 52.5 52.9	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.3% -0.3% -0.2% -0.1% 0.0% -0.2% -1.1%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 55.0 56.6 53.6 54.3	2,514 1,696 species and lif ter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6 53.6 54.1	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0 -0.1	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.3%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 54.8 55.1	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3 54.3 54.6	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.5	2.6% 25.59 Pam and Re -0.3% -0.4% -1.0% 0.1% 0.1% -0.4% -0.8%
Septer Fi D C Sacramento R de releases from Diversion Dam, or rinity River belo Monthly Ter Jul-Sep D C Hear Creek at Igo Monthly Ter Jul-Sep C C Acramento River Monthly Ter Jul-Sep C C C C C C C C C C C C C C C C C C C	Full Simulation Period         Dry         Critical         River Flows for Temperature Control         m Shasta Dam of appropriate water temperatures, and subsequently from Ke         with particular emphasis on the months of highest potential water tempera         pw Lewiston         mperature (SQ-33)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         Imperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 54.4 55.7 55.7 53.0 53.5	2,630 1,562 n daily water t y through Nove 51.2 51.4 53.7 54.3 54.3 54.5 55.6 55.6 52.5 52.9	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.3% -0.3% -0.2% -0.1% 0.0% -0.2% -1.1%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 55.0 56.6 53.6 54.3	2,514 1,696 species and lif ter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6 53.6 54.1	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0 -0.1	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.3%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 54.8 55.1	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3 54.3 54.6	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.5	2.6% 25.59 Pam and Re -0.39 -0.49 -0.49 -1.09 -0.1% -0.49 -0.49 -0.89 -0.99
Septer Fi C Sacramento R de releases from Diversion Dam, y rinity River belov Monthly Ter Jul-Sep C Monthly Ter Jul-Sep C Monthly Ter Jul-Sep C Monthly Ter Jul-Sep C C C C C C C C C C C C C	Full Simulation Period         Dry         Critical         River Flows for Temperature Control <i>n</i> Shasta Dam of appropriate water temperatures, and subsequently from Kee         with particular emphasis on the months of highest potential water temperator         pw Lewiston         mperature (SQ-33)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry         mperature (SQ-04)	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 54.4 55.7 55.7 53.0 53.5	2,630 1,562 n daily water t y through Nove 51.2 51.4 53.7 54.3 54.3 54.5 55.6 55.6 52.5 52.9	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.3% -0.3% -0.2% -0.1% 0.0% -0.2% -1.1%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 55.0 56.6 53.6 54.3	2,514 1,696 species and lif ter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6 53.6 54.1	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0 -0.1	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.3%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 54.8 55.1	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3 54.3 54.6	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.5	2.6% 25.59 Pam and Re -0.39 -0.49 -0.49 -1.09 -0.1% -0.49 -0.49 -0.89 -0.99
Septen Fi D C Sacramento R de releases from Diversion Dam, to rinity River belo Monthly Ter Jul-Sep C Iear Creek at Igo Monthly Ter Jul-Sep C C Iear Creek at Igo C Monthly Ter Jul-Sep C C C C C C C C C C C C C C C C C C C	Full Simulation Period         Dry         Critical         River Flows for Temperature Control <i>n</i> Shasta Dam of appropriate water temperatures, and subsequently from Kee         with particular emphasis on the months of highest potential water temperator         pw Lewiston         mperature (SQ-33)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry         mperature (SQ-04)         p (Deg-F)	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 54.4 55.7 53.0 53.5 56.5	2,630 1,562 n daily water t y through Nove 51.2 51.2 51.4 53.7 54.3 54.3 54.5 55.6 52.5 52.9 55.1	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.3% -0.3% -0.2% -0.1% 0.0% -0.2% -0.1% 0.0% -0.2% -0.2% -0.1% 0.0% -0.2% -0.2% -0.3% -0.2% -0.3% -0.3% -0.3% -0.3% -0.2% -0.3% -0.3% -0.3% -0.2% -0.3% -0.3% -0.3% -0.2% -0.3% -0.3% -0.2% -0.3% -0.3% -0.3% -0.2% -0.3% -0.2% -0.3% -0.2% -0.3% -0.2% -0.2% -0.2% -0.3% -0.2%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 54.3 54.3 56.5	2,514 1,696 species and lifter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6 54.1 55.9	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.1 -0.6 -0.6 -0.1 -0.6 -0.6 -0.1 -0.6 -0.6 -0.1 -0.6 -0.6 -0.1 -0.6	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% -0.2% -0.2% -0.2% -0.3% -1.1%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 58.1 54.8 55.1 60.5	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3 54.6 58.6	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.3 -0.5 -0.5 -0.5 -0.5 -1.8	2.6% 25.5% Dam and Re -0.3% -0.4% -0.4% -0.4% -0.4% -0.4% -0.4% -0.4% -0.4% -0.4% -0.9% -0.9% -0.9% -0.9% -0.9%
Septer Septer Provide the set of the set o	Full Simulation Period         Dry         Critical         River Flows for Temperature Control         n Shasta Dam of appropriate water temperatures, and subsequently from Ke         with particular emphasis on the months of highest potential water tempera         pw         Devision         mperature (SQ-33)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         o         mperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         mperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry         mperature (SQ-04)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry         mperature (SQ-04)         p (Deg-F)         Full Simulation Peri	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 54.4 54.4 54.4 55.7 53.0 53.5 56.5 54.6 55.1	2,630 1,562 n daily water t y through Nove 51.2 51.2 51.4 53.7 54.3 54.5 55.6 52.5 52.9 55.1 52.5 52.9 55.1	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.3% -0.9% -1.1% -2.5% -0.9%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 54.3 56.5 54.3 56.5	2,514 1,696 species and lifter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6 54.1 55.9 55.2	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% -0.2% -0.2% -0.3% -1.1%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 58.1 55.1 60.5 56.5	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3 54.6 58.6 58.6 58.6	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -1.8 -0.5	2.6% 25.5% Dam and Re -0.3% -0.4% -0.4% -0.4% -0.4% -0.4% -0.4% -0.4% -0.4% -0.9% -0.9% -0.9% -3.0%
Septer Septer Fi Composite of the second	Full Simulation Period         Dry         Critical         River Flows for Temperature Control         In Shasta Dam of appropriate water temperatures, and subsequently from Kee         with particular emphasis on the months of highest potential water temperator         Dry         Developmentation         Imperature (SQ-33)         p (Deg-F)         Full Simulation Period         Dry         Critical         O         Imperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         O         Imperature (SQ-37)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Bonnyview         Imperature (SQ-03)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry         Imperature (SQ-04)         p (Deg-F)         Full Simulation Period         Dry         Critical         er at Balls Ferry         Imperature (SQ-04)         p (Deg-F)	2,490 1,343 eswick Dam, to maintain mea ture-related impacts (i.e., July 51.3 51.6 53.9 53.9 54.4 54.4 55.7 55.7 55.7 55.5 56.5 54.6	2,630 1,562 n daily water t y through Nove 51.2 51.2 51.4 53.7 54.3 54.5 55.6 52.5 52.9 55.1 52.5 52.9 55.1	140 219 emperatures yea ember) during Bel -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1	5.6% 16.3% r-round at levels low Normal, Dry -0.2% -0.3% -0.3% -0.3% -0.3% -0.9% -1.1% -2.5% -0.9%	2,457 1,515 suitable for all and Critical wo 51.1 51.5 53.8 54.8 55.0 56.6 54.3 56.5 54.3 56.5	2,514 1,696 species and lifter year types. 51.1 51.7 53.5 54.7 54.9 56.5 53.6 54.1 55.9 55.2	57 181 e stages of anada 0.0 0.2 -0.2 -0.2 -0.1	2.3% 12.0% romous salmonia -0.1% 0.3% -0.4% -0.2% -0.2% -0.2% -0.2% -0.2% -0.3% -1.1%	2,167 971 ds in the Sacrar 51.9 52.7 55.4 55.7 56.0 58.1 58.1 55.1 60.5 56.5	2,224 1,219 mento River bet 51.8 52.4 54.8 55.7 56.1 57.9 54.3 54.6 58.6 58.6 58.6	56 247 tween Keswick D -0.2 -0.2 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -1.8 -0.5	2.69 25.5 Dam and R -0.3 -0.4 -0.4 -1.0 0.19 -0.4 -0.9 -0.9 -0.9

				vith Project nus DCR 2015			WSIP 2030 with Project Reservoir minus WSIP 2030				WSIP 2070 with Project Reservoir minus WSIP 2070	
	DCR 2015	DCR 2015		Project	<b>WSIP 2030</b>	WSIP 2030		t Project	WSIP 2070	WSIP 2070		t Project
	without Project	with Project	Difference	Relative Difference	without Project	with Project	Difference	Relative Difference	without Project	with Project	Difference	Relative Difference
Critical	58.0	56.6	-1.4	-2.3%	58.1	57.5	-0.6	-1.1%	61.9	60.2	-1.7	-2.7%
Sacramento River at Jellys Ferry												
Monthly Temperature (SQ-05)												
Jul-Sep (Deg-F)												
Full Simulation Period	55.9	55.4	-0.5	-0.8%	56.6	56.5	-0.1	-0.1%	57.9	57.4	-0.5	-0.9%
Dry	56.4	55.8	-0.6	-1.1%	57.3	57.0	-0.3	-0.5%	58.4	57.7	-0.6	-1.1%
Critical	59.2	57.9	-1.3	-2.2%	59.4	58.8	-0.6	-1.0%	63.0	61.5	-1.5	-2.5%
Sacramento River at Bend Bridge												
Monthly Temperature (SQ-06)												
Jul-Sep (Deg-F)												
Full Simulation Period	56.9	56.5	-0.4	-0.8%	57.6	57.6	-0.1	-0.2%	59.0	58.5	-0.5	-0.9%
Dry	57.5	56.9	-0.6	-1.1%	58.5	58.1	-0.3	-0.6%	59.5	58.8	-0.7	-1.1%
Critical	60.1	58.9	-1.2	-2.1%	60.3	59.7	-0.6	-1.0%	63.8	62.4	-1.4	-2.3%
A-3. Folsom Lake Cold Water Pool												

om Lake												
End-of-Month Storage (SW-24)												
May (TAF)												
Full Simulation Period	838	841	3	0.4%	769	764	-4	-0.5%	679	677	-2	-0.3%
Dry	765	775	10	1.3%	699	692	-8	-1.1%	601	607	6	1.0%
Critical	480	489	9	1.9%	476	473	-3	-0.6%	407	401	-5	-1.3%
September (TAF)												
Full Simulation Period	505	532	27	5.3%	428	447	19	4.5%	377	396	19	5.2%
Dry	426	465	39	9.1%	371	410	38	10.4%	349	373	24	6.7%
Critical	265	278	13	4.7%	293	289	-4	-1.4%	235	246	11	4.8%
rican River at Watt Ave												
Monthly Temperature (SQ-19)												
Jul-Sep (Deg-F)												
Full Simulation Period	66.7	65.8	-0.9	-1.3%	70.6	69.9	-0.6	-0.9%	71.9	71.2	-0.7	-0.9%
Dry	68.0	67.2	-0.8	-1.2%	70.7	70.5	-0.2	-0.4%	72.2	71.9	-0.3	-0.4%
Critical	71.6	70.2	-1.4	-2.0%	73.6	73.1	-0.5	-0.7%	75.6	74.7	-0.9	-1.2%

EEA-4. Stabilize American River Flows

Stabilize flows in the lower American River to minimize dewatering of fall-run Chinook salmon redds (i.e., October through May), and reduce isolation events (specifically, flow increases to 4,000 cfs with subsequent reduction to < 4,000 cfs) of juvenile anadromous salmonids, particularly from October through June. Reduce the reliance upon Folsom Reservoir as a "real-time, first response facility" to meet Delta objectives and demands, particularly from January through August, to reduce flow fluctuation and water temperature-related impacts to fall-run Chinook salmon and steelhead in the lower American River.

N/A - Reporting Metrics require daily timestep modeling of flow operations to demonstrate how flexibility in storage operations supports stabilization of flows throughout late Fall through Spring.

EEA-5, Yolo Bypass Floy

lta Smelt															
			Increase flows in the Yolo Bypass by 400 cfs in August, September, and October to promote food production for Delta Smelt												
15	58	42	273.7%	24	64	40	163.2%	20	58	38	188.3%				
14	47	33	241.6%	60	100	40	66.4%	37	59	22	58.4%				
14	23	9	64.2%	13	18	5	33.5%	9	22	13	150.4%				
	15 14 14	15         58           14         47           14         23	15         58         42           14         47         33           14         23         9	14 47 33 241.6%	14 47 33 241.6% 60	14         47         33         241.6%         60         100	14         47         33         241.6%         60         100         40	14         47         33         241.6%         60         100         40         66.4%	14         47         33         241.6%         60         100         40         66.4%         37	14         47         33         241.6%         60         100         40         66.4%         37         59	14         47         33         241.6%         60         100         40         66.4%         37         59         22				

## EEA-6. Lake Oroville Cold Water Pool

Improve the reliability of coldwater pool storage in Oroville Reservoir to improve water temperature suitability for juvenile steelhead and spring-run Chinook salmon over-summer rearing, and fall-run Chinook salmon spawning in the lower Feather River from May through November during all water year types. (Improve storage conditions for:) Provide releases from Oroville Dam to maintain mean daily water temperatures at levels suitable for juvenile steelhead and spring-run Chinook salmon over-summer rearing, and fall-run Chinook salmon spawning in the lower Feather River. Stabilize flows in the lower Feather River to minimize redd dewatering, juvenile stranding and isolation of anadromous salmonids.

STATUS:	FINAL	PREPARER:	J HERRIN	PHASE:	1	VERSION:	А
PURPOSE:	PROGRAM REQUIREMENT A1	CHECKER:	D RUARK	DATE:	2017 AU	GUST	
CAVEAT:		QA/QC:		REF/FILE #:	WSIP API	PLICATION	
NOTES:				PAGE:	3	OF	4

		DCR 2015	DCR 2015	DCR 2015 with Project Reservoir minus DCR 2015 without Project		WSIP 2030	WSIP 2030	WSIP 2030 with Project Reservoir minus WSIP 2030 without Project		WSIP 2070	WSIP 2070	Reservoir min	with Project nus WSIP 2070 t Project
		without	with	5.4	Relative	without	with		Relative	without	with	5:55	Relative
Lako	e Oroville	Project	Project	Difference	Difference	Project	Project	Difference	Difference	Project	Project	Difference	Difference
	End-of-Month Storage (SW-18)												-
	May (TAF)												
	Full Simulation Period	2,814	2,849	35	1.2%	2,760	2,786	26	0.9%	2,620	2,651	31	1.2%
	Dry	2,204	2,304	100	4.5%	2,294	2,332	38	1.7%	2,167	2,206	39	1.8%
	Critical	1,444	1,502	58	4.0%	1,527	1,611	83	5.5%	1,507	1,618	111	7.4%
	September (TAF)												
	Full Simulation Period	1,677	1,763	86	5.1%	1,469	1,528	59	4.0%	1,287	1,383	96	7.4%
	Dry	1,153	1,258	104	9.0%	1,146	1,195	49	4.3%	1,140	1,147	7	0.6%
	Critical	898	967	69	7.7%	901	924	23	2.6%	903	979	76	8.4%
-7. S	Stabilize Sacramento River Fall Flows												
	e flows in the Sacramento River between Keswick Dam and the Red Bluff Diversion Dam to minimize	dewatering of fall <sup>,</sup>	-run Chinook sa	ılmon redds (for	the spawning an	d embryo incub	ation lifestage	periods extendi	ng from October	through March	h), particularly	during fall mont	hs. (avoid
rupt c	changes; operation limited to not greatly impact cold water pool operations in D and C years)												
Sacra	amento River below Keswick											ļ	
	Monthly Flow (SW-10)											ļ	
	Dec-Feb (cfs)											ļ	
	Full Simulation Period	8,349	8,720	372	4.4%	9,028	9,256	228	2.5%	9,459	9,617	157	1.7%
	Below Normal	5,071	5,448	376	7.4%	4,711	4,889	177	3.8%	5,479	5,693	214	3.9%
		2,020	4 4 7 2	242	0.00/	2 0 0 0	4 4 4 2	474	44.00/	2 720	2.004	220	6.40/
	Dry	3,829	4,173	343	9.0%	3,969	4,442	474	11.9%	3,736	3,964	228	6.1%

STATUS:	FINAL	PREPARER:	J HERRIN	PHASE:	1	VERSION:	А
PURPOSE:	PROGRAM REQUIREMENT A1	CHECKER:	D RUARK	DATE:	2017 AU		
CAVEAT:		QA/QC:		REF/FILE #:	WSIP AP	PLICATION	
NOTES:				PAGE:	4	OF	4