Lower San Joaquin River Committee

Briefing of New Melones Project and Vernalis Modeling

Baseline
Planned Bundle
Maximum Management Bundle
Maximum Treatment Bundle

Dan Steiner
February 26, 2015

Task

Demonstrate effects of changed flow and salinity in the San Joaquin River upon Vernalis flow and salinity and the operations of the New Melones Project.

Approach

- Flow and quality conditions of the San Joaquin River at Maze provided by WARMF.
- NEWMOM worksheet model used to simulate the river reach between Maze and Vernalis, and the operation of the New Melones Project on the Stanislaus River as affected by differing mainstem flow and quality conditions.
- Comparison of model results.

Settings

Base – New Melones Project

- June 2009 BO RPA (Appendix 2E) w/ extra dry year schedule
- D1641 Vernalis Base Flow Feb-Jun, & no pulse flow
- D1641 Vernalis WQ (.7/1.0)
- Stanislaus River DO (flow surrogate)
- OID/SSJID formula entitlements, up to land use requirements
- SEWD/CSJWCD up to 155 TAF, three tier District proposal

- WARMF "Base" depiction of historical flow and quality conditions at Maze

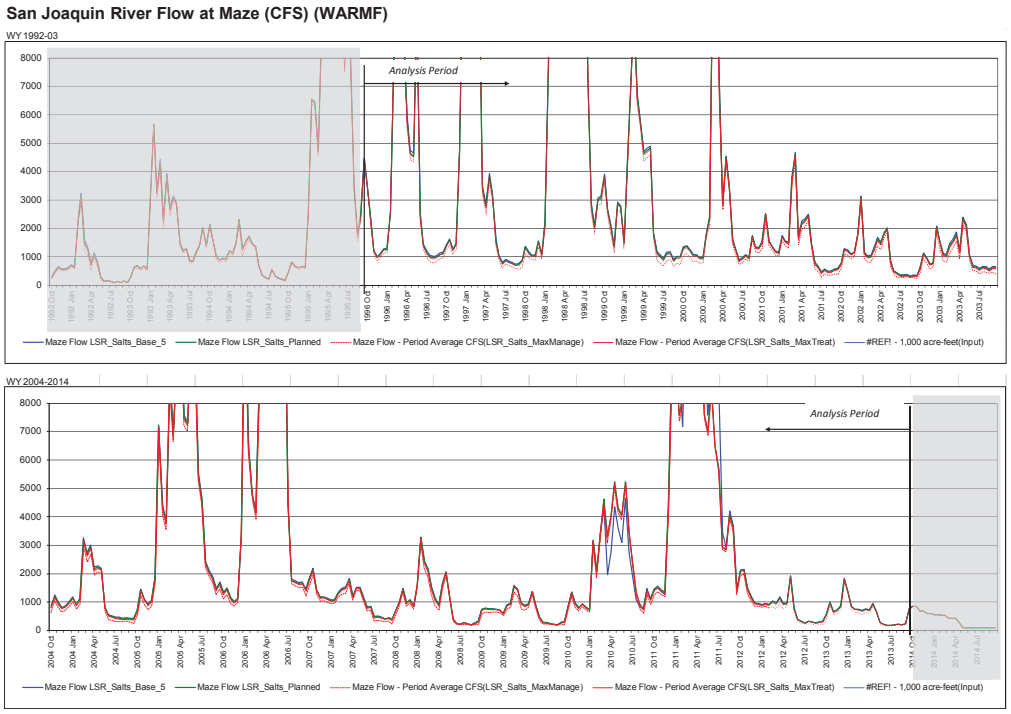
Alternative Settings – New Melones Project

New Melones operates consistently to Base operation objectives; but its boundary condition of flow and water quality at Maze differs:

- WARMF "Planned Bundle"
- WARMF "Maximum Management Bundle"
- WARMF "Maximum Treatment Bundle"

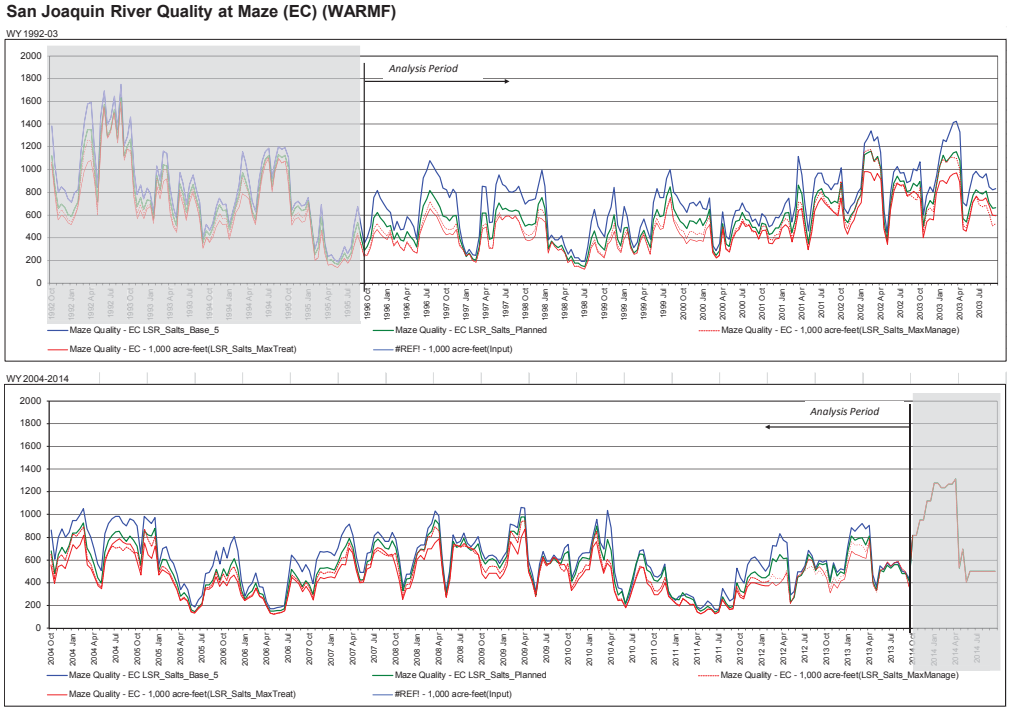
San Joaquin River at Maze

Base and Bundles (input to NEWMON)



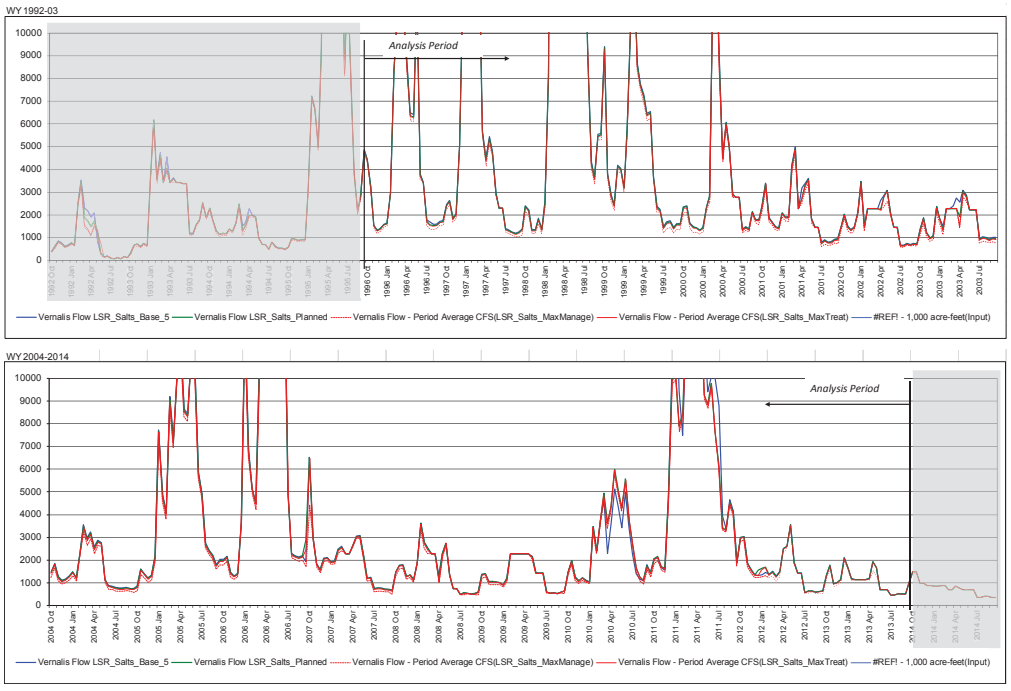
San Joaquin River at Maze

Base and Bundles (input to NEWMON)



San Joaquin River at Vernalis

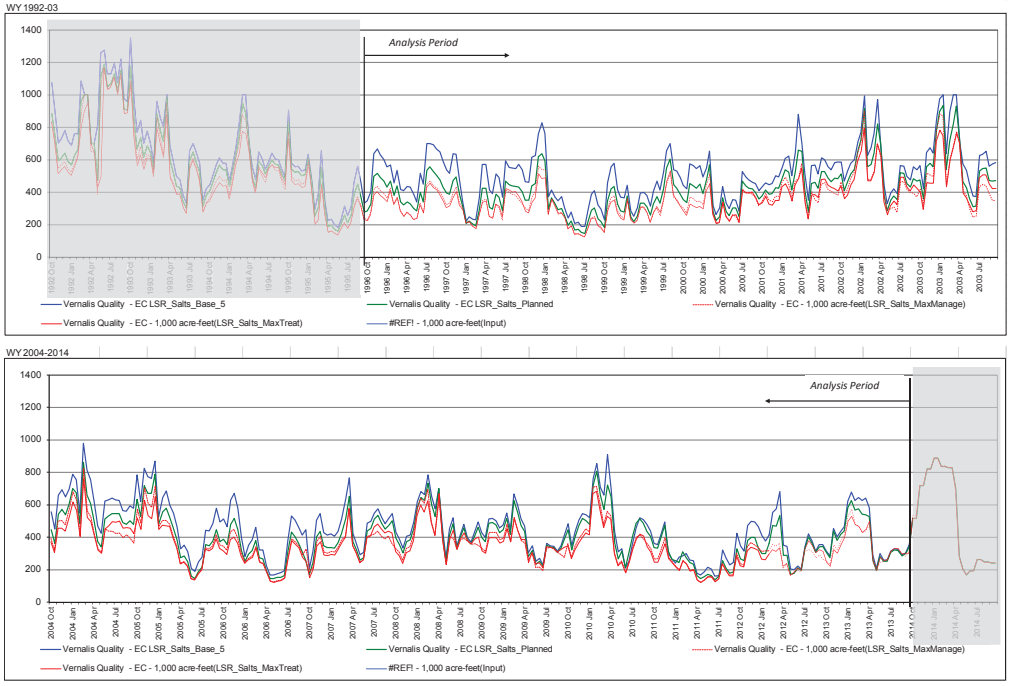
Base and Bundles (output from NEWMON)



San Joaquin River at Vernalis

Base and "Planned Bundle" (output from NEWMON)

San Joaquin River Quality at Vernalis (EC)



New Melones Project Operation

Base (output from NEWMON)

New Melones Project Operation and River Characteristics – Base (1,000 acre-feet)

	New Melones			Goodwin										
	New Melones Inflow	New Melones Storage	Tulloch Storage	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum	NM Forecast Index
Avg	1,191			518	518	51	66	352	11	10	37	500	90	
	WY	EOS	EOS	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	
1995	2,160	1,482	64	452	452	75	80	348	3	0	0	360	9	2,309
1996	1,512	1,713	64	517	517	75	80	587	0	3	21	1,380	769	2,841
1997	1,902	1,630	64	556	556	75	80	462	0	0	15	504	27	2,749
1998	1,876	2,100	64	444	444	75	80	587	0	0	0	1,247	660	3,374
1999	1,326	1,714	64	508	508	75	80	588	0	1	0	588	0	2,860
2000	1,062	1,578	64	488	488	75	80	462	0	0	33	499	4	2,595
2001	588	1,217	64	469	469	75	80	234	14	19	76	343	0	2,061
2002	710	853	64	548	548	10	49	234	15	40	119	408	0	1,733
2003	896	702	64	530	530	10	49	186	20	72	126	404	0	1,575
2004	670	541	64	600	600	10	0	99	38	26	0	182	20	1,239
2005	1,576	1,240	64	524	524	75	80	234	15	0	0	249	0	2,083
2006	2,061	2,099	64	496	496	75	80	587	0	0	0	798	211	3,153
2007	581	1,280	64	587	587	75	80	348	3	0	18	369	0	2,289
2008	579	926	64	550	550	10	49	185	27	7	88	307	0	1,720
2009	866	740	64	564	564	10	49	185	27	6	141	360	0	1,623
2010	1,011	959	64	478	478	10	49	185	27	15	12	245	5	1,644
2011	2,093	1,911	64	466	466	75	80	588	0	0	0	589	2	2,967
2012	607	1,357	64	525	525	75	80	348	3	0	39	390	0	2,351
2013	559	979	64	544	544	10	49	234	15	0	24	273	0	1,771

New Melones Project Operation

Planned Bundle (output from NEWMON)

New Melones Project Operation and River Characteristics – Planned (1,000 acre-feet)

	New Melones			Goodwin										
	New Melones Inflow	New Melones Storage	Tulloch Storage	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum	NM Forecast Index
Avg	1191			518	518	51	66	352	13	2	41	500	93	
	WY	EOS	EOS	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	
1995	2,160	1,482	64	452	452	75	80	348	3	0	0	360	9	2,310
1996	1,512	1,715	64	517	517	75	80	587	0	0	23	1,380	770	2,841
1997	1,902	1,628	64	556	556	75	80	462	0	0	18	504	24	2,749
1998	1,876	2,100	64	444	444	75	80	587	0	0	0	1,247	660	3,374
1999	1,326	1,715	64	508	508	75	80	588	0	0	0	588	0	2,860
2000	1,062	1,578	64	488	488	75	80	462	0	0	35	500	4	2,596
2001	588	1,223	64	469	469	75	80	234	15	0	89	339	0	2,060
2002	710	862	64	548	548	10	49	234	15	7	147	403	0	1,737
2003	896	735	64	530	530	10	49	186	27	16	150	379	0	1,584
2004	670	573	64	600	600	10	0	99	59	5	0	182	20	1,271
2005	1,576	1,270	64	524	524	75	80	234	15	0	0	249	0	2,114
2006	2,061	2,100	64	496	496	75	80	587	0	0	0	828	241	3,184
2007	581	1,278	64	587	587	75	80	348	3	0	20	371	0	2,289
2008	579	926	64	550	550	10	49	185	27	4	90	306	0	1,718
2009	866	737	64	564	564	10	49	185	27	3	145	361	0	1,622
2010	1,011	983	64	478	478	10	49	185	27	0	0	217	5	1,641
2011	2,093	1,935	64	466	466	75	80	588	0	0	0	613	25	2,991
2012	607	1,357	64	525	525	75	80	348	3	0	40	391	0	2,351
2013	559	977	64	544	544	10	49	234	15	0	25	274	0	1,771

New Melones Project Operation

Maximum Management Bundle (output from NEWMON)

New Melones Project Operation and River Characteristics – Maximum Management (1,000 acre-feet)

	New Melones			Goodwin										
	New Melones Inflow	New Melones Storage	Tulloch Storage	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum	NM Forecast Index
Avg	1191			518	518	51	66	346	14	1	55	502	86	
	WY	EOS	EOS	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	
1995	2,160	1,482	64	452	452	75	80	348	3	0	0	360	9	2,310
1996	1,512	1,710	64	517	517	75	80	587	0	0	27	1,380	766	2,841
1997	1,902	1,616	64	556	556	75	80	462	0	0	30	513	21	2,749
1998	1,876	2,100	64	444	444	75	80	587	0	0	0	1,239	652	3,365
1999	1,326	1,708	64	508	508	75	80	588	0	0	7	595	0	2,860
2000	1,062	1,562	64	488	488	75	80	462	0	0	44	509	4	2,589
2001	588	1,188	64	469	469	75	80	234	15	0	119	368	0	2,044
2002	710	807	64	548	548	10	49	185	27	11	201	424	0	1,692
2003	896	649	64	530	530	10	49	186	27	8	186	407	0	1,519
2004	670	484	64	600	600	10	0	99	64	0	1	183	20	1,181
2005	1,576	1,184	64	524	524	75	80	234	15	0	0	249	0	2,026
2006	2,061	2,044	64	496	496	75	80	587	0	0	0	743	157	3,097
2007	581	1,267	64	587	587	75	80	348	3	0	32	383	0	2,289
2008	579	897	64	550	550	10	49	185	27	0	121	334	0	1,706
2009	866	672	64	564	564	10	49	185	27	0	181	393	0	1,583
2010	1,011	916	64	478	478	10	49	185	27	0	0	217	5	1,572
2011	2,093	1,869	64	466	466	75	80	588	0	0	0	588	0	2,923
2012	607	1,315	64	525	525	75	80	348	3	0	49	399	0	2,311
2013	559	938	64	544	544	10	49	185	27	0	49	262	0	1,722

New Melones Project Operation

Maximum Treatment Bundle (output from NEWMON)

New Melones Project Operation and River Characteristics – Maximum Treatment (1,000 acre-feet)

	New Melones			Goodwin										
	New Melones Inflow	New Melones Storage	Tulloch Storage	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum	NM Forecast Index
Avg	1191			518	518	51	66	352	13	0	44	500	91	
	WY	EOS	EOS	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	
1995	2,160	1,482	64	452	452	75	80	348	3	0	0	360	9	2,310
1996	1,512	1,714	64	517	517	75	80	587	0	0	24	1,380	769	2,841
1997	1,902	1,626	64	556	556	75	80	462	0	0	20	504	22	2,749
1998	1,876	2,100	64	444	444	75	80	587	0	0	0	1,247	660	3,374
1999	1,326	1,715	64	508	508	75	80	588	0	0	0	588	0	2,860
2000	1,062	1,576	64	488	488	75	80	462	0	0	36	502	4	2,596
2001	588	1,217	64	469	469	75	80	234	15	0	95	345	0	2,058
2002	710	849	64	548	548	10	49	234	15	0	162	411	0	1,729
2003	896	724	64	530	530	10	49	186	27	4	158	376	0	1,568
2004	670	561	64	600	600	10	0	99	64	0	0	182	20	1,259
2005	1,576	1,259	64	524	524	75	80	234	15	0	0	249	0	2,102
2006	2,061	2,100	64	496	496	75	80	587	0	0	0	817	230	3,172
2007	581	1,276	64	587	587	75	80	348	3	0	22	373	0	2,289
2008	579	924	64	550	550	10	49	185	27	0	96	308	0	1,716
2009	866	728	64	564	564	10	49	185	27	0	154	366	0	1,618
2010	1,011	975	64	478	478	10	49	185	27	0	0	217	5	1,632
2011	2,093	1,926	64	466	466	75	80	588	0	0	0	604	17	2,982
2012	607	1,357	64	525	525	75	80	348	3	0	42	393	0	2,351
2013	559	974	64	544	544	10	49	234	15	0	27	276	0	1,769

New Melones Project Operation

Base and “Planned Bundle”

New Melones Project Operation and River Characteristics - Planned minus Base (1,000 acre-feet)

	New Melones			Goodwin										
	New Melones Inflow	New Melones Storage	Tulloch Storage	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum	NM Forecast Index
Avg	0			0	0	0	0	0	2	-8	4	0	3	
	WY	EOS	EOS	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	
1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	1	0	0	0	0	0	0	0	-3	2	0	1	0
1997	0	-3	0	0	0	0	0	0	0	0	3	0	-3	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	1	0	0	0	0	0	0	0	-1	0	-1	0	0
2000	0	-1	0	0	0	0	0	0	0	0	1	1	0	1
2001	0	6	0	0	0	0	0	0	1	-19	13	-5	0	-1
2002	0	9	0	0	0	0	0	0	0	-33	28	-5	0	4
2003	0	33	0	0	0	0	0	0	8	-56	24	-25	0	9
2004	0	32	0	0	0	0	0	0	21	-21	0	0	0	32
2005	0	31	0	0	0	0	0	0	0	0	0	0	0	31
2006	0	1	0	0	0	0	0	0	0	0	0	30	30	31
2007	0	-2	0	0	0	0	0	0	0	0	2	2	0	0
2008	0	-1	0	0	0	0	0	0	0	-3	2	-1	0	-2
2009	0	-3	0	0	0	0	0	0	0	-3	5	1	0	-1
2010	0	24	0	0	0	0	0	0	0	-15	-12	-27	0	-3
2011	0	24	0	0	0	0	0	0	0	0	0	24	24	24
2012	0	0	0	0	0	0	0	0	0	0	1	1	0	0
2013	0	-2	0	0	0	0	0	0	0	0	1	1	0	-1

New Melones Project Operation

Base and "Maximum Management Bundle"

New Melones Project Operation and River Characteristics - Maximum Management minus Base (1,000 acre-feet)

	New Melones			Goodwin										
	New Melones Inflow	New Melones Storage	Tulloch Storage	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum	NM Forecast Index
Avg	0			0	0	0	0	-5	3	-9	18	3	-4	
	WY	EOS	EOS	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	
1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	-3	0	0	0	0	0	0	0	-3	6	0	-3	0
1997	0	-14	0	0	0	0	0	0	0	0	14	9	-5	0
1998	0	0	0	0	0	0	0	0	0	0	0	-9	-9	-9
1999	0	-6	0	0	0	0	0	0	0	-1	7	6	0	0
2000	0	-17	0	0	0	0	0	0	0	0	11	11	0	-6
2001	0	-29	0	0	0	0	0	0	1	-19	43	25	0	-17
2002	0	-46	0	0	0	0	0	-49	12	-29	82	16	0	-41
2003	0	-52	0	0	0	0	0	0	8	-65	60	3	0	-56
2004	0	-57	0	0	0	0	0	0	26	-26	1	1	0	-58
2005	0	-56	0	0	0	0	0	0	0	0	0	0	0	-57
2006	0	-55	0	0	0	0	0	0	0	0	0	-54	-54	-55
2007	0	-13	0	0	0	0	0	0	0	0	15	15	0	0
2008	0	-30	0	0	0	0	0	0	0	-7	33	27	0	-14
2009	0	-68	0	0	0	0	0	0	0	-6	40	34	0	-40
2010	0	-43	0	0	0	0	0	0	0	-15	-12	-27	0	-72
2011	0	-42	0	0	0	0	0	0	0	0	0	-2	-2	-43
2012	0	-42	0	0	0	0	0	0	0	0	9	9	0	-41
2013	0	-41	0	0	0	0	0	-49	12	0	25	-12	0	-49

New Melones Project Operation

Base and "Maximum Treatment Bundle"

New Melones Project Operation and River Characteristics - Maximum Treatment minus Base (1,000 acre-feet)

	New Melones			Goodwin										
	New Melones Inflow	New Melones Storage	Tulloch Storage	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum	NM Forecast Index
Avg	0			0	0	0	0	0	2	-10	6	0	2	
	WY	EOS	EOS	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	
1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	-3	3	0	0	0
1997	0	-4	0	0	0	0	0	0	0	0	4	0	-4	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	1	0	0	0	0	0	0	0	-1	0	-1	0	0
2000	0	-3	0	0	0	0	0	0	0	0	3	3	0	1
2001	0	0	0	0	0	0	0	0	1	-19	19	1	0	-3
2002	0	-4	0	0	0	0	0	0	0	-40	43	3	0	-4
2003	0	22	0	0	0	0	0	0	8	-68	32	-28	0	-7
2004	0	20	0	0	0	0	0	0	25	-25	0	0	0	20
2005	0	19	0	0	0	0	0	0	0	0	0	0	0	20
2006	0	1	0	0	0	0	0	0	0	0	0	19	19	19
2007	0	-4	0	0	0	0	0	0	0	0	4	4	0	0
2008	0	-3	0	0	0	0	0	0	0	-7	8	1	0	-4
2009	0	-12	0	0	0	0	0	0	0	-6	13	7	0	-5
2010	0	15	0	0	0	0	0	0	0	-15	-12	-27	0	-12
2011	0	15	0	0	0	0	0	0	0	0	0	15	15	15
2012	0	-1	0	0	0	0	0	0	0	0	2	2	0	0
2013	0	-5	0	0	0	0	0	0	0	0	3	3	0	-2

New Melones Project Operation

Effect Summary

New Melones Project Operation and River Characteristics - Bundle minus Base (1,000 acre-feet)

(1,000 acre-feet)		Goodwin									
	New Melones Inflow	OID & SSJID Canals	Total OID & SSJID	SEWD NM Water	CSJWCD NM Water	Instream Fish	Dissolved Oxygen	Vernalis Water Quality	Vernalis Flow Objective	Total Goodwin Release to River	Release above Minimum
	WY	WY		M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F
Base Average	1191	518	518	51	66	352	11	10	37	500	90
Difference from Base											
Planned	0	0	0	0	0	0	2	-8	4	0	3
Max Management	0	0	0	0	0	-5	3	-9	18	3	-4
Max Treatment	0	0	0	0	0	0	2	-10	6	0	2

New Melones Project Operation

In general, the actions and circumstances of the bundles develop changes in flow and quality in the San Joaquin River upstream of the Stanislaus River confluence. At times these changes occur when the New Melones Project operation is providing specific releases to comply with the D1641 Vernalis water quality objective. If the change in upstream San Joaquin River flow and quality requires less water from the Stanislaus River to comply with the downstream water quality objective, New Melones would release less water for that purpose. However, such a reduction in release may be countered or limited by a need to release for a flow or quality requirement such as the D1641 Vernalis flow requirement or Stanislaus River instream dissolved oxygen objectives. During periods when Vernalis flow objectives affected the New Melones operation, changes in flow due to Planned bundle actions and circumstances would cause a corresponding change in New Melones releases, again potentially countered or limited by other release requirements.