

Stanislaus River Operations Group

DRAFT Meeting Notes

Date June 16, 2010

Attendees

Chelsea Stewart, Liz Kiteck, Rachel Barnett-Johnson, Liz Vasquez, and Carol Nicolos, USBR; Barb Byrne and Rhonda Reed, NMFS; J.D. Wikert, FWS; Kari Kyler and Greg Wilson (phone), SWRCB; and Tim Heyne, DFG.

Handouts

- Agenda
- NMFS OCAP Biological Opinion: Reasonable and Prudent Alternatives Ref.
- Chinook salmon possible numbers through June 01, 2014
- Mossdale Trawl Steelhead Catch; April – June 2010
- New Melones Lake Daily Operations, Run Date: June 16, 2010
- Tulloch Reservoir Daily Operations, Run date: June 16, 2010
- Goodwin Reservoir Daily Operations, Run date: June 16, 2010
- New Melones - Stanislaus River Basin
- Orange Blossom Bridge Temperature Profile through June, 2010
- New Melones Temperature Profile through June, 2010
- Goodwin Dam Releases through June 11, 2010
- Draft – Stanislaus River Gravel Augmentation Plan

Agenda Items/Announcements:

A thank you to Liz Kiteck for helping out while Randi is on vacation.

Float trip was a success. Those who were able to participate saw where Reclamation had previously added gravel to the river. The field trip reinforced the difficult logistics involved in gravel projects. Just traveling to the project site via land can often be difficult (other than by boat). Previous gravel augmentations had been completed in 1999 and 2006. These sites continue to be maintained with a couple thousand CY of gravel being added each year. The fish relocate quite a bit of the gravel while spawning.

Draft Hydraulic Model is done and model results have been forwarded to FWS. The Reclamation and FWS models may need to meet to discuss the model. River 2-D Study field work on the Stanislaus is complete and data should be forthcoming once analysis has been completed.

Fisheries:

The count of *O. mykiss* are probably more stable than the Chinook.

Water spiked at Caswell just after Memorial Day but has reduced since. The flow is still too high for the screw traps to be effective; DFG/FishBio are considering removing the traps for now.

Efforts on the Stanislaus to get statistically valid numbers and increase confidence in population estimates are a priority; DFG and FWS are looking for different technologies to help with counting the fish to get a handle on what the actual population is.

Gravel Augmentation:

Draft Augmentation Plan was sent to the SOG e-mail list. The report is based on the current deficiencies of the Stanislaus River. CVPIA has an on-going plan in an effort to increase spawning. The RPA identifies 50,000 yd³ needs to be put into the river by 2014.

Honolulu Bar, Lover's Leap and Goodwin Canyon have been identified as projects that are already scheduled or likely to occur. Potential projects include Knights Ferry, Two-Mile Bar, Horseshoe Recreation Area and the Valley Oak Recreation Area.

Reclamation and FWS have a verbal agreement with the town of Knights Ferry that no work will be initiated between the bridge and the crossing. There is some misunderstanding as to which bridge is meant in the statement. More outreach with the community will be needed to gain acceptance of any gravel placement. There is a lot more potential for gravel augmentation above the covered bridge area of Knights Ferry. The intent is to serve the immediate habitat situation and to move gravel to form a natural alluvial system. It was suggested to wait until there would be something specific to show the residents of Knights Ferry what is planned and show before and after pictures of a completed project.

A suggestion was made that perhaps a couple sentences should be added to the plan defining each Monitoring and Science Task so that others who read the document will understand. Also, instead of using L, M and H for frequency; include numbers for a more specific understanding of the required work. It was pointed out that table two of the plan is for a base study; each site would be specific to the need of that particular site. It was brought up that monitoring is good but it must be balanced with the restoration project needs. The monitoring work should not limit our ability to do the actual work necessary.

Management goals of the augmentation are to: increase spawning gravel and rearing habitat (availability, quality and quantity), for Chinook and Steelhead, keep the river as much a natural system as possible and to determine the project effectiveness by conducting monitoring.

One possible strategy to these types of gravel augmentation projects would be to define max depth and velocity and let the river do most of the work. This type of targeted project would only look to intervene by adding gravel and restoring parts of the river only where it is needed. This would be less expensive and easier to do than the "zen garden" approach to river restoration. The "zen garden" approach attempts to design all aspects of the restoration and may even describe the placement of individual rocks and boulders. Monitoring would be performed on a limited basis to ensure that the gravel is doing what was intended and expected.

Operations Summary:

The New Melones Reservoir has increased in storage approximately 1,000 AF since 1 June. The peak snowmelt was later than normal and has now passed. As long as temperatures stay within normal ranges, the Stanislaus River should continue to receive steady inflows.

Releases for Goodwin are at 300 cfs; releases may be lowered to 250-275 cfs if necessary. 200 cfs is the minimum requirement. Tulloch is at summer operating levels so there will not be much variation expected related to Tulloch operations. Temperatures at Orange Blossom have remained under target because of the milder temperatures California has been experiencing so far this season.

Next Meeting

Date: Wednesday, 21 July 2010

Location: Central Valley Operations Office
3310 El Camino Ave.
Sacramento, CA 95821

Room: 302

Time: 1300

Notes by: Carol Nicolos and Liz Vasquez

AGENDA
Stanislaus Operations Group
June 16, 2010
Central Valley Operations Office, 3310 El Camino Avenue, Room 300, Sacramento, CA
95821
1:00 PM to 3:00 PM
Telecon Number 1-866-757-8460
Participant Code #9068008

RPA Action

Agenda Items

Announcements

Fishery and Restoration Updates

Section 11.2.1.3 Fish Monitoring and Reporting
-Caswell Screw Trap

Action III.2.1 Gravel Augmentation
-Discuss draft Gravel Plan

Stanislaus Operations Summary & Expected Operations

Action III.1.2 Temperature Criterion

Action III.1.3 Minimum Flow

Action IV.2.1 San Joaquin Inflow Export Ratio

SWRCB Standards

NMFS OCAP Biological Opinion: Reasonable and Prudent Alternatives (RPAs) References

ACTION ID	PAGE #	RPA NAME
Section 11.2.1.3	584	Monitoring and Reporting: (e) Adult escapement and juvenile monitoring for steelhead on the Stanislaus River
Action III.1.1	581-583,620	Establish Stanislaus Operational Group (SOG) for Real-Time Operational Decision-Making
Action III.1.2	620-621	Provide Cold Water Releases to Maintain Suitable Steelhead Temperatures.
Action III.1.3	622-625, Appendix 2-E	Operate the East Side Division Dams to Meet the Minimum Flows, as Measured at Goodwin Dam.
Action III.2.1	626	Increase and Improve Quality of Spawning Habitat with addition of 50,000 Cubic Yards of Gravel by 2014 and with a Minimum Addition of 8,000 Cubic Yards per Year for the Duration of the Project Actions.
Action III.2.2	627	Conduct Floodplain Restoration and Inundation in Winter or Spring to Inundate Steelhead Juvenile Rearing Habitat on One- to Three- Year Schedule.
Action III.2.3	627	Restore Freshwater Migratory Habitat for Juvenile Steelhead by Implementing Projects to Increase Floodplain Connectivity and to Reduce Predation Risk During Migration.
Action III.2.4	628	Evaluate Fish Passage at New Melones, Tulloch, and Goodwin Dams
Action IV.2.1	641	Phase I: Interim Operations in 2010-2011: Reclamation shall increase its releases at Goodwin Reservoir, if necessary, in order to meet the flows required at Vernalis

UNITED STATES DEPARTMENT OF THE INTERIOR
 U.S. BUREAU OF RECLAMATION-CENTRAL VALLEY PROJECT-CALIFORNIA

JUNE 2010

NEW MELONES LAKE DAILY OPERATIONS

RUN DATE: June 16, 2010

DAY	ELEV	STORAGE		COMPUTED* INFLOW C.F.S.	POWER	RELEASE - C.F.S.			EVAPORATION		PRECIP INCHES
		1000 ACRE-FEET IN LAKE	CHANGE			SPILL	OUTLET	C.F.S.	INCHES		
		1,290.6									
1	979.65	1,291.6	+1.0	2,486	1,900	0	0	74	.27	.00	
2	979.97	1,294.3	+2.7	2,863	1,431	0	0	66	.24	.00	
3	980.66	1,300.1	+5.9	3,857	857	0	0	44	.16	.00	
4	981.41	1,306.5	+6.4	5,019	1,723	0	0	75	.27	.00	
5	982.52	1,316.0	+9.5	6,169	1,312	0	0	72	.26	.00	
6	983.81	1,327.1	+11.1	6,923	1,266	0	0	70	.25	.00	
7	985.07	1,338.0	+10.9	7,269	1,688	0	0	95	.34	.00	
8	986.40	1,349.5	+11.6	7,251	1,355	0	0	73	.26	.00	
9	987.72	1,361.1	+11.5	6,809	916	0	0	85	.30	.00	
10	988.59	1,368.7	+7.6	6,324	2,430	0	0	48	.17	.00	
11	989.31	1,375.0	+6.3	5,361	2,081	0	0	88	.31	.00	
12	990.12	1,382.2	+7.1	4,668	953	0	0	114	.40	.00	
13	990.64	1,386.8	+4.6	4,257	1,840	0	0	97	.34	.00	
14	991.01	1,390.0	+3.3	3,730	1,979	0	0	100	.35	.00	
15	991.41	1,393.6	+3.6	3,283	1,403	0	0	89	.31	.00	
TOTALS			+103.1	76,269	23,134	0	0	1,190	4.23	.00	
ACRE-FEET			+103,100	151,280	45,886	0	0	2,360			

COMMENTS:

* COMPUTED INFLOW IS THE SUM OF CHANGE IN STORAGE, RELEASES AND EVAPORATION.

SUMMARY

RELEASE (ACRE-FEET)		PRECIPITATION	
POWER	45,886	OUTLET	0
SPILL	0	TOTAL	45,886
		THIS MONTH =	.00
		JULY 1, 2009 TO DATE =	36.69

OAKDALE IRRIGATION DISTRICT
 SOUTH SAN JOAQUIN IRRIGATION DISTRICT
 TRI DAMS PROJECT-CALIFORNIA

JUNE 2010

GOODWIN RESERVOIR DAILY OPERATIONS

RUN DATE: June 16, 2010

DAY	ELEV	STORAGE		TULLOCH	RIVER		RELEASE - C.F.S.	
		ACRE-FEET	CHANGE		RELEASE	OUTLET	SPILL	JOINT
		RES.					MAIN	MAIN
		535						
1	360.00	537	+2	1,497	0	202	816	313
2	359.97	535	-2	1,500	0	208	857	292
3	359.97	535	+0	1,447	0	210	796	291
4	360.05	541	+6	1,420	0	269	714	287
5	360.08	543	+2	1,400	0	303	674	270
6	360.05	541	-2	1,402	0	300	675	270
7	360.08	543	+2	1,461	0	303	703	293
8	360.05	541	-2	1,551	0	302	758	331
9	360.05	541	+0	1,593	0	301	795	350
10	360.05	541	+0	1,671	0	304	840	362
11	360.08	543	+2	1,639	0	306	760	362
12	360.08	543	+0	1,592	0	308	690	355
13	360.08	543	+0	1,534	0	308	363	350
14	360.08	543	+0	1,707	0	306	803	362
15	360.08	543	+0	1,856	0	305	1,028	354
TOTALS			+8	23,270	0	4,235	11,272	4,842
ACRE-FEET			+8	46,156	0	8,400	22,358	9,604

JOINT MAIN OPERATED BY SSJID AND OID.
 SOUTH MAIN OPERATED BY OID.

SUMMARY
 RELEASE (ACRE-FEET)

JOINT MAIN CANAL	22,358	OUTLET	0
SOUTH MAIN CANAL	9,604	SPILL	8,400
		TOTAL	40,362

UNITED STATES DEPARTMENT OF THE INTERIOR
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JUNE 2010

TULLOCH RESERVOIR DAILY OPERATIONS

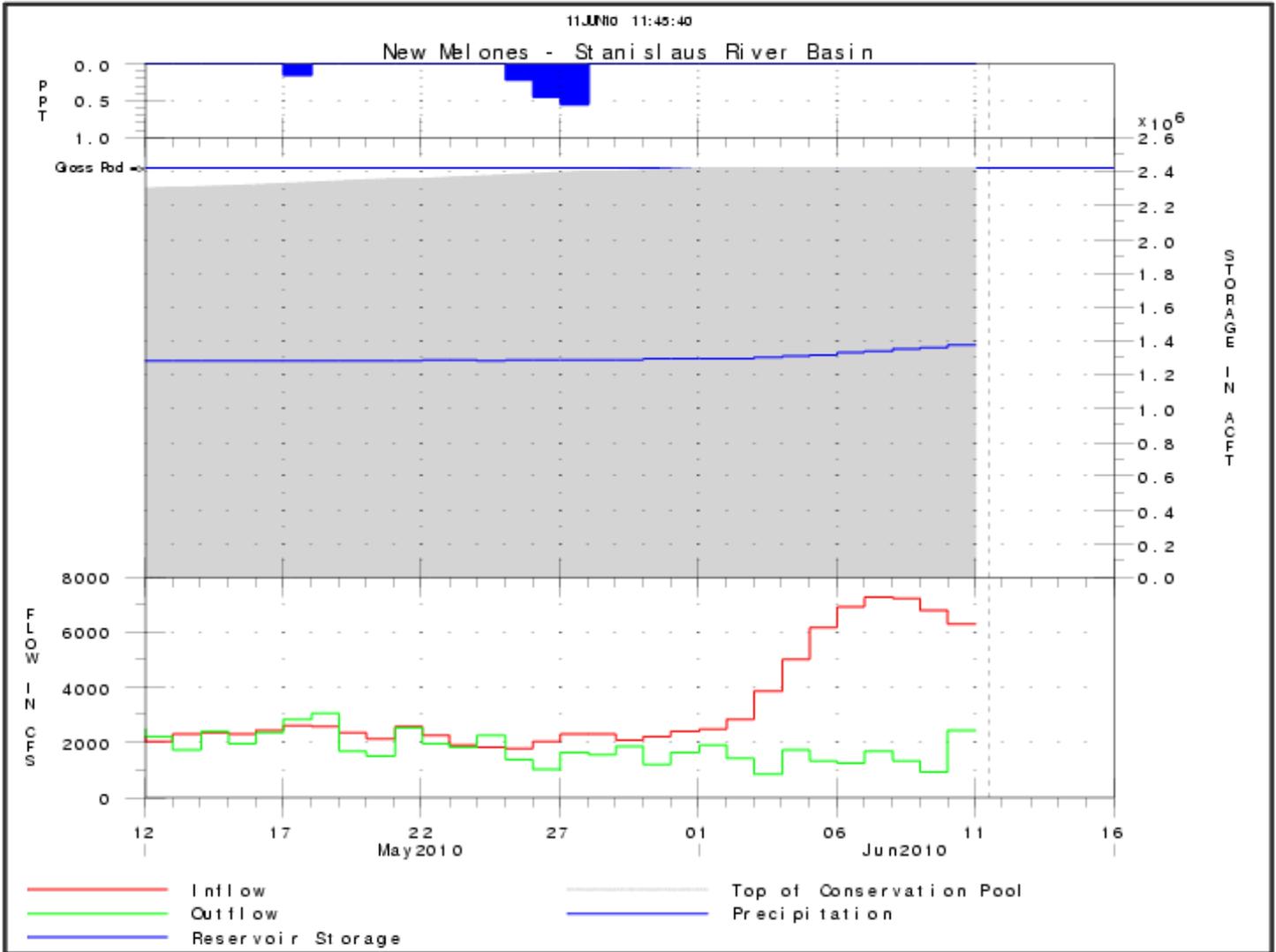
RUN DATE: 06/16/2010

DAY	ELEV	STORAGE		COMPUTED* INFLOW C.F.S.	NEW MELONES RELEASE	POWER	RELEASE - C.F.S.		EVAP C.F.S. (1)
		ACRE-FEET RES.	CHANGE				SPILL	OUTLET	
		65,560							
1	509.37	66,182	+622	1,822	1,900	1,497	0	0	11
2	509.24	66,020	-162	1,428	1,431	1,500	0	0	10
3	508.29	64,846	-1,174	861	857	1,447	0	0	6
4	508.80	65,474	+628	1,748	1,723	1,420	0	0	11
5	508.66	65,301	-173	1,323	1,312	1,400	0	0	10
6	508.44	65,031	-270	1,276	1,266	1,402	0	0	10
7	508.81	65,486	+455	1,704	1,688	1,461	0	0	14
8	508.46	65,055	-431	1,344	1,355	1,551	0	0	10
9	507.31	63,653	-1,402	898	916	1,593	0	0	12
10	508.57	65,191	+1,538	2,453	2,430	1,671	0	0	7
11	509.29	66,082	+891	2,100	2,081	1,639	0	0	12
12	508.21	64,748	-1,334	935	953	1,592	0	0	16
13	508.99	65,708	+960	2,032	1,840	1,534	0	0	14
14	509.12	65,870	+162	1,803	1,979	1,707	0	0	14
15	508.37	64,944	-926	1,401	1,403	1,856	0	0	12
TOTALS			-616	23,128	23,134	23,270	0	0	169
ACRE-FEET			-616	45,874	45,886	46,156	0	0	335

*COMPUTED INFLOW IS SUM OF CHANGE IN STORAGE, RELEASES, AND EVAPORATION.

**SUMMARY
RELEASE (ACRE-FEET)**

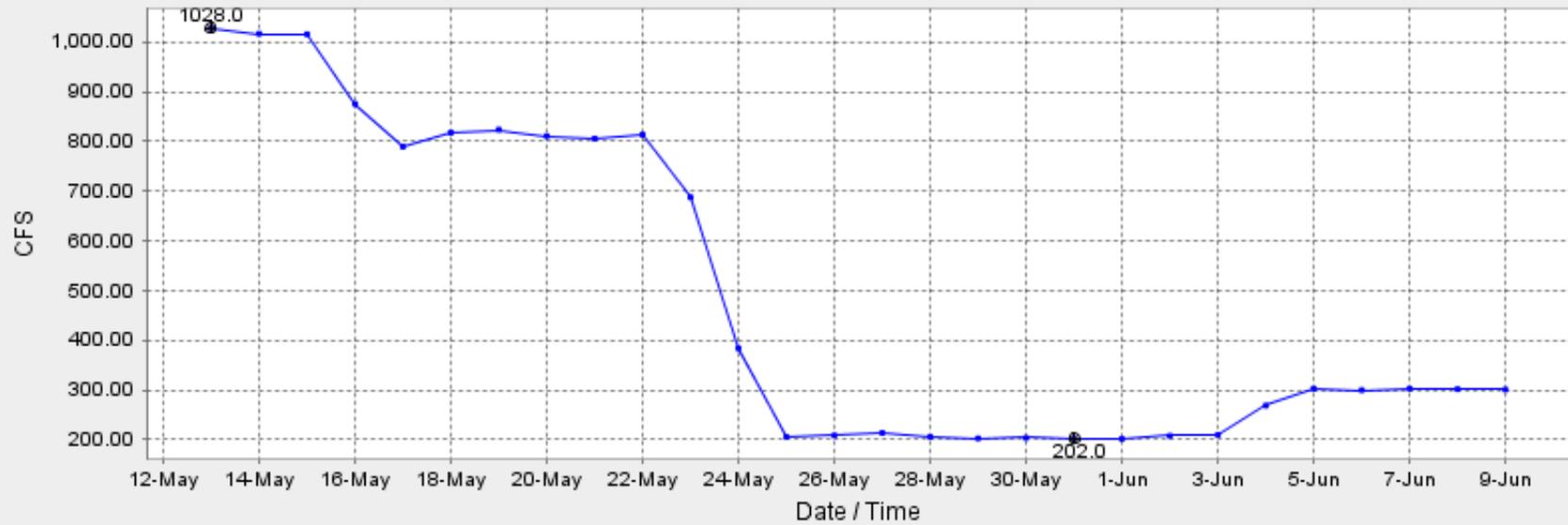
POWER	46,156	OUTLET	0
SPILL	0	TOTAL	46,156



GOODWIN DAM (GDW)

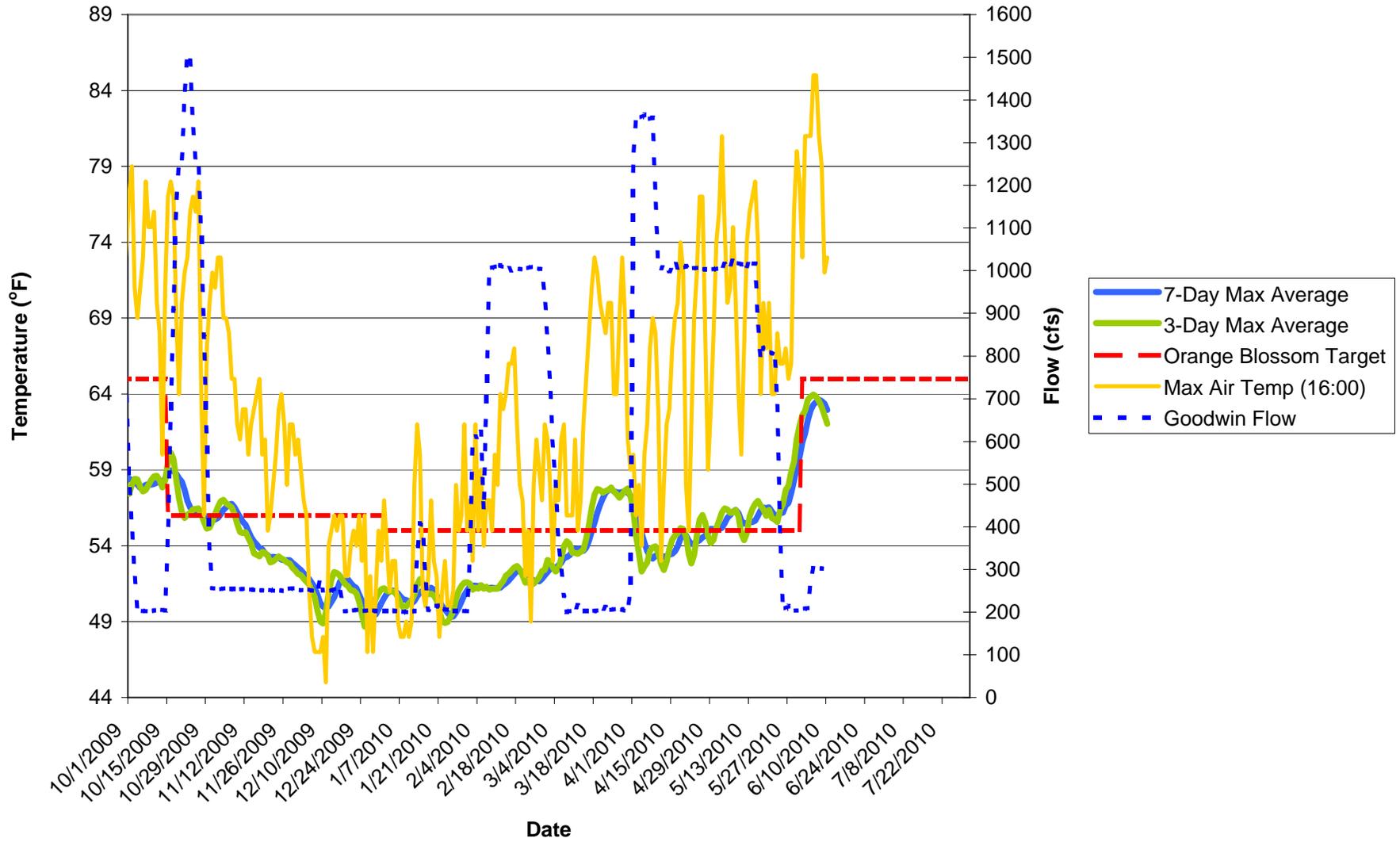
Date from 05/12/2010 12:22 through 06/11/2010 12:22 Duration : 30 days

Max of period : (05/13/2010 00:00, 1028.0) Min of period : (05/31/2010 00:00, 202.0)

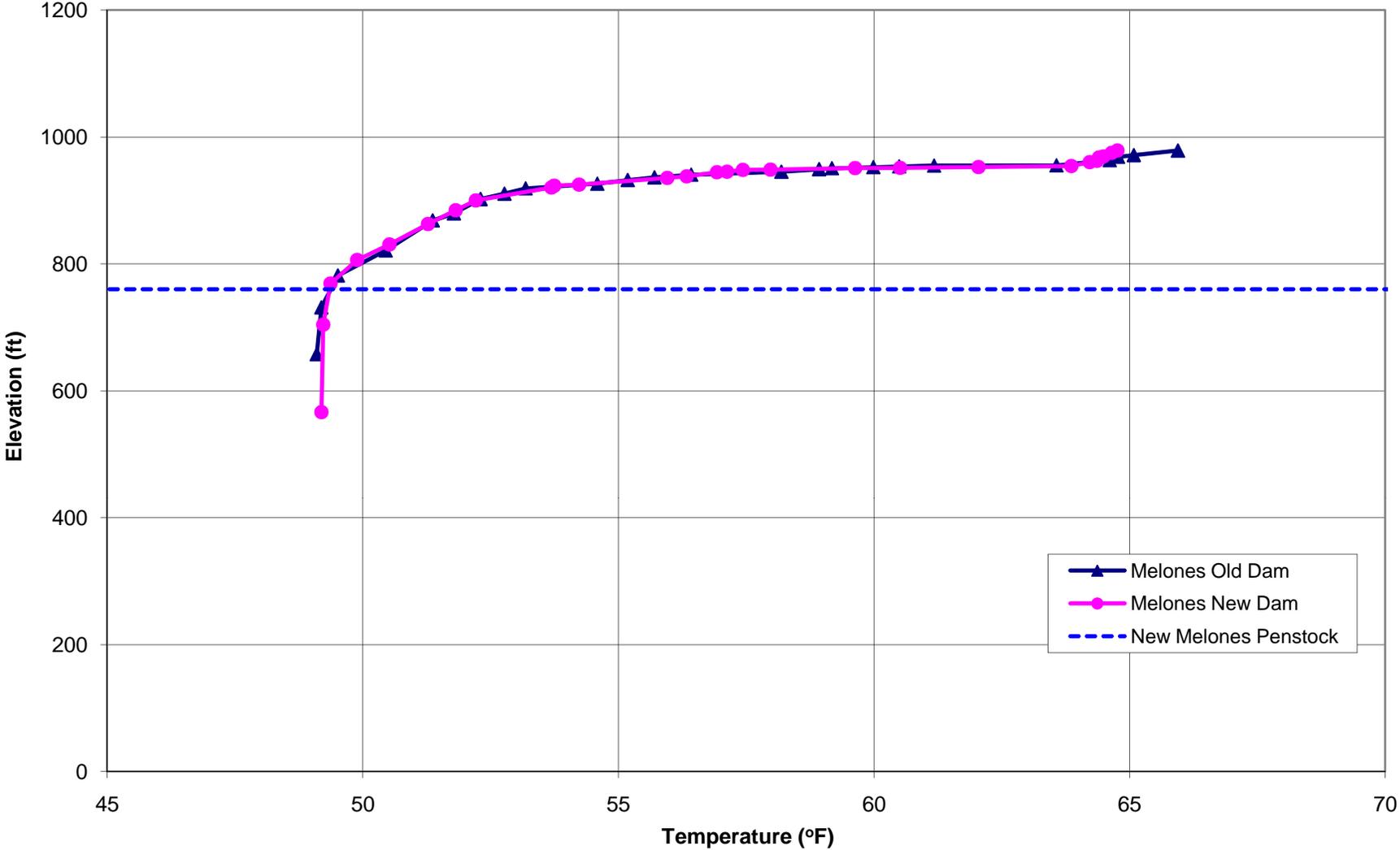


DISCHARGE, SPILLWAY - CFS (9183)

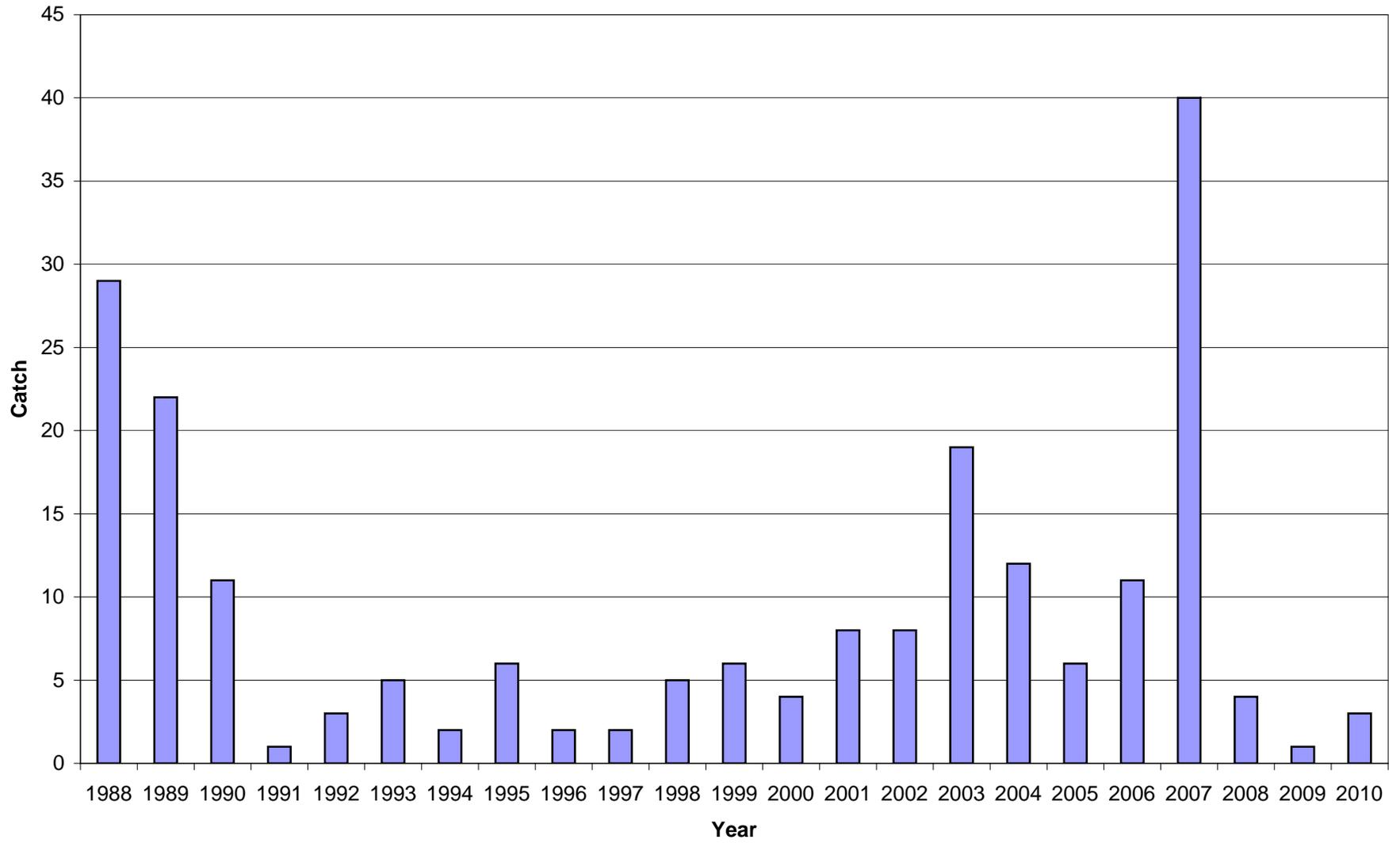
Orange Blossom Bridge Temperatures



**New Melones Temperature Profile
5/25/2010**



Mossdale Trawl Steelhead Catch - April to June

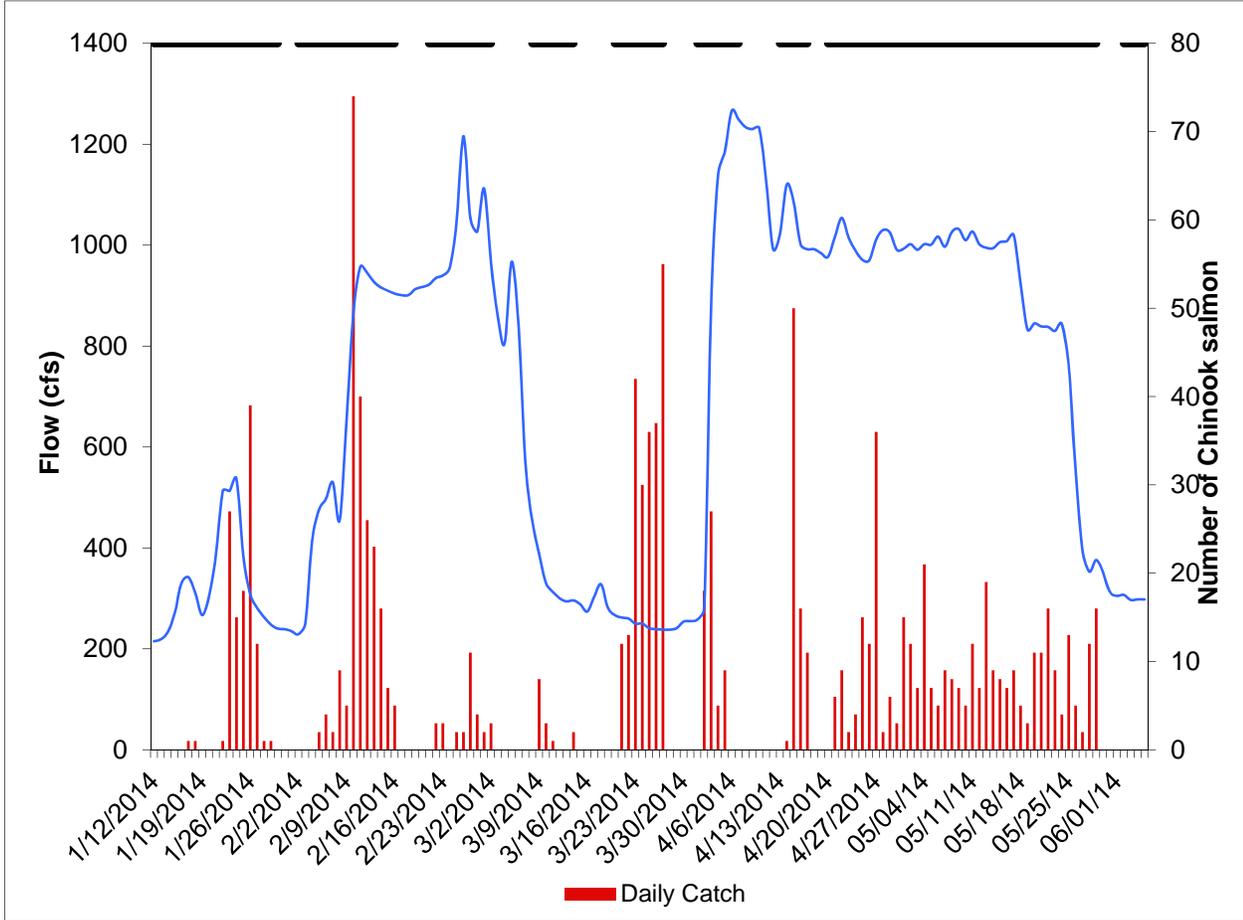


BatchDate	Days trapped	Chinook salmon		<i>O. mykiss</i>	RIP Flow (cfs)	Temp (C)	D.O. (mg/L)	Turbidity (NTU)
		Count	Mean FL (mm)	Count				
1/12/2014	Install	n/a	n/a	n/a	215			
1/13/2014	x	0		0	219	9.6	10.83	0.94
1/14/2014	x	0		0	233	10.8	10.20	3.77
1/15/2014	x	0		0	270	10.5	10.29	1.32
1/16/2014	x	0		0	331	10.2	10.83	2.70
1/17/2014	x	1	38.0	0	342	10.0	10.60	2.10
1/18/2014	x	1	38.0	0	311	10.2	10.54	2.12
1/19/2014	x	0		0	267	10.4	10.54	1.70
1/20/2014	x	0		0	304	10.0		6.06
1/21/2014	x	0		0	386	10.0		7.75
1/22/2014	x	1	34.0	0	513	10.0		21.60
1/23/2014	x	27	33.5	0	513	8.5		39.00
1/24/2014	x	15	34.9	0	537	10.0		32.20
1/25/2014	x	18	33.6	0	383	8.2	10.32	41.70
1/26/2014	x	39	32.5	0	308	9.0	84.50	18.40
1/27/2014	x	12	33.3	0	281	8.5		11.80
1/28/2014	x	1	34.0	0	263	9.0		6.07
1/29/2014	x	1	37.0	0	248	9.0		4.55
1/30/2014	x	0		0	240	10.1	10.14	3.08
1/31/2014	-	-	-	-	239	-	-	-
2/1/2014	-	-	-	-	235	-	-	-
2/2/2014	x	n/a	n/a	n/a	229	11.2	10.15	
2/3/2014	x	0		0	250			
2/4/2014	x	0		0	415	10.3	10.45	
2/5/2014	x	2	31.5	0	476	10.8	10.10	6.28
2/6/2014	x	4	33.5	0	497	11.3	10.12	7.51
2/7/2014	x	2	33.5	0	530	11.4	10.15	5.42
2/8/2014	x	9	34.2	0	455	10.9	10.13	4.51
2/9/2014	x	5	33.2	0	653	11.0	10.88	4.40
2/10/2014	x	74	34.1	0	867	10.7	10.63	11.50
2/11/2014	x	40	36.3	0	957	10.3	10.61	8.46
2/12/2014	x	26	34.5	0	945	10.6	11.80	7.12
2/13/2014	x	23	33.9	0	927	10.6	10.74	5.72
2/14/2014	x	16	33.7	0	916	11.0	10.67	3.20
2/15/2014	x	7	34.7	0	910	10.7	10.77	2.32
2/16/2014	x	5	34.8	0	904	11.1	10.86	2.68
2/17/2014	-	-	-	-	901	-	-	-
2/18/2014	-	-	-	-	901	-	-	-
2/19/2014	-	-	-	-	913	-	-	-
2/20/2014	-	-	-	-	917	-	-	-
2/21/2014	x	n/a	n/a	n/a	922	11.3	11.05	4.91
2/22/2014	x	3	36.3	0	935	10.8	10.68	4.85
2/23/2014	x	3	35.3	0	940	10.7	10.95	2.72
2/24/2014	x	0		0	955	10.6	10.94	3.04
2/25/2014	x	2	42.0	0	1047	10.3	11.00	5.78
2/26/2014	x	2	37.0	0	1216	10.9	10.67	10.39

2/27/2014	x	11	35.4	0	1053	11.4	10.10	5.23
2/28/2014	x	4	32.5	0	1027	11.3	10.29	4.33
3/1/2014	x	2	35.0	0	1112	11.1	10.49	3.18
3/2/2014	x	3	33.3	0	966	11.5	10.35	4.98
3/3/2014	-	-	-	-	858	-	-	-
3/4/2014	-	-	-	-	806	-	-	-
3/5/2014	-	-	-	-	967	-	-	-
3/6/2014	-	-	-	-	843	-	-	-
3/7/2014	-	-	-	-	569	-	-	-
3/8/2014	x	n/a	n/a	n/a	454	13.3	9.28	5.86
3/9/2014	x	8	46.6	0	388	12.3	9.15	5.60
3/10/2014	x	3	66.7	0	330			2.15
3/11/2014	x	1		0	313	11.3	9.64	2.55
3/12/2014	x	0		0	300	10.7	9.96	1.49
3/13/2014	x	0		0	294	11.8	10.03	1.41
3/14/2014	x	2	62.0	0	296	12.7	10.51	1.14
3/15/2014	-	-	-	-	288	-	-	-
3/16/2014	-	-	-	-	274	-	-	-
3/17/2014	-	-	-	-	303	-	-	-
3/18/2014	-	-	-	-	328	-	-	-
3/19/2014	-	-	-	-	281	-	-	-
3/20/2014	x	n/a	n/a	n/a	267			
3/21/2014	x	12	67.9	0	262	15.3	9.80	3.89
3/22/2014	x	13	70.0	0	260	15.1	9.41	4.39
3/23/2014	x	42	68.7	0	250	15.2	9.53	5.72
3/24/2014	x	30		0	250	14.0		6.56
3/25/2014	x	36	70.8	0	241	16.1	10.04	3.59
3/26/2014	x	37	71.1	0	239	15.2	9.49	3.28
3/27/2014	x	55	69.7	0	238	14.6	9.60	4.15
3/28/2014	-	-	-	-	238	-	-	-
3/29/2014	-	-	-	-	241	-	-	-
3/30/2014	-	-	-	-	254	-	-	-
3/31/2014	-	-	-	-	255	-	-	-
4/1/2014	x	n/a	n/a	n/a	258			
4/2/2014	x	18	76.3	0	280	15.2	9.75	2.91
4/3/2014	x	27	78.9	0	879	12.8	10.06	5.23
4/4/2014	x	5	73.6	0	1137	11.2	10.47	5.62
4/5/2014	x	9	69.1	0	1185	11.5	10.60	
4/6/2014	x	0		0	1266	10.9	10.51	4.27
4/7/2014	x	0		0	1249	12.2	10.55	3.97
4/8/2014	-	-	-	-	1234	-	-	-
4/9/2014	-	-	-	-	1230	-	-	-
4/10/2014	-	-	-	-	1232	-	-	-
4/11/2014	-	-	-	-	1129	-	-	-
4/12/2014	-	-	-	-	993	-	-	-
4/13/2014	x	n/a	n/a	n/a	1021	11.8	10.22	2.50
4/14/2014	x	1	84.0	0	1120	12.5	10.45	4.44
4/15/2014	x	50	79.2	0	1086	13.0	9.94	16.10

4/16/2014	x	16	79.6	0	1002	13.3	10.08	6.69
4/17/2014	x	11	81.5	0	992	14.0	0.00	
4/18/2014	-	-	-	-	992	-	-	-
4/19/2014	-	-	-	-	984	-	-	-
4/20/2014	x	n/a	n/a	n/a	977	15.0	9.90	2.14
4/21/2014	x	6	88.5	0	1016	14.9	9.96	
4/22/2014	x	9	86.3	0	1054	12.7	9.87	3.57
4/23/2014	x	2	85.0	0	1015	12.3	10.17	2.05
4/24/2014	x	4	90.3	0	989	12.4	10.00	2.76
4/25/2014	x	15	88.1	0	971	14.1	9.93	4.58
4/26/2014	x	12	84.6	0	970	14.9	9.92	4.81
4/27/2014	x	36	86.5	0	1011	15.7	9.99	2.67
4/28/2014	x	2	85.0	0	1030	15.3	9.86	2.80
04/29/14	x	6	83.8	0	1025	14.5	10.17	1.72
04/30/14	x	3	88.7	0	991	13.5	10.51	2.95
05/01/14	x	15	89.4	0	993	13.0	10.09	
05/02/14	x	12	91.1	0	1002	13.7	9.86	3.28
05/03/14	x	7	92.0	0	991	14.6	9.76	1.95
05/04/14	x	21	91.4	0	1002	15.8	9.85	3.24
05/05/14	x	7	94.9	0	1001	15.9	9.81	1.52
05/06/14	x	5	90.4	0	1017	16.2	10.24	2.65
05/07/14	x	9	86.8	0	997	15.4	10.29	1.45
05/08/14	x	8	93.6	0	1026	15.0	10.2	3.14
05/09/14	x	7	87.6	0	1032	15.7	10.36	4.54
05/10/14	x	5	90.6	0	1010	15.3	10.4	1.55
05/11/14	x	12	92.8	0	1027	12.8	9.52	1.56
05/12/14	x	7	95.0	0	1002	14	9.89	1.73
05/13/14	x	19	0.0	0	995	14.2	10	2.38
05/14/14	x	9	94.4	1	994	15.1	10.05	2.48
05/15/14	x	8	93.8	0	1006	16	10.1	2.9
05/16/14	x	7	90.4	0	1008	16.1	10.33	3.02
05/17/14	x	9	80.4	0	1020	16.1	10.57	5.37
05/18/14	x	5	76.2	0	924	15.6	9.84	2.28
05/19/14	x	3	95.7	0	833	15.9	9.8	1.91
05/20/14	x	11	86.5	0	845	15.2	9.52	-
05/21/14	x	11	90.5	0	839	-	-	-
05/22/14	x	16	96.8	0	838	15.9	9.84	-
05/23/14	x	9	97.7	0	830	14.3	9.77	-
05/24/14	x	4	91.3	0	844	13.9	9.88	-
05/25/14	x	13	95.8	0	760	-	-	-
05/26/14	x	5	92.4	0	554	15.4	9.68	-
05/27/14	x	2	90.0	0	395	15.6	8.68	-
05/28/14	x	12	93.7	0	353	16.3	8.28	-
05/29/14	x	16	92.7	0	376	17.1	8.88	-
05/30/14	-	-	-	-	351	-	-	-
05/31/14	-	-	-	-	312	-	-	-
06/01/14	-	-	-	-	305	-	-	-
06/02/14	x	0	-	0	307	20.4	8.32	3.55

06/03/14	x	0	-	0	297	20.5	8.07	2.08
06/04/14	x	0	-	0	298	22.5	8.28	1.86
06/05/14	x	0	-	0	298	22.0	7.6	2.58
Grand Total	115	1104	66.0	1	-	-	-	-



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DRAFT_V1
STANISLAUS RIVER GRAVEL AUGMENTATION PLAN
NMFS Biological Opinion 2009, RPA Action III.2.1

Purpose:

This plan is prepared in partial fulfillment of US Bureau of Reclamation's (USBR) responsibilities to minimize effects of water operations on the Stanislaus River through improving spawning habitat for steelhead per Action III.2.1 of the NMFS Biological Opinion (2009). Here, USBR outlines projects that aim to achieve the placement of 50,000 cubic yards of gravel on the Stanislaus River by 2014. Specifically, this plan includes project descriptions, implementation schedules, and monitoring plans to improve spawning habitat.

Background:

The construction of Central Valley Project (CVP) dams has had dramatic effects on the rivers in which they are located. One of the main effects is the prevention of rocks, gravel, dirt, and other substrates from passing through them. Without the dams, these materials would move into the river providing habitat needed for successful spawning and juvenile rearing of salmonids. There is currently a Central Valley gravel augmentation program designed to meet the goals of the Central Valley Project Improvement Act Section 3406(b)(13), which represents a continuous effort to restore spawning and rearing habitat in the Upper Sacramento River from Keswick Dam to Red Bluff Diversion Dam, in the American River downstream of Nimbus Dam, and on the Stanislaus River downstream of Goodwin Dam.

The average annual gravel deficits on CVP streams are based on quantitative calculations which estimate the amount of gravel that the dams retain: Sacramento River (50,000 cubic yards); Stanislaus River (20,000 cubic yards); American River (57,000 cubic yards). The program focuses on sites that are thought to have the most benefit to increase the quality and quantity of spawning and rearing habitats. To date (1997-2009), the (b)(13) program has placed 145,000 cubic yards among all three rivers. Additional gravel augmentation projects have been funded and implemented on the Stanislaus River by AFRP, CALFED, CDFG, and CDWR Four Pumps.

Salmon have been observed spawning on the gravel at each of the placement sites on all three rivers. Monitoring of gravel placements (using aerial photos, red surveys, snorkel surveys, and boat surveys) has shown significant improvements to salmon habitat. Several metrics have been used to quantify and document this success (see Central Valley Project Improvement Act- Fiscal Year 2009 Annual Report).

Stanislaus River:

Historically, gravel and gold mining occurred in the active channel of the Stanislaus River between the 1930s and 1970s substantially reducing the availability of spawning habitat and potentially increasing the occurrence of redd superimposition by crowding spawners (Mesick 2001). Pebble counts and sediment size analysis of spawning areas has shown an increase in sand and fine material in spawning beds on the Stanislaus River since construction of New Melones Dam (Kondolf et al. 2001, Mesick 2001). Most non-enhanced riffles had sufficient

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fine material to impair egg incubation and survival. All gravel placements throughout CVP streams now utilize the data and findings from a gravel suitability study conducted on the Stanislaus River in 2005, which determined the optimum sizes of gravel to create adequate permeability for egg survival.

Projects within the CVPIA program are now being prioritized to reduce the impacts of watershed specific factors thought to limit salmon population growth in that system. Gravel placement activities within the Stanislaus River, in the absence of the RPA, may be prioritized lower than gravel placement on other CVP rivers because of greater spawning habitat limitations in other rivers (primarily Upper Sacramento and American Rivers).

Overbank flows are critical for redistributing fine sediments out of spawning beds and onto the floodplain terrace. Since the construction of upstream dams, significant channel incision has occurred on the lower Stanislaus River further increasing the flows needed to obtain overbank flows and reduced the frequency of occurrence. Without sufficient flows for geomorphic processes to manage fine sediment deposition in spawning gravels, spawning gravels will be increasingly unsuitable for spawning. The long-term quality of spawning habitat is therefore inter-related to overbank/ floodplain processes. Therefore, when possible, USBR will pursue projects that will holistically improve habitat complexity, utilize in-river gravel, increase juvenile side-channel and floodplain habitat (Action III.2.2 of the OCAP Biological Opinion (2009)) while achieving the primary goal of this plan to improve spawning habitat for steelhead with gravel augmentation on the Stanislaus River.

In this plan, USBR:

- II. Identifies projects scheduled (or likely) to occur
- III. Identifies other potential projects and impediments to their immediate implementation
- IV. Outlines potential monitoring plans
- V. Identifies some next steps necessary to bridge the gap between the current gravel outlook and the RPA requirement, including a process for updates to this plan.

II. Projects scheduled (or likely) to occur

USBR, USFWS, and CDFG identify four projects likely to occur that will assist in meeting the minimum gravel augmentation target of 50,000 cubic yards by 2014 on the Stanislaus River. See Figure 1 for project locations.

- (1) **Honolulu Bar:** This is an ongoing project of USBR and USFWS's Anadromous Fish Restoration Program (AFRP). Construction is expected to occur during summer 2010. Approximately 8,000 cubic yards of screened spawning sized gravel from the site will be placed in the main channel adjacent to the bar to augment spawning riffles, and used to construct a 0.7 acre floodplain bench upstream on the south (east) side of the river. USBR will contribute \$62,400 in (b)(13) funding (FY 2011). Remainder of funding is from AFRP [(b)(1)] and Oakdale Irrigation District.

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- (2) **Goodwin Canyon @ cable crossing:** This location has received successful gravel additions in the past. This project has some existing permitting that could be renewed. Potential (b)13 funds exist to place an estimated 4,000 cubic yards in summer 2011.
- (3) **Goodwin Canyon @ float tube pool:** This location has received successful gravel additions in the past through helicopter and sluice delivery systems. This project has some existing permitting that could be renewed. An estimated 2,000 cubic yards could be placed in summer 2012, although no funding has been identified. The cost per unit of gravel placed at this site is twice that of sites with front end loader access. However, spawning fish density (Chinook salmon and *O. mykiss*) is high and water is coolest at this upper most spawning habitat in the river.
- (4) **Lover's Leap:** One mile of riparian floodplain habitat is available for restoration. There is potentially enough gravel to meet the entire OCAP BO requirement in perched floodplain on this site. AFPR is planning to start a cooperative agreement with the landowners this fiscal year (2010) to begin planning, outreach, design, and permitting. The Natural Resources Conservation Service (NRCS) is interested in funding the project implementation. Given the scale of the project, and the likelihood of the gravel needing to be moved off the project site, it is likely that a Surface Mining and Reclamation Act (SMARA) permit will be required. At the earliest, this restoration project would occur in 2012, but may not occur until 2013 given constraints in funding and necessary permits. Gravel from this project has the potential to be stockpiled for future gravel work on the river to meet placement of 8,000 cubic yards subsequent to 2014 per Action III.2.1 of the OCAP BO.

III. Potential projects and impediments to their progress

- (1) **Knights Ferry upstream of covered bridge and rapids:** This location is easily accessed and thus cost effective in delivering gravel. Gravel has been placed by USBR to create three riffles in the past. Permits exist to add a significant amount of gravel just below this site and could likely be utilized to simplify permitting here. The site is at the break between a bedrock controlled channel with deep pools and the downstream alluvial stream reach. Gravel would be stockpiled in the channel here with the intent that high flows would mobilize it to the downstream alluvial reach to create and maintain spawning habitat there. Access would be over Federal (Corps of Engineers) land and would need to be improved over uneven bedrock terrain. The town has not been supportive of the project in the past. If this project gained support, an estimated 6,000 cubic yards could be placed in summer 2013, although no funding has been identified. USBR will work with the local community and stakeholders in an attempt to gain support for this project.
- (2) **Two Mile Bar:** This project could provide floodplain, side channel and a significant amount of screened spawning sized gravel for placement in the main channel. This land is privately owned and is moderately accessible. Topographic surveys of the site have been completed. The CVPIA program attempted, but could not purchase the property because the owner wanted to be paid with inclusion of mineral rights; raising the cost so the realty personnel would not approve the purchase. Trust for Public land

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was the partner lined up to take possession of the land. USBR will contact the landowner to determine whether a conservation easement could be granted or if a project could be conducted overtime- excavate floodplain and process gravel on an annual basis as funding allows.

(3) Horseshoe Recreation Area: This land is owned by the US Army Corps and is accessible. CDWR Four Pumps has previously augmented spawning riffles in the upstream part of this reach. This project would provide top dressing to the riffles and could provide additional spawning and rearing habitat further downstream within this ¾ mile river reach. One benefit to the project is that it would provide clean-coarse gravel providing good habitat for macro-invertebrate production lower down in the river than most of the other projects. It would also assist in breaking up the river into more complex riffle/ pool habitat, reducing predator habitat and improving juvenile rearing habitat by increasing water surface elevation resulting in more frequent inundation of vegetated areas.

(4) Valley Oak Recreation Area: This land is owned by the US Army Corps and is accessible. Spawning riffles were previously created in the upstream part of this reach. They have degraded and could benefit from additional gravel placement to maintain spawning habitat. This is not a high density spawning area but some spawning does occur each year. It may not be the most desirable area for steelhead to spawn because it is lower in the river where over-summer rearing temperatures can approach 65 F.

III. Monitoring plan(s)

Monitoring is an important component of our management action(s). Monitoring will allow us to understand the effectiveness of the project, make long term planning decisions, and adjust techniques to improve future project implementation (adaptive management). A combination of focused, long and short term monitoring with applied research will be used to improve restoration implementation and ultimately improve restoration success. Table 2 describes potential monitoring projects that could be implemented on a project specific basis as funding permits. Monitoring will be driven by specific questions that will align with restoration, program and site-specific goals. In addition, we will work with current and on-going monitoring efforts on the Stanislaus River to increase project efficacy.

The primary management goals are to:

1. Increase the availability, quality, and quantity of spawning gravel and rearing habitat for Stanislaus River Chinook salmon and steelhead trout
2. Restore, maintain, or enhance natural system process whenever possible
3. Determine project effectiveness through monitoring

Our monitoring plan addresses the third management goal and is comprised of two overarching monitoring objectives that are applicable to all of the proposed projects and are of highest priority (see Table 2). These include (a) conducting implementation monitoring of abiotic conditions to document the project was installed according to design standard aimed at meeting successful salmon and steelhead spawning habitat and (b) conducting effectiveness

monitoring of salmon and steelhead habitat use of placed gravel. These monitoring objectives are articulated by the following hypotheses.

(a) Implementation monitoring – Habitat characteristics

H₁: Habitat metrics in the placed gravel conform to design criteria for appropriate spawning conditions.

- Do water velocities and depths fall within ranges appropriate for spawning?
 - Conduct topographic survey to determine depths within placed gravel and measure velocities
- Do water velocities and depths fall within appropriate ranges in areas of lower spawning utilization?
 - Compare velocities and depths between areas of higher and lower spawning utilization

H₂: Intragravel habitat conditions in the placed gravel conform to design criteria for appropriate temperatures, dissolved oxygen (DO) levels, and permeability for egg incubation and early development.

- Do temperatures, DO levels, and permeability fall within ranges appropriate for egg incubation and development?
 - Measure intragravel conditions and compare results to specific requirements

H₃: Design flows are sufficient to mobilize gravel placed according to design criteria and configurations.

- What volume of placed gravel is mobilized?
 - Measure volumetric changes to help determine gravel replacement, maintenance needs, and evaluate future placements by using the chain-scour technique

Comment [UF&WS1]: Not sure we will learn much here. I think the depth/velocity stuff has been sufficiently covered, and gravel mobilization likely happens more by fish than flow in most years.

(b) Effectiveness monitoring- Habitat use

H₄: Gravel augmentation increases spawning utilization at the enhanced site

- Does the addition of gravel recover productive habitat for spawning?
 - Measure utilization rates of spawning Chinook salmon and steelhead trout at the enhanced sites through redd counts
 - Compare redd number and density from the enhanced site to redd number and density in nearby unrestored habitat areas
 - Compare proportion of spawning in the restored area versus the entire watershed before and after project

Comment [UF&WS2]: Unrestored areas are 6+ feet deep with armored bottom.

H₅: Gravel augmentation increases juvenile presence at the enhanced site

- Measure utilization rates of juvenile Chinook salmon and steelhead trout at the enhanced sites through snorkel surveys

Comment [UF&WS3]: These were already done by (b)(13)

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- Compare abundance of juveniles from the enhanced site to abundance nearby unrestored habitat areas
- Compare abundance of juveniles in the restored area before and after project

IV. Gravel outlook and plan update

The current gravel outlook is promising for meeting RPA requirements in a timely manner. Specifically, funding and permits for two projects to place 12,000 cubic yards of gravel have been identified to take place by 2012. Two projects in particular (Lover's Leap and Two-mile bar) have enough gravel that could be processed on-site to meet the entire RPA gravel requirement. A significant amount of spawning gravel from Lover's Leap can be placed in-river, but also has the potential to be source material for placement at other locations (e.g., Goodwin Canyon, Horeshoe Recreational Area, pending SMARA and site-specific permits). USBR will make considerable efforts to identify funds, initiate permitting for potential projects and work towards reducing the impediments identified for specific projects in Table 1.

An annual update on progress-to-date on meeting RPA III.2.1 goals will be provided to the Stanislaus Operations Group (SOG) by May of each year. USBR will work with USFWS, CDFG, and NMFS to update project schedules and identify future project goals and funding. Modifications to this plan will be articulated at monthly SOG meetings as necessary.

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Figure 1. Map of Stanislaus River with locations of proposed gravel augmentation projects

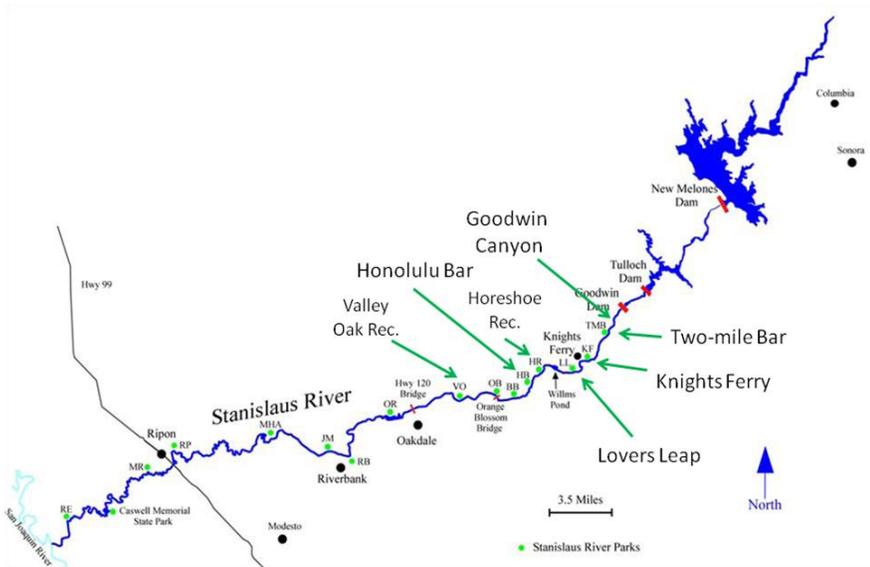


Table 1: Proposed and potential project summaries**Proposed projects**

Project	Permits status	Anticipated gravel ^a	Access	Project cost	Funding status	Timeline summer	Action (NMFS BO)
Honolulu Bar	Permitted	8,000	Accessible	\$65,000 in FY11	Funded AFRP and (b)(13)	2011	Action III.2.1 & Action III.2.2
Goodwin Canyon @ cable crossing	Renewal potential	4,000	Steep access	\$170,000	Funded (b)(13)	2011/2012	Action III.2.1
Goodwin Canyon @ float tube pool	Renewal potential	2,000	Gravel pump from road	\$250,000	Not identified	2012	Action III.2.1
Lover's Leap	Initiated/potential SMARA	80,000 ^b	Accessible	\$1,000,000	Initial permit process funded	2013	Action III.2.1 & Action III.2.2

Potential projects

Project	Permit	Anticipated gravel ^a	Access	Project cost	Landowner	Impediment	Action
Knights Ferry (upper)	Permits exist for adjacent reach	6,000	Accessible with work	\$300,000	Not sure if it's all Corps	Lack of community support and access improvement	Action III.2.1
Two Mile Bar	Not permitted	>20,000 ^b	Accessible	\$1,000,000	Private	Cost of mineral rights, access over private land	Action III.2.1
Horeshoe Recreation Area	Not permitted	6,000	Accessible	\$280,000	US Army Corps	Moderately accessible	Action III.2.1
Vally Oak Recreation Area	Not permitted	3,000	Accessible	\$150,000	US Army Corps	Downstream area receives less spawning use	Action III.2.1
Goodwin Canyon @RM~57	Renewal potential	7,000	Steep access	\$450,000		Steep access	Action III.2.1

Note: cost estimates include permitting but not monitoring. ^acubic yards; ^bestimated amount available on perched floodplain

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Table 2. Potential project monitoring efforts and priority to project(s)

	Monitoring and Science Tasks	Purpose			Import	Freq	Durat'n	Cost/ Effort
		PE	LTP	AM				
P h y s i c a l	Topographic surveys at project site	x			H	M	1yr	M
	Intragravel conditions- measure DO, temp, gravel permeability	x			H	H	1yr	M
	Substrate size and condition	x			H	H	1yr	L
	Gravel mobility surveys- scour chain, tracer rocks	x	x		H	M	>5yrs	L
	Water quality	x	x	x	H	H	1yr	L
B i o l o g i c a l	Spawning surveys	x	x	x	H	H	1-3 yrs	H
	Fish community use		x		M	M	1-3 yrs	M
	Juvenile rearing surveys	x	x	x	H	H	1-3 yrs	M
	Macro-invertebrate surveys	x			M	M	1-3 yrs	H
	Survivorship and growth rates of eggs and fry relative to intra gravel conditions and substrate size	x	x	x	M	L	1 yr	M
	Survivorship, growth rate, and condition of emerging fry	x	x	x	M	L	1-5 yrs	H
	Biological response to project features		x	x	M	M	1yr	L
	Habitat suitability modeling for fish and macro-invertebrates	x			M	M	1yr	M
Juvenile rearing energetics		x	x				M	

Comment [RB4]: JD recommended from H to M

Comment [RB5]: JD recommended from H to L

Comment [RB6]: JD recommended change from H to M

Comment [RB7]: JD recommended from H to L

Note: Project effectiveness monitoring (PE), (2) Long term planning (LTP), and (3) Adaptive management (AM)