

Water Temperature Monitoring in the San Joaquin River Restoration Area

2013 Summary and Available Data

Prepared by:

Brian Mahardja, Environmental Scientist
California Department of Fish and Wildlife
San Joaquin River Restoration Program
brian.mahardja@wildlife.ca.gov

Principal Investigator:

Erica M. Meyers, Environmental Scientist
California Department of Fish and Wildlife
San Joaquin River Restoration Program
erica.meyers@wildlife.ca.gov

Introduction

The California Department of Fish and Wildlife (CDFW) began the collection of water temperature data for the San Joaquin River Restoration Program (SJRRP) during the fall of 2009. Thermographs are installed at various sites throughout the Restoration Area to measure and record temperature in the mainstem San Joaquin River and nearby tributaries. This report summarizes the latest water temperature data collected for the 2013 water year and on.

Methods

CDFW currently maintains, operates, and manages data from 51 temperature monitoring sites in the Restoration Area. An additional 7 monitoring sites in the Restoration Area are maintained by consultants due to site access restrictions. HOB0® U22 Water Temp Pro v2 thermographs are used to record hourly water temperature at various locations in the Restoration Area. Temperature data acquired from this process may be used to evaluate the instream temperature suitability for different Chinook salmon life stages, such as adult migration, holding, spawning, and juvenile rearing habitat [available in SJRRP (2010)]. A map of temperature monitoring locations is provided in **Figure 1**.

Thermographs are deployed, managed, and calibrated as described in *San Joaquin River Restoration Program Stream Temperature Monitoring Study Standard Operating Procedures* (CDFW 2013). Field personnel download data from most thermographs monthly or quarterly, depending on the site, when river conditions and staff availability allow. This frequency allows identification and remedy of any problems, such as malfunctioning equipment or missing/vandalized thermographs. Certain thermographs, particularly in the lower reaches of the river, are only accessible under certain river conditions and may be downloaded less frequently.

Data management procedures are designed promote data integrity and validity. Thermograph data is managed with a database equipped with a Quality Assurance/Quality Control (QA/QC) utility that flags any data points that appear questionable when compared to adjacent points or historical monthly averages. Based on knowledge of river conditions and professional judgment of CDFW staff, flagged points are then either accepted or nullified and removed from the dataset. Accepted data remain flagged in the final dataset, and original data are retained for review. **Table 1** provides further information on the different QA/QC flags.

Available Data

Data is available for nearly all sites for the 2013 water year, although certain data gaps exist. Missing data mainly resulted from vandalism or equipment malfunction. Description of monitoring site locations and extent of available data can be found in **Table 2**. Hourly temperature data for each monitoring location are available as an attachment to this report.

Reporting

The final 2013 Annual Report for this study is in development and will include analysis of temperature data in the Restoration Area and comparisons to temperature targets for different life stages of Chinook salmon. As such, data provided in this report should be considered preliminary and subject to revision. The complete 2013 Annual Report is expected to be made available in March 2014.

References

California Data Exchange Center; <http://cdec.water.ca.gov>

CDFW (California Department of Fish and Wildlife). 2013. San Joaquin River Restoration Program Stream Temperature Monitoring Study Standard Operating Procedures (SOPs). Version 1.0, March, 2013. 57 pages.

SJRRP (San Joaquin River Restoration Program). 2010. Fisheries Management Plan: A framework for adaptive management in the San Joaquin River Restoration Program. Exhibit A, Conceptual Models of Stressors and Limiting Factors for San Joaquin River Chinook Salmon.

Table 1: QA/QC Flag Interpretation

Code	Comments
1	Thermograph out of water during field collection
10	Value was flagged because its difference from previous or following values was greater than a specified tolerance.
100	Value was flagged because its difference from mean monthly stream temperatures was greater than a specified tolerance.
1000	Value was flagged because its difference from mean monthly stream temperatures was greater than a specified percent.

Table 2: SJRRP Temperature Monitoring Sites and 2013 Data Availability

Site ID	Site Name	Site Type	River			Database Period of Record		Notes about 2013 Data
			Mile	Latitude	Longitude	Begin Date	End Date	
SJRFP	SJR Friant Pool	Stream	267.2	36.9970	-119.7079	7/26/2007	1/21/2014	
SJRCC	SJR Cottonwood Creek	Stream	267.0	36.9976	-119.7076	12/15/2009	1/21/2014	Thermograph out of water 7/10/2013 - 7/25/2013
SJRFB	SJR Friant Bridge	Stream	266.6	36.9900	-119.7150	5/24/2002	1/21/2014	
SJRLL	SJR Lost Lake	Stream	264.7	36.9690	-119.7404	4/30/2002	1/21/2014	
SJRBRB	SJR Ball Ranch Bridge	Stream	262.2	36.9442	-119.7388	3/16/2010	1/21/2014	
SJRWU	SJR Willow Unit	Stream	260.9	36.9290	-119.7510	7/2/2007	1/21/2014	
SJR RB	SJR River Bend	Stream	259.5	36.9198	-119.7593	8/13/2008	1/22/2014	
SJRRI	SJR Rank Island	Stream	259.5	36.9170	-119.7558	8/13/2008	1/22/2014	
SJRV2	SJR Vulcan	Stream	258.0	36.9101	-119.7747	9/29/2009	1/21/2014	
SJRSC	SJR Sportsman Club	Stream	256.4	36.8907	-119.7883	5/29/2002	1/22/2014	
SJRGPA1	SJR Gravel Pit A1	Gravel Pit, Surface	254.1	36.8662	-119.8029	8/29/2011	1/27/2014	Data lost 6/20/2013 - 8/29/2013 due to vandalism
SJRGPA2	SJR Gravel Pit A2	Gravel Pit, Depth	254.1	36.8662	-119.8029	8/29/2011	1/27/2014	
SJRGPB1	SJR Gravel Pit B1	Gravel Pit, Surface	254.1	36.8670	-119.8076	8/29/2011	1/27/2014	
SJRGPB2	SJR Gravel Pit B2	Gravel Pit, Depth	254.1	36.8670	-119.8076	8/29/2011	1/27/2014	
SJRGPAB	SJR Gravel Pit AB	Stream	254.0	36.8654	-119.8072	8/29/2011	1/27/2014	
SJRGPC1	SJR Gravel Pit C1	Gravel Pit, Surface	253.5	36.8614	-119.8122	8/30/2011	1/27/2014	
SJRGPC2	SJR Gravel Pit C2	Gravel Pit, Depth	253.5	36.8614	-119.8122	1/5/2012	1/27/2014	
SJRGPCD	SJR Gravel Pit CD	Gravel Pit	253.5	36.8613	-119.8099	10/11/2011	8/29/2013	Possible vandalism. Another field collection to be attempted in February-March 2014.
SJRGPD1	SJR Gravel Pit D1	Gravel Pit, Surface	253.5	36.8609	-119.8082	9/19/2012	1/27/2014	
SJRGPD2	SJR Gravel Pit D2	Gravel Pit, Depth	253.5	36.8609	-119.8082	9/19/2012	1/27/2014	
SJRGPE1	SJR Gravel Pit E1	Gravel Pit, Surface	253.2	36.8557	-119.8073	8/29/2011	1/27/2014	
SJRGPE2	SJR Gravel Pit E2	Gravel Pit, Depth	253.2	36.8557	-119.8073	8/29/2011	1/27/2014	

			<i>River</i>			<i>Database Period of Record</i>		
<i>Site ID</i>	<i>Site Name</i>	<i>Site Type</i>	<i>Mile</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Begin Date</i>	<i>End Date</i>	<i>Notes about 2013 Data</i>
SJRGPE	SJR Gravel Pit DE	Stream	253.1	36.8575	-119.8078	10/11/2011	1/27/2014	
SJRGPF-US1	SJR Gravel Pit F-upstream 1	Gravel Pit, Surface	252.5	36.8507	-119.8182	8/29/2011	1/27/2014	Data lost 7/16/12-12/19/12 due to vandalism
SJRGPF-US2	SJR Gravel Pit F-upstream 2	Gravel Pit, Depth	252.5	36.8507	-119.8182	8/29/2011	1/27/2014	Data lost 7/16/12-12/19/12 due to vandalism
SJRGPF Outlet	SJR Gravel Pit F River Outlet	Stream	252.4	36.8490	-119.8211	9/29/2012	1/27/2014	
SJRGPF-DS1	SJR Gravel Pit F-downstream 1	Gravel Pit, Surface	252.4	36.8506	-119.8211	1/5/2012	1/27/2014	
SJRGPF-DS2	SJR Gravel Pit F-downstream 2	Gravel Pit, Depth	252.4	36.8506	-119.8211	1/6/2012	1/27/2014	
SJRSIDS	SJR Downstream Sycamore Island	Stream	251	36.8550	-119.8365	9/19/2012	8/29/2013	Possible vandalism. Another field collection to be attempted in February-March 2014.
SJRSCI	SJR Scout Island	Stream	249.9	36.8583	-119.8387	7/20/2010	10/30/2013	
SJRMU	SJR Milburn Unit	Stream	247.5	36.8568	-119.8795	6/7/2007	1/22/2014	
SJRSP	SJR Skaggs Park	Stream	234.0	36.8215	-120.0605	10/6/2010	1/22/2014	Suspected out of water 7/19/2013 - 9/20/2013
SJRGF	SJR Gravely Ford	Stream	231.2	36.8174	-120.0964	5/20/2008	1/22/2014	
SJRTHOMAS	SJR Thomas	Stream	229.1	36.8093	-120.1360	4/10/2012	1/10/2014	Thermograph out of water or tampered with between 10/5/2013-10/18/2013
SJRDSALISO	SJR Aliso Canal	Stream	222.1	36.7865	-120.2214	4/17/2012	1/10/2014	
SJRDSBIFUR	SJR Downstream of Bifurcation	Stream	215.7	36.7734	-120.2835	4/10/2012	1/10/2014	
SJRSM	SJR San Mateo	Stream	211.9	36.7815	-120.3119	4/19/2011	1/23/2014	Data lost 6/11/2013-1/23/2014 due to vandalism
MWA	Mendota Wildlife Area (Fresno Slough)	Slough	NA	36.7327	-120.3428	6/16/2011	1/23/2014	
SJRDSM	SJR Downstream Mendota	Stream	203.5	36.8105	-120.3692	10/3/2011	6/14/2012	Possible vandalism. Another field collection to be attempted in February-March 2014.
CBAVE12	Chowchilla Bypass @ Ave 12	Bypass	NA	36.8720	-120.3185	10/13/2011	12/22/2011	No data for water year 2013 (No Flood Release)
CBAVE14	Chowchilla Bypass @ Ave 14	Bypass	NA	36.9525	-120.3506	10/13/2011	12/22/2011	No data for water year 2013 (No Flood Release)
SJRFIRE	SJR at Firebaugh Bridge	Stream	195.1	36.8581	-120.4491	4/10/2012	1/9/2014	
SJRUSHWY152	SJR Highway 152	Stream	174.0	37.0552	-120.5482	4/19/2012	1/9/2014	No data for water year 2013 (No Sufficient Flow)
ESB	Eastside Bypass	Bypass	NA	37.2057	-120.6980	4/15/2011	10/13/2011	No data for water year 2013 (No Flood Release)
ESBWB	Eastside Bypass at Washington Bridge	Bypass	NA	37.1133	-120.5625	1/20/2012	9/7/2012	No data for water year 2013 (No Flood Release)
SJRSS	SJR Sand Slough Control Structure	Stream	168.3	37.1134	-120.5877	3/26/2009	9/7/2012	No data for water year 2013 (No Flood Release)
MB	Mariposa Bypass	Bypass	NA	37.2019	-120.7057	4/15/2011	9/7/2012	No data for water year 2013 (No Flood Release)
SJRUSCBC	Bear Creek Confluence	Stream	136.4	37.2750	-120.8276	4/17/2012	1/9/2014	
BCCSJR	Bear Creek	Stream	NA	37.2779	-120.8241	4/17/2012	1/9/2014	

			<i>River</i>			<i>Database Period of Record</i>		
<i>Site ID</i>	<i>Site Name</i>	<i>Site Type</i>	<i>Mile</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Begin Date</i>	<i>End Date</i>	<i>Notes about 2013 Data</i>
SJRSTV	SJR Stevenson Bridge	Stream	132.8	37.2954	-120.8513	7/31/2008	12/20/2012	Data lost 12/20/2012 - 1/23/2013 due to multiple vandalism events
SJRASALT	SJR Above Salt	Stream	131.0	37.2947	-120.8948	3/2/2012	4/8/2013	Inaccessible during January 2014 collection due to insufficient flow. Another field collection to be attempted in February-March 2014.
SALTS	Salt Slough	Slough	NA	37.2940	-120.8988	7/13/2009	4/8/2013	Inaccessible during January 2014 collection due to insufficient flow. Another field collection to be attempted in February-March 2014.
SJRBSALT	SJR Below Salt Slough	Stream	130.0	37.2941	-120.8988	7/18/2011	4/8/2013	Inaccessible during January 2014 collection due to insufficient flow. Another field collection to be attempted in February-March 2014.
SJRFFB	Ford Fremont Bridge	Stream	127.0	37.3185	-120.9349	10/25/2010	4/10/2013	Inaccessible during January 2014 collection due to insufficient flow. Another field collection to be attempted in February-March 2014.
SJRAMUD	Above Mud Slough	Stream	125.0	37.3316	-120.9498	7/25/2011	1/7/2013	Inaccessible during January 2014 collection due to insufficient flow. Another field collection to be attempted in February-March 2014.
MUDSL	Mud Slough	Slough	NA	37.2940	-120.8988	7/25/2011	4/10/2013	Inaccessible during January 2014 collection due to insufficient flow. Another field collection to be attempted in February-March 2014.
SJRNW	SJR Newman Wasteway	Stream	121.0	37.3339	-120.9526	9/3/2008	4/10/2013	Inaccessible during January 2014 collection due to insufficient flow. Another field collection to be attempted in February-March 2014.
SJRHF	SJR Hills Ferry	Stream	118.5	37.3470	-120.9761	4/28/2009	3/14/2013	2013 data to be collected February 2014

