SYRCL SOUTH YUBA RIVER CITIZENS LEAGUE
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March 13, 2009

Daniel McClure
Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, Suite 100
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Via Email submission; Hardcopy if requested.

Re: Proposed 303(d) listing for the South Yuba River

Dear Mr. McClure

The South Yuba River Citizens League (SYRCL) appreciates your work in developing the proposed listing of the South Yuba River as temperature impaired. In advance of the Central Valley Region Water Quality Control Board's meeting to decide upon final listings, I am submitting comments and information pertaining to the temperature conditions in the South Yuba River.

SYRCL is a 501(c)(3) community organization with the mission of protecting and restoring the Yuba River and greater Yuba watershed. SYRCL members reside along and recreate in the South Yuba River. SYRCL requests status as a designated party of this proceeding.

I have reviewed the relevant fact sheet and integrated report sections supporting the proposed listing of the South Yuba River as temperature impaired. The following comments fall into three categories:

1) Large amounts of data from continuously recording thermographs in the South Yuba River are available and support the proposed listing but are not referred to in the fact sheet.
2) The available data supports a determination of the South Yuba as temperature impaired in reference to a variety of temperature criteria, not just the Basin Plan and EPA Region 10.
3) Two significant causes of temperature impairment for the South Yuba River are known.

1. Additional data supports temperature impairment determination for the South Yuba River.

a) The Upper Yuba River Studies Program (UYRSP) commissioned the collection and analysis of temperature data at up to ten stations in the South Yuba River in 2003, 2004,

and 2005 by CH2MHill (Figures 1 and 2). Results of that work are published in a 2006 Habitat Assessment Report available from the California Department of Water Resources (http://www.watershedrestoration.water.ca.gov/fishpassage/projects/upperyuba.cfm). The UYRSP exists for the purpose of assessing the feasibility of restoring access to the South and Middle Yuba for salmon and steelhead. The large public expense of this program represents the value of the South and Middle Yuba as a restoration opportunity for these anadromous species listed as threatened with extinction. As a stakeholder in the UYRSP, SYRCL had received the temperature data files from this monitoring and provided these to Regional Water Board staff in 2008.

b) During the spring, summer and fall of 2007 and 2008, SYRCL used continuous recording thermographs to monitor temperature at six stations in the South Yuba River. These data were supplied to Regional Water Board staff in November 2008.

The data available from these two sources provides additional support to the determination of the South Yuba as temperature impaired. Resident *Oncorhynchus mykiss* (rainbow trout/steelhead) persist in the South Yuba despite a severe limitation to their productivity due to elevated water temperature. As Figures 2 and 3 depict, most stations in the South Yuba River measured daily average temperature above lethal limits for O. mykiss during summer. While it may be impossible to cool the overall length of the South Yuba River, it is of critical importance in restoring a healthy population of O. mykiss (or other salmonid populations) to reduce temperature in the upper reaches below Spaulding Dam. Releases from Spaulding Dam only exceed the minimum flow level of 5 cfs when the dam is spilling in winter or spring. Figures 2 and 3 show that while temperatures are cool at Langs Crossing (less than 1 mile below Spaulding), temperatures only 8 miles downstream have increased during spring and summer months to levels causing stress for spawning or migrating O. mykiss.

Figure 1: Clipped image of map of thermograph locations in the South Yuba River for the Upper Yuba River Studies Program.

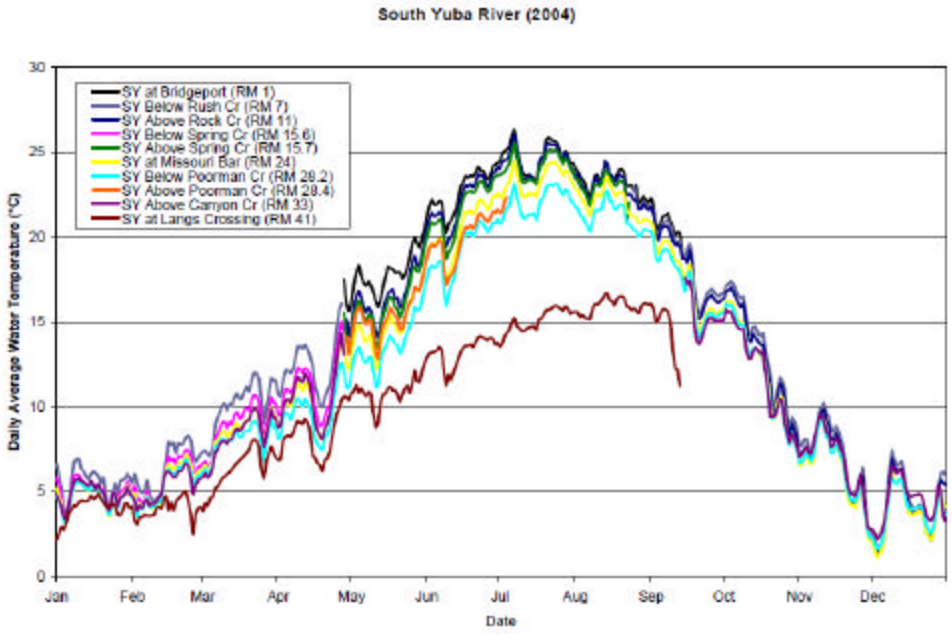

Figure 2: Thermograph chart from the Upper Yuba River Studies Program data in 2004.

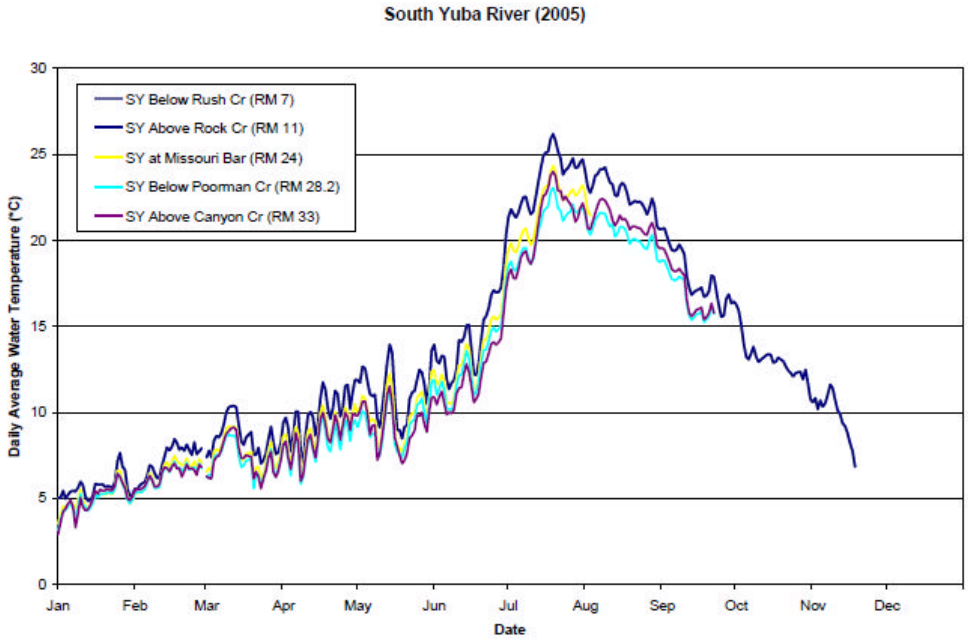

Figure 3: Thermograph chart from the Upper Yuba River Studies Program data in 2005. Langs Crossing temperature data was lost in 2005.

2. Impairment supported by alternative criteria

Available data supports the claim that the South Yuba is temperature impaired according to many reasonable criteria. As mentioned above, the native rainbow trout population of the South Yuba River is depressed due to high water temperatures in spring and summer

despite the availability of otherwise high-quality habitat in the reaches below Canyon Creek (RM 33). Higher reaches near Langs Crossing (RM 41)are predominantly bedrock and extremely high gradient. Existing populations persist somehow despite severe temperature limitation, possibly due to limited temperature refugia or recolonization from tributaries. Cooler water temperatures in spring and early summer would greatly enhance the native trout population by providing more successful spawning, higher growth rates and reduced stress over-summer rearing.

Table 1 summarizes a variety of temperature criteria for O. mykiss, all of which are exceeded in the South Yuba River. Standard EPA temperature thresholds are 19 ^{o}C (maximum weekly average) and 24 ^{o}C (acute threshold) (Brungs and Jones 1977). Sullivan et al. (2000) reviewed temperature criteria for salmon and steelhead and developed a model for assessing risk of growth loss and suggest that more appropriate criteria for O. mykiss may be 18 ^{o}C and 21 ^{o}C, respectively.

Table 1: Excerpted table from UYRSP (Habitat Report Technical Appendix B) summarizing temperature tolerance by life stage for Oncorhynchus mykiss.

Life Stage	Water Temperature °C (°F)	Descriptor	Source	Notes
Upstream Migration	7.8–11.1°C (46–52°F)	Preferred	NMFS (2000), McEwan and Jackson (1996)	Central Valley winter-run steelhead
	>21°C (>70°F)	Stressful	Lantz (1971), as cited in Beschta et al. (1987)	Columbia River steelhead
Adult Holding (freshwater residence)	10–15°C (50–59°F)	Preferred	Moyle et al. (1995)	California summer steelhead
	>16.1°C (>61°F)	Chronic high stress	USFWS (1995)	Central Valley winter-run steelhead
	23–24°C (73–75°F)	Lethal	Moyle (2002)	run or location not specified
Spawning	3.9–11.1°C (39–52°F)	Preferred	McEwan and Jackson (1996), IEP Steelhead Project Work Team (no date)	Central Valley winter-run steelhead
	7.2–10°C (45–50°F)	Optimum	FERC (1993)	Based on undocumented literature review
	20°C (68°F)	Stressful	FERC (1993)	Based on undocumented literature review
	>22°C (>72°F)	Lethal	FERC (1993)	Based on undocumented literature review
Incubation (eggs)	8.9–11.1°C (48–52°F)	Optimum/preferred	NMFS (2000), McEwan and Jackson (1996), FERC (1993), Bell (1986)	Bell (1986) gives 50°F as preferred
	>12.8°C (>55°F)	Stressful	FERC (1993)	Based on undocumented literature review
	>15°C (>59°F)	Lethal	Myrick and Cech (2001)	

Other native species would also benefit from a lowering of temperature in at some reaches of the South Yuba River. Compared to O. mykiss, even lower thresholds of impact apply to California red-legged frog (*Rana aurora draytonii*), a federal Threatened species known to inhabit the South Yuba. The northern red-legged frog has the lowest upper (21^{o}C) and lower (4^{o}C) lethal embryonic temperatures of any North American ranid frog (Licht 1971).

Excessive algae in the South Yuba River has been noted in formal documents (PG&E 2008) and in the local press (http://www.theunion.com/article/20080911/NEWS/109119973/1062&parentprofile=1053). Algal growth is sensitive to water temperature and excessive algae threatens river health with low levels of nighttime dissolved oxygen and pH.

3. The obvious causes of temperature impairment are legacy effects of mining-era disturbance and the massive diversion at Spaulding Dam.

The South Yuba River watershed includes sites of the first and most intensive hydraulic mining activity anywhere. Extensive and large mining operations from 1853 until the 1930's exerted catastrophic impacts on the river channel, riparian areas and tributary streams. This legacy of the South Yuba River has certainly affected the channel features, riparian shading, among other possible factors known to influence stream water temperature. Comprehensive assessment and planning could address some of these legacy effects and lead to partial restoration of conditions supporting cooler water temperatures.

The South Yuba River watershed also includes the oldest large dam in California. Spaulding Dam was originally constructed in the 1870s and raised to 275' in 1913. Spaulding is diverts more than 400,000 acre feet from the South Yuba Watershed including water previously diverted from the Middle Yuba River through the Milton-Bowman, then Bowman-Spaulding conduits. Figure 4 illustrates the fate of upper South Yuba water (not accounting for Middle Yuba water) at Spaulding Dam. Note that an extremely small amount of the watershed yield is passed downstream of the reservoir.

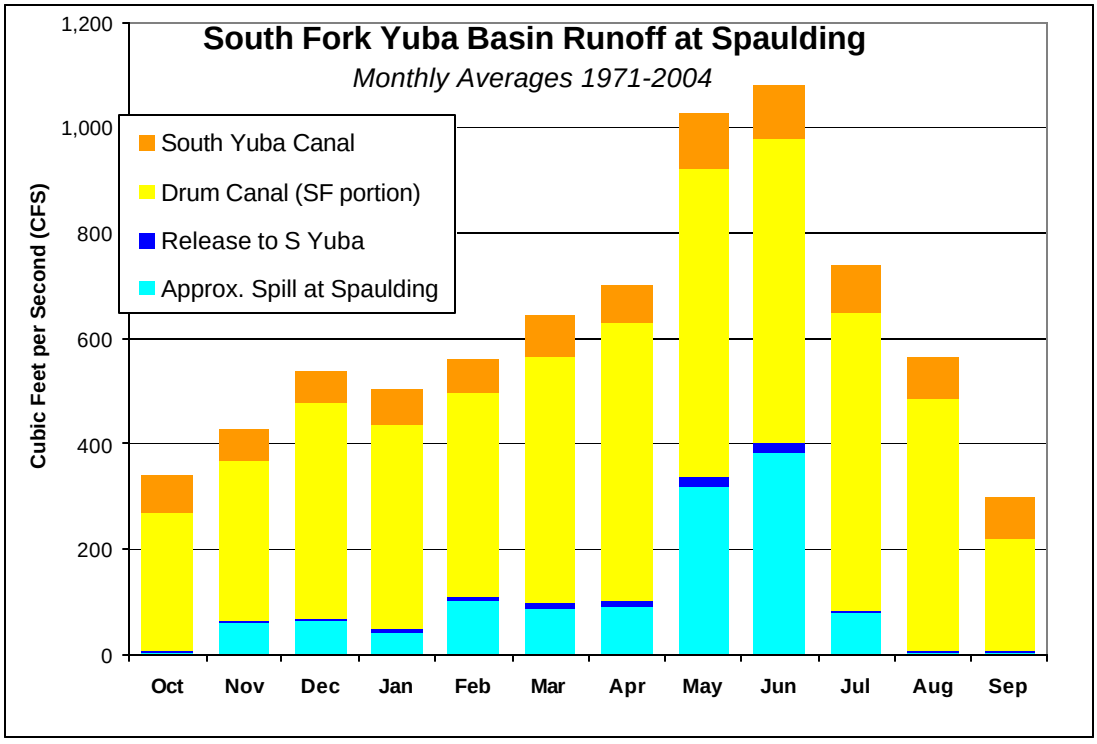

Figure 4: Relative proportions of upper South Yuba River watershed yield passed downstream as release or spill, or diverted into the Drum or South Yuba canals.

Hydrologic data and other relevant information on the operation of Spaulding Dam and associated diversions can be found in PG&E's Pre-Application Document to FERC (PG&E 2008). The UYRSP Habitat Report (5.1.3) conducted some preliminary analysis of how changes in the operation of Spaulding could cool the South Yuba River:

"The Study Team does acknowledge that changes in the boundary conditions could affect water temperatures in the South Yuba River between Langs Crossing (RM 41) and Poorman Creek (TM 28); thus affecting the extent of thermally suitable habitat for spring-run Chinook salmon and steelhead in this reach".

Human activities have contributed to excessively rapid and severe warming of the South Yuba River. Modified river management and actions developed from assessment and conservation plans would enhance river temperatures to better support native biota.

Thank you for considering these comments. If you have any questions or require clarification, please contact me.

Gary Reedy, River Science Program Director

Citations:

Brungs and Jones. 1977. Temperature criteria for freshwater fish: protocol and procedures. Ecological Research Series., U.S. Environmental Protection Agency, EPA-600/3-77-061. 130 pp.

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McCullough, D. 1999 . A Review and Synthesis of Effects of Alterations to the Water Temperature Regime on Freshwater Life Stages of Salmonids, with Special Reference to Chinook Salmon. Columbia Intertribal Fisheries Commission, Portland, OR. Prepared for the U.S. Environmental Protection Agency Region 10. Published as EPA 910-R-99-010.

Sullivan, K., D.J. Martin, R.D. Cardwell, J.E. Toll, and S. Duke. 2000. An analysis of the effects of temperature on salmonids of the Pacific Northwest with implications for selecting temperature criteria. Sustainable Ecosystems Institute. Portland, OR. 192 pp.

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Pacific Gas and Electric Company. April 2008. Relicensing Pre-Application Document for Drum Spaulding Project (FERC No. 2310). Available at http://www.eurekasw.com/DS/FERC Filings/FERC Filings by PGandE

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Upper Yuba River Studies Program Team. June 2006. Upper Yuba River Watershed Chinook Salmon and Steelhead Habitat Assessment – Technical Report. Prepared for the Department of Water Resources.