October 21, 2009

To: Bruk Moges – LADWP
111 North Hope St – Room 1468
Los Angeles, CA 90012

From: Ross N. Taylor
Ross Taylor and Associates
1254 Quail Run Court
McKinleyville, CA 95519

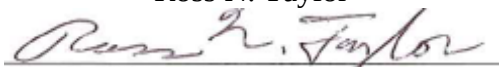
Bruk:

Attached to this letter is a memo from Thomas R. Payne and Associates (TRPA), the independent third-party who reviewed the water temperature model developed for Rush Creek by the Mono Basin Fisheries Scientists. We selected TRPA to perform this review because of their extensive use of the model and the fact that TRPA was the firm that modified the original USGS DOS-based model (SNTEMP) into a more user-friendly Windows-based program. We obtained the Windows-based version (called StreamTemp) from TRPA for developing the Rush Creek model.

Don Bremm at TRPA conducted an initial review of the Rush Creek StreamTemp model as constructed by Brad Shepard of the Fisheries Team. Mr. Bremm then worked closely with Brad to strengthen the model based on several suggestions that resulted from the initial review.

I believe a thorough review of the StreamTemp model was necessary before we used the model to assist us in evaluating summer baseflows in Rush Creek as part of the Synthesis Report. I also hope this third-party review provides assurances to LADWP, the Water Board, and stakeholders that the Rush Creek StreamTemp model was constructed as well as possible with the available data and is performing adequately as an evaluation tool.

Sincerely,
Ross N. Taylor



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MEMORANDUM

October 14, 2009

To: Ross N. Taylor
Ross Taylor and Associates
1254 Quail Run Court
McKinleyville, CA 95519

From: Donald J. Bremm
Senior Fisheries Biologist

RE: StreamTemp Model for Rush Creek

Background:

At the request of Ross Taylor of Ross Taylor and Associates on behalf of LADWP, Donald Bremm of Thomas R Payne & Associates was asked to conduct a review of the Rush Creek StreamTemp model as constructed by Brad Shepard of B. B. Shepard and Associates. This assessment was to include the review of the model construction and checking the adequacy of the existing model calibration. If found necessary, additional assistance was to be given in recommending changes that would strengthen the model's temperature prediction capability.

Rush Creek Temperature Model Review:

The first impression when reviewing this temperature model was the extensive effort that was obviously expended for the collection of the model's input data, the careful and thorough model construction, and the adequate model calibration. Although not perfect and no model ever is, the data gaps that weaken this model are not serious enough to hamper the model's prediction capabilities. These data gaps occur primarily in the stream geometry and flow and in the meteorology.

The dynamic nature of the lower stream channel likely results in changing width-to-flow relationships. Because portions of the channel received little or no flows seasonally for more than fifty years, with additional stream flows now being released from Grant Reservoir, the channel is still trying to reach equilibrium. Until such time, no model will be able to fully predict an accurate width-to-flow ratio. Because the channel is fairly well confined within the range of flows of interest, there is minimal change in width with a change in flow.

The lack of synoptic flow data to assess flow losses and gains along the length of the mainstem and the two modeled tributaries is a problem common to most stream temperature models – more data is usually better, but certainly this model has sufficient information to give satisfactory results.

There is often difficulty in obtaining good solar radiation or cloud cover information at locations near to the site with most temperature models and this is no exception. Although the SNTEMP model was originally constructed requiring cloud cover, this information is now rarely collected at most meteorological sites. A surrogate for cloud cover was derived by Brad Shepard from the locally available mean daily solar radiation and used in the Rush Creek model with satisfactory results.

Shepard calibrated the 2008 data set by changing the wind speeds coefficients within each segment of stream in a reasonable manner (faster in canyons, slower in open plain, etc...). He then applied these same modifications to the other years of data (2000, 2001, 2006) as validation checks of the original calibration. The quality control parameters from the resulting simulations are within the bounds for a "satisfactory" calibration. As such, this model as constructed should perform adequately to predict stream temperatures for gaming scenarios (multiple flow releases under different temperature releases, under different climate conditions).

I have concluded that the Rush Creek StreamTemp model as constructed by Brad Shepard is adequately constructed and calibrated with all the available data. The calibrated model was tested under different climatological and hydrological years. As such, the model should serve as an adequate prediction tool for gaming resulting downstream temperatures under a range of different mid-year weather scenarios and flow releases to provide optimal thermal and flow conditions for brown trout during the summer.