

March 23, 2015

Peter Barnes, Engineering Geologist  
State Water Resources Control Board (Board)  
Water Quality Certification Program  
P.O. Box 2000  
Sacramento, CA 95812-2000

Dear Mr. Barnes,

My wife and I are residents of the Lake Almanor Peninsula and wish to express our strongest opposition to the State's plan of action for Lake Almanor put forth in the DEIR for the Water Quality Certification of PG&E's Upper North Fork Feather River Hydroelectric FERC Project 2105 (NFFR).

Our key objections are based upon the following:

**A. The Board's Staff Recommendations Rely on Experimental Methods to Achieve Hypothetical Results that appear to us to have a low probability of success.**

1. We do not support the removal of cold water from Lake Almanor under any plan to hypothetically lower river water temperatures by tiny amounts 40 miles downstream of Lake Almanor. The plans are hypothetical experiments with a natural system that has and will change its baseline conditions beyond those assumed in analytical models performed many years ago by Stetson Engineers (2009). The State Department of Water Resources recognizes global warming and as such a reduction of 1-2 degrees C will be difficult to impossible to achieve in the future under such an experiment, particularly in one of the hottest canyons in California during the summer. It does not appear that the analytical modeling by Stetson Engineers (2009) included this scenario. Also, the modeling by Stetson used a mere 33 year record of data but physical historical evidence over longer periods of time indicate that even the last 150 year history of climate conditions in California may not be representative of the future. (Ingram, 2013)
2. Whereas the planned results for the river below the NFFR are hypothetical, the negative impact on Lake Almanor's fisheries has a high likelihood since measured temperatures and oxygen levels within our lake have been trending adversely for several years. Added removal of the coldest lake (hypolimnion) waters can only make fishery conditions worse.

Even the DEIR refers to "a recent finding by Schneider et al. (2009) that the nighttime lake surface temperature appears to be warming at about  $0.15 \pm 0.03^{\circ}\text{C}$  per year since 1992." Over the past 20 years (and likely

over the next twenty years) that implies an increase of 3°C in each time segment. Granted, this would primarily have a direct, adverse effect on the warm water habitat within the epilimnion waters (the lake water in the upper surfaces above the thermocline layer). But one has to ask, however, if future temperature increases of 3-6°C in these waters during the months of June, July and August would have an adverse affect on warm water habitat, such as small and large mouth bass, and on algae formation. This appears significant since 2000-2010 baseline upper water temperatures appear to average 22°C (see Figures 6.5-1a-1h in DEIR)

3. Coldwater habitat (e.g. rainbows and browns) reside in the deeper hypolimnion waters (those under both the epilimnion waters and the thermocline layer). These are the waters planned to be removed from the outlet gates (dam and Prattville). This removal would result in a deepening of the thermocline zone during outflows and in our opinion, the progressively increased warming of epilimnion and thermocline waters would progressively heat the upper cold fishery waters of the hypolimnion waters. The DEIR acknowledges the depression of the thermocline layer by saying "Increased withdrawals of cold, hypolimnetic water through use of a thermal curtain and the lower elevation gates on Canyon dam would cause the depth of the thermocline to increase by up to three feet during two to four weeks from July through August in normal and drier water years, compared with current conditions." Such a lowering causes a decreased volume of coldwater habitat volume depending on the "type of year" that occurs, ranging from "normal water years" to "critically dry water years" The DEIR estimates:

a) In a **normal water year**, "suitable" coldwater habitat volumes for about a two week period in mid-August when using Alternative 1 may reduce the suitable coldwater habitat volume by up to about 10,420 AF (**23.5 percent**), from about 44,400 AF to 33,980 AF; and

b) In a **critically dry water year**, the volume of the most "suitable" coldwater habitat (i.e., water equal to or less than 20°C with DO of 5 mg/L or more) would become **severely limited by mid-July** and **decline to zero** during much of August under Alternative 1. (emphasis added)

Considering the forecast of global warming and temperature trends noted by Schneider et al. (2009), it appears to us that future years could likely be multiple "critically dry water years".

The Board does offer a mitigation to the "temporary" decline of coldwater habitat by committing to annually stock coldwater fish under their assumption that the fall and winter cold weather will restore the hypolimnion and epilimnion to a healthy habitat state. But if critically dry water years occur for several years in a row and the coldwater habitat volume **declines annually to zero for a month**, the only coldwater fish in the lake may be fish stocked the prior fall which are very young in age and size with a complete loss of sizeable or trophy fish.

Of course the DEIR does not concern itself about the summer "decline to zero" of the "suitable" (defined as <20°C) coldwater habitat volume because it implies that the EXISTING coldwater fish will survive within the "marginal" (defined as <21°C) habitat volume, which also declines 37 percent but supposedly doesn't decline to zero during August.

**B. Mandates and Arguments Supporting that the Board Decisions Appear Contrived in Selective Areas**

1. The Lake Almanor community remains suspicious as to why and when and how the river reach from Belden to Lake Oroville was listed as "temperature impaired" Here are comments from Bill Dennison in regard to the origin of the whole plan: "Bob Orange, retired California Game Warden who served the NFFR area for more than 30 years answered a question posed by an earlier speaker, "Who first raised the question that the water temperature near the PG&E Rock Creek/Cresta is detrimental to the fisheries?" Apparently, this "idea" was presented by a California Department of Fish and Game employee. The Game Warden's Association and others rejected the "idea" that the river needed special attention. However, the IDEA continued to circulate and grow until it reached higher levels, where it did meet resistance. Joe Pedri (Central Valley Regional Water Quality Control Board) in a December 2005 letter stated "In conclusion, we do not support 303(d) temperature listing for the NF Feather River based on information we have referenced in the two page listing summary." The letter was sent to Joe Karkoski with a copy to Sharon Stohrer, SWRCB Division of Water Rights in Sacramento. This was mere weeks before DWR listed the river as temperature impaired."
2. The DEIR states that: "As part of the water quality certification process, the State Water Board is responsible for reviewing projects to ensure compliance with relevant water quality control plans, in this case the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* (Basin Plan) (Central Valley Regional Water Quality Control Board 2011)." Additionally the DEIR states: "The Basin Plan defines the water quality objectives applicable to the beneficial uses of Lake Almanor and the North Fork Feather River, which are identified in (DEIR) Table 2-2. In determining whether and under what conditions to issue a water quality certification for the UNFFR Project, the State Water Board must ensure compliance with these objectives".

The DEIR version of Table 2-2 of the Basin Plan lists water quality objectives (numerical objectives) for various Constituents of listed Beneficial Uses. One constituent is DO or Dissolved Oxygen. The DEIR lists the minimum parameters for DO as follows:

- Waters designated WARM 5.0 milligrams per liter (mg/l)
- Waters designated COLD 7.0 mg/l
- Waters designated SPWN 7.0 mg/l

DO values for rivers are determined differently than for lakes but the above values represent the minimums to be used in any evaluation. The DEIR uses the DO criteria of 5 percent mg/l for Lake Almanor in all evaluations including the analytical modeling

However, in reviewing the full revised 2011 version of the Basin Plan issued by the California Regional Water Quality Control Board for the Central Valley, their Table II-2 lists Lake Almanor as surface water body No. 32 and indicates it contains both a Warm and Cold Freshwater Habitat. For clarification when a water body contains both Habitats, the table provides footnote (2) as a guide for the Lake's final "water designation" for the DO criteria. Footnote (2) lists as follows:

- (2) Resident does not include anadromous.  
COLD and WARM beneficial use designations will be considered COLD

It appears to us that a DO criterion of 7 mg/l (instead of 5 mg/l) is more applicable for evaluations of conditions for Lake Almanor as a result of Table II-2 and footnote (2). It is

not clear from the DEIR why the Board used 5 mg/l in all their assumptions and analyses for Lake Almanor. Upon reviewing DEIR Figures 6.5-2a and 2b, existing data for DO shows DO measurements for the deeper hypolimnion waters of below 7 mg/l for July, September and November readings in most "water year types". Using this higher minimum criterion, we expect that "suitable" or "marginal" hypolimnion water volumes would decrease substantially more than calculated above (see A-3, a and b) for 5 mg/l AND for longer periods of time (possibly from late spring to late autumn). This would likely lead to the conclusion that a substantial impact to the coldwater habitat would occur and that annually planting fish would not be a viable mitigation as suggested in the DEIR. This could lead to a substantial impact to the economy of the Lake Almanor region.

3. As stated in A-4 above, it appears that under Alternate 1 the DEIR does not concern itself about the summer "decline to zero" of the "suitable" (defined as <20°C) coldwater habitat volume because it implies that the EXISTING coldwater fish will survive within the "marginal" (defined as <21°C) habitat volume, which also declines 37 percent but supposedly doesn't decline to zero during August.

What is the basis of changing the criterion from "<20°C" to "<21°C"? Is it what happens when one doesn't like the result produced by the first criterion?

**C. The DEIR Does Not Commit to Specific Criteria upon which the Steps of the Mitigations will be Judged by Interested and Affected Parties.**

1. We also do not support plans that do not publicly list metrics for the various decisions that must be made to advance the various steps in the planned experiments. Certainly PG&E needs to know the specific parameters of current baseline lake temperatures at the dam and current baseline river temperatures that will justify 250 cfs releases that have a high probability of achieving a specific target river temperature at the downstream point of interest. Why start lake releases if future, current baseline conditions have no chance of lowering river temperatures to below a specific target.
2. Publicly listed metrics that justify initiating construction of the thermal curtain should also be specified. Since the plans are experimental, PG&E, the affected County Supervisors and the Almanor area communities should be able to know specific metrics that justify each step of experiments that can adversely affect the area's lake fisheries, the economics of the community and local properties values.

In light of the information above, I strongly urge the board to reject the DEIR recommendations and reconsider the viability of the plan and generate other non-experimental options that would achieve a realistic and practical outcome in the NFFR while not potentially impacting the Almanor basin in such a devastating manner.

Very truly yours,



Carlos España  
Principal Engineer  
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