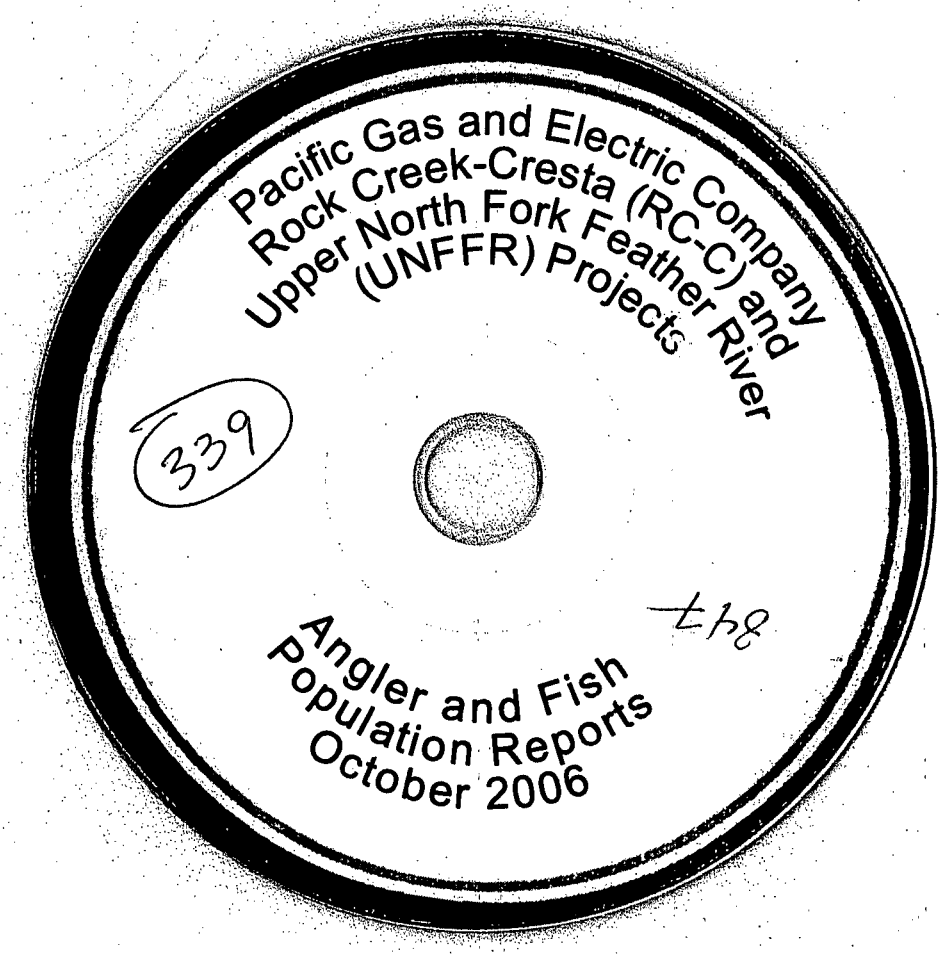
Pacific Gas and Electric Company
Rock Creek-Cresta (RC-C) and
Upper North Fork Feather River
(UNFFR) Projects
339
Angler and Fish
Population Reports
October 2006

10/25/06 BdMtg Item 10
303(d) List
Deadline: 10/20/06 5pm

Pacific Gas and Electric Company

947

Power Generation

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October 19, 2006

UPS – OVERNIGHT MAIL

Ms. Tam Doduc, Chairperson
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Attention: Song Her – Clerk to the Board

RE: Comments Letter – 2006 Federal CWA Section 303(d) List

Dear Ms. Doduc:

Attached please find Pacific Gas and Electric Company's (PG&E) detailed comments to the Revision to Federal Clean Water Act Section 303(d) list of Water Quality Limited Segments for California. PG&E acknowledges the enormous amount of staff work involved in developing the State's Section 303(d) list and appreciates the opportunity to provide additional comments on the latest version of this important document. However, PG&E is concerned with the number of revisions to the listing and the very limited time to comment prior to the State Water Resources Control Board (SWRCB) meeting scheduled for October 25th. We hope that staff has adequate time to review the comments and provide appropriate input to Board members. We have identified six proposed listings which we believe either do not qualify for listing under the state's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy) or should be revised. Our concerns are summarized below.

1. Feather River, North Fork (below Lake Almanor) listing for Mercury

The proposed listing is based on two lines of evidence. However, none of the Belden Forebay samples listed in the first line of evidence exceed the OEHHA guideline and thus, provide no evidence to support a listing. The second line of evidence provides no data of mercury exceedances on the North Fork Feather River between Belden Dam to immediately above the Poe Reservoir. Therefore, this listing should be revised to include only the Feather River, North Fork below Poe Reservoir for mercury.

2. Feather River, North Fork (below Lake Almanor) listing for Temperature

This proposed listing is now based on eight lines of evidence, one involving exceedances of a temperature criterion and seven others newly included involving various data suggesting population or community degradation. Although required by the Listing Policy, the fact sheets do not describe how this evidence is weighted.

PG&E previously submitted on, January 26, 2006, detailed comments regarding the use of the Sullivan guideline to establish a temperature criterion and we have summarized those comments in the attached document. The criterion from the Sullivan report does not exist in the Sacramento/San Joaquin River Basin Plan nor was it used when the beneficial uses were established and specific reaches of the river designated. Using only the Sullivan Report's 21 °C instantaneous maximum guideline for temperature is excessively stringent in that it does not acknowledge the complexity of the river system's temperature regime (see e.g. 303(d) Comment letter from James Pedri, Assistant Executive Officer, Central Valley RWQCB, 12/1/05) and there is significant data that suggests this instantaneous temperature was not met under natural conditions. Our comments include detailed information on these points.

There are several key concerns with the newly presented lines of evidence with regard to population or community degradation. First, fact sheets have cited various reports from the 1940s – 1980s on fish populations in the Feather River, but have not utilized any of the more recent data that is available. Fact sheet's evidence presents an inaccurate assessment of the current population and fish assemblage by not including many of the more recent fish population and angler studies that have been conducted since 2000, as either part of the relicensing effort of the Upper North Fork Feather River Project (FERC 2105) or under the new license for the Rock Creek-Cresta Project (FERC 1962). The data available from these two projects provides information indicating that fish populations/catch rates are much closer to and sometimes exceed the earliest data that is presented to indicate a currently "impacted" ecosystem. Although previously provided to the SWRCB, we have included this data in the attached CD. Additionally, the lines of evidence consisting of two pictures - one of a Native American woman in 1915 and another of two fisherman in 1911 - cannot be considered credible evidence as they do not meet the Listing Policy's requirements for photographic documentation included in section 6.1.4. In summary, using current fisheries information, there is no evidence of a significant degradation of fish populations or communities.

On-going assessments of the North Fork Feather River for many water quality and biological parameters are being conducted as part of the 2001 license requirements for the Rock Creek-Cresta Project (FERC 1962). These studies include a 15-year flow and biological evaluation with the first 5-year study period to be completed at the end of this year. This long-term study will provide much new information on the biological resources of the North Fork Feather River and along with future studies associated with both the Upper North Fork Feather River and Poe projects will provide invaluable information, which is essential to making any temperature determination on this river. Additionally, North Fork Feather River supports both warm and cold water species and it is inappropriate to base temperature criteria only on the cold water species listed in the 303(d) fact sheets. Therefore, PG&E believes that there is insufficient evidence to list the Feather River, North Fork for temperature.

3. Lower Bear River Reservoir listing for Copper

All sample result concentrations for the Lower Bear River Reservoir from March 2002 through January 2003 used for determining the proposed section 303(d) listing do not meet section 6.1.5.5 of the Listing Policy (*Quantitation of Chemical Concentration)*. The quantitation limit of the analytical method used was greater than the water quality standard/water quality criteria and the sample results. Thus, these results cannot be used in a listing analysis. Additionally, data collected from February 2003 through September 2003 which was provided to the SWRCB but not used in the listing analysis, utilized a more sophisticated analytical method and satisfies the requirements of section 6.1.5.5. These results are all below the numerical criteria for listing. Therefore, there is no data to support the listing of Lower Bear River Reservoir for copper.

4. Mokelumne River, North Fork listing for Copper

This proposed listing is based on 30 sample results from July 2000 through May 2002. The sampling results for 2000-02 sampling period used for determining listing were below the capability of the analytical methods used and therefore do not meet the requirements of the Listing Policy. Secondly, the analytical laboratory's lowest achievable reporting limit (quantitation limit) for the samples results that were analyzed during the 2000 – 2002 sampling period was higher than the water quality criteria and was higher that the sampling concentrations. Therefore, these data do not meet section 6.1.5.5 of the Listing Policy (Quantitation of Chemical Concentrations). Additional data that was issued in a report that was submitted to the SWRCB in January 2006 contains results from March-December 2005. The 21 samples collected during this period were collected using "Ultra Clean" sampling and analytical techniques and are of sufficient quality for determining listing. Further, all sample results that met the Listing Policy's requirements were below the CTR criteria for copper. Thus, there is no evidence to support a listing of Mokelumne River, North Fork for copper.

5. Sugar Pine Creek (tributary to Lower Bear River Reservoir) listing for Copper

All three sample concentrations used for determining section 303(d) listing did not meet section 6.1.5.5. of the Listing Policy (Quantitation of Chemical Concentration). The quantitation limit was greater than the water quality standard/ water quality criteria and the sample results. Thus, there is no evidence to support a listing of Sugar Pine Creek for copper.

6. Willow Creek (Madera County) listed for Temperature

The proposed listing is based on data collected from 1986-1995 by PG&E during various studies related to the relicensing process required by the resource agencies and FERC. This data was collected before the new license conditions were implemented and is therefore obsolete. PG&E's Crane Valley Project was relicensed in September, 2003. The new license required changes in streamflow conditions and a new five year stream temperature monitoring plan is underway. Additionally, Willow Creek supports both warm and cold water species and it is inappropriate to base temperature criteria only on the cold water species listed in the 303(d) fact sheets. Therefore, there is insufficient accurate and verifiable evidence to list Willow Creek for temperature.

Ms. Tam Doduc, Chairperson
State Water Resources Control Board

Again, PG&E appreciates the opportunity to provide comments on the proposed 303(d) list. If you have any questions or wish to discuss these comments in more detail, please contact Sara Everitt at (415) 973 – 0707.

Sincerely

Tammie Candelario

Tammie Candelario
Director, License Management/Relicensing

Cc: Craig Wilson (SWRCB)
Dorena Goding (SWRCB)

Attachments

PG&E Comments on Staff Report "Revision of the Clean Water Act Section 303(d) List of Water Quality Limited Segments - October 6, 2006"

PG&E reviewed the proposed revisions to California's Clean Water Act Section 303(d) List published on October 6, 2006 and has identified five listings that it believes do not qualify under the State's listing policy and one that should be revised. PG&E previously submitted comments on an earlier version of Staff's proposed revisions.

I. North Fork Feather River (Below Lake Almanor) Listing for Mercury

The mercury OEHHA guideline used for listing is 300 ppb and the proposed listing is based on two lines of evidence. It is important to note that none of the data from the first line of evidence, PG&E Belden Forebay data from 2002, includes any exceedances of the OEHHA criterion of 300 ppb. Therefore, this data does not support a listing.

The second line of evidence is from the Poe Project License (PG&E 2003). PG&E reviewed the original data for smallmouth bass and the mercury levels range from 0.09 to 0.27 ppm. No smallmouth bass had a value of 0.90 ppm. This appears to be a simple transcription error on our part in the original license document, and smallmouth bass should not be included with the other fish species that exceeded the 0.3 ppm mercury criteria level.

In summary, the only data identified which exceeds the criteria is from Poe Reservoir and further downstream. Therefore, the proposed listing should be revised and only the segment of the river below Poe Dam should be considered for listing.

II. North Fork Feather River (Below Lake Almanor) Listing for Temperature

The proposed listing is based on eight lines of evidence – one regarding temperature exceedances of a temperature guideline and seven others involving a variety of historical and outdated reports and data suggesting population and community degradation on the North Fork Feather River (NFFR). The fact sheets proposal relies upon a number of unsupported and invalid assumptions to reach the erroneous conclusion that the NFFR should be listed as impaired for water temperature including a report that calculates risk in an overly stringent manner compared to U.S. Environmental Protection Agency (USEPA) guidelines and inaccurate or obsolete data. Further, fact sheets do not consider available data that supports not listing the NFFR for temperature.

A. The Temperature Guideline from the Sullivan Report is Overly Stringent and should not be the only criterion for temperature

PG&E believes that the Sullivan report provides an overly stringent guideline for temperature that is not supported by existing numeric temperature criteria in the Sacramento/San Joaquin River Basin Plan or in guidance provided by USEPA which existed at the time the beneficial uses were established and specific river reaches designated. Utilizing a single metric to determine listings for temperature fails to address the inherent complexity of river systems and

the variety of conditions that exist. The literature includes numerous other metrics that should be considered in developing accurate criteria to assess impairment due to temperature including maximum weekly average temperature, number of successive or total days exceeding an identified maximum, and diurnal temperature variations. Further, there is significant data confirming that the natural conditions of the river system do not meet a 21°C instantaneous maximum.

1. Sullivan Report

As provided in our earlier comments (January 26, 2006) and restated here for reconsideration are PG&E's concerns with the use of the Sullivan Report to establish a temperature guideline. The guideline used to compare temperatures is from Sullivan et. al. (2000). The report calculated the Annual Maximum (instantaneous maximum observed during the summer) upper threshold criterion for steelhead trout as 21°C. The risk assessment approach used by Sullivan et. al. (2000) suggests that an upper threshold for the Annual Maximum of 21°C for steelhead will reduce average growth 10% from optimum. The Sullivan et. al. (2000) report makes reference to a USEPA document from 1977 that suggests a higher criterion (24.0°C) for the protection of steelhead trout with an associated reduction in growth of 20% (Sullivan et. al. 2000). PG&E believes that the USEPA criterion should be used for comparison to temperatures in the North Fork Feather River since these are not lethal temperatures and an Annual Maximum of 24°C was reported as acceptable to the USEPA in their 1977 report.

In addition, as presented in the PG&E (2000) report, *Water Temperature Objectives in the Rock Creek-Cresta Collaborative Process* explains that the relevant literature shows considerable variability in trout temperature tolerances. The variability in the literature partly reflects differences in the way various laboratory studies were conducted (e.g., differences in acclimation temperatures), but may also be influenced by other factors that are more difficult to control in a particular experiment, such as physiological condition, state of health, season, photoperiod, and the race of fish being tested (PG&E 2000).

2. Historic Data does not support a 21°C maximum

Historic NFFR water temperature regime between 1940 and 1963 - Water temperatures in the NFFR during the time periods referenced by the fact sheet line of evidence (1940-1963) were likely comparable to, if not warmer than, the current water temperatures. This water temperature expectation is based on the following facts:

- Historic water surface in Lake Almanor generally is more than 20 feet lower in elevation than the present condition. Maximum allowable water surface elevations were: 4474 feet (PG&E) prior to 1927, raised to 4490 feet after 1963, and was requested to be permanently raised to 4494 in 1974 and approved in 1976. However, actual lake levels have varied since 1976 due to annual run-off and meteorological conditions, and the maximum storage levels have not been attained in all years since.
- Water temperature data measured in 1985 and 2001 indicated the release temperatures from the present intake structure ranged from 20 to 22° C (daily mean) for July and August. Lake water surface levels in these two water years were comparable to the peak water surface levels of those earlier years in the 1930-1963 period. Hence, this measured water temperature range is a good indicator of what water temperatures would have been in those years.

- The temperature of water drawn by the Prattville intakes (either the abandoned intake or the present intake) is a function of several factors, including water surface elevation in Lake Almanor, flows drawn by the intakes, and the strength of the lake temperature stratification. The higher the water surface elevation, the stronger the stratification (the density difference between the surface and bottom waters) and the lower the flows, the colder the withdrawal temperatures would be.
- Both Prattville intake structures are located in the same shallow cove. Waters drawn into both intakes come from the same strata. Although the invert elevation (i.e., the depth of the actual intake gate from the surface) of these two intakes differ, the topography outside of the intake cove, regardless of the intake structure, determines the actual strata (depth) of water withdrawn. The constraint elevation is approximately at 4437 feet (PG&E).
- Before Butt Valley Powerhouse and Caribou 2 Powerhouse came online in 1958, flows from old Prattville Intake at Lake Almanor were in the range of 800 to 1,000 cfs. Although these historic flows were lower than the current range (from 800 to 1,600 cfs), temperature data have revealed that Prattville water temperatures are fairly compatible given this flow range (Reference: a special study conducted by PG&E in 1994).
- For PG&E's analysis, we conservatively assumed that all waters were released from the lower elevation gates from Canyon Dam Tower at Lake Almanor; hence, this analysis used the coldest possible water source to predict the water temperatures under the pre-dam scenario described below. For the period 1935-1963, the frequency analysis indicated a release flow of 37 cfs or less occurred 50% of the time; flows exceeded 316 cfs 25% of the time, and flows exceeded 644 cfs 10% of the time. Because of the small quantity of flows coming from Canyon Dam when compared to the flows from Butt Valley Reservoir, it is reasonable to expect that, on a regular basis, the downstream temperatures were largely dictated by water temperatures from the old Prattville Intake.

Historic NFFR water temperature regime prior to all PG&E dams (pre-1913) - Water temperature modeling of pre PG&E projects conditions demonstrate that natural flows in the NFFR at the Canyon Dam site would result in daily mean water temperatures of about 17 to 18°C and a daily maximum water temperature of about 19 to 21°C during July and August. This water temperature modeling used standard accepted computer models and conservative assumptions. These water temperature modeling results indicate that a water temperature standard of 21°C for the NFFR could not be met under natural conditions.

For this analysis, PG&E conducted a preliminary temperature modeling study to assess the temperature regime under an unimpaired flow scenario (no PG&E dams in NFFR, from Indian Ole Dam in Mt. Meadows through all downstream dams [Canyon Dam, Belden Dam, Rock Creek, Cresta, Bucks and Poe dams]). Two types of models were used for this assessment, SSTEMP (stream segment temperature model) (Bartholow 1999) and SNTEMP (stream network temperature model) (Theurer et al 1984). Both models took into account heat exchange with the atmosphere, various inflows (including groundwater and springs), heat transport through various stream channels configurations, and topographic and riparian shading effects. SSTEMP model was developed for three reaches; 1) the historic (pre-Lake Almanor) Big Meadow Reach, 2) the

historic Hamilton Reach, and 3) the historic Seneca Reach. A series of SNTEMP models were used for the historic NFFR reach below Belden Dam. The historic NFFR was simulated by individual stream segments as they are now separated by the various dams, including Belden, Rock Creek, Cresta and Poe reaches. The SNTEMP models were developed in 1985 with actual data for calibration (Woodward-Clyde Consultants [WCC], 1986a, 1986b).

Predicted unimpaired hydrology data were constructed using historic storage data and the powerhouse flows to back-calculate the corresponding natural hydrology for a normal water year and a dry water year (90% exceedance). The historic Big Meadow hydrology was estimated by assessing the origin of waters, which includes three major sources: (a) snowmelt, (b) presently known tributaries (such as Benner, Last Chance, Mud and Bailey creeks), and (c) groundwater/spring flows. Multiple years of historic data at Chester and flow measurement at known tributaries (personal communication with PG&E's watershed hydrographer) provided information for snowmelt and tributary inflows. Groundwater/springs feeding the historic NFFR were further broken into two groups – those springs with presently known locations (by library research and/or historic maps) are considered as point source and others with unknown locations are considered as line source.

All sources of water were then routed through the various historic landscapes. This included the snowmelt run-off from Chester through the 11-mile long braided channels in the historic Big Meadow (that currently forms the submerged western arm of Lake Almanor) to Canyon Dam. Also, a 9-mile incised channel historically formed a very distinctive conduit to carry cold waters from Hamilton Branch and known springs (such as Big Spring) to Canyon Dam. These waters interact with both solar radiation and the atmosphere and become warmer as they travel downstream. Because of the significant range of water temperatures associated with snowmelt, two snowmelt water temperatures (16°C and 18°C) were considered as the starting temperature at Chester. Water temperatures for all groundwater and springs are assumed at a constant level equivalent to the annual averaged air temperature at 11.2°C. The 11.2°C level was later found warmer than the measured value (about 8°C measured at Big Spring area), however, a sensitivity test conducted recently suggested this difference (in the assumption of the groundwater/spring temperature) would have made the predicted temperature difference of about 0.5-0.7°C near Canyon Dam.

Normal and warm meteorological conditions are obtained from a study by Woodward-Clyde Consultants (WCC, 1986a, 1986b). Predicted temperatures in the warmest months (July and August) are modeled. A total of three modeling scenarios were simulated:

- Scenario 1 - a normal case with average hydrology/meteorology condition and a snowmelt temperature at 16°C,
- Scenario 2 - a normal case with average hydrology/meteorology condition and a higher snowmelt temperature at 18°C,
- Scenario 3 - an extreme case with a Dry hydrology/Warm meteorology condition and a snowmelt temperature at 16°C.

The following table provides model results for the predicted July/August daily mean water temperatures at the beginning and end of each stream reach, from Seneca to Poe, respectively. At the Canyon Dam location, the unimpaired flow, including snowmelt waters from the historic Big Meadow, Hamilton Branch and the various groundwater and springs, was estimated close to 630 cfs in July and 560 cfs in August. The predicted daily mean water temperatures at Canyon Dam are 18.1/17.4°C for July/August under Scenario 1, 18.3/17.4°C (July/August) under Scenario 2, and 17.3/17.4°C (July/August) under Scenario 3. The model is also capable of predicting the daily maximum temperature. Under Scenario 1, the daily maximum temperature for water originating from Chester snowmelt is predicted to be close to 20.4°C in July when it reaches Canyon Dam. The corresponding predicted daily mean temperature is about 18.4°C under the same scenario (Note: the 18.1°C daily average temperature previously mentioned represented the mixed waters from Chester snowmelt run-off, Hamilton snowmelt and groundwater springs). This represents a diel (daily maximum to daily minimum) temperature difference of about 4°C in a normal July condition (twice the difference between daily maximum to daily mean). This value is reasonable compared to those of the snowmelt measured at Chester, which has a documented diel range of 3.9 to 7.6°C (Source: various annual reports in FERC 1962 Condition 4C monitoring data). It is likely that the diel temperature range of 4°C would have persisted as water travels downstream in NFFR. Hence, daily maximum temperatures in NFFR could be estimated by adding the predicted daily means by half of the diel range.

Flow increases moving downstream because of accretion flows from springs and/or tributaries. Water temperatures also warm up with distance. Generally, daily mean water temperatures approached 19.5°C in July and 20°C in August at the end of the Poe Reach under all modeled scenarios. Applying a typical diel temperature range of 4°C to this daily mean would result in water temperatures that exceed an instantaneous maximum of 21°C.

Predicted Daily Mean Temperatures for Unimpaired NFFR

Unimpaired Flow - Scenario 1 -- Chester runoff at 16C, Normal Hydrology, Normal Meteorology

	JULY				AUGUST				
Stream Reach	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Model used
Seneca	629	18.1	629	19.0	560	17.4	560	17.9	SSTEMP
Belden	688	18.3	817	19.3	607	17.7	697	18.5	SNTEMP
Rock Creek	900	19.0	945	19.3	769	18.2	786	18.7	SNTEMP
Cresta	945	19.3	976	19.5	786	18.7	806	18.9	SNTEMP
Poe	976	19.5	981	20.0	806	18.9	810	19.4	SNTEMP

Unimpaired Flow - Scenario 2 -- Chester runoff at 18C, Normal Hydrology, Normal Meteorology

Stream Reach	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Model used
Seneca	629	18.3	629	18.8	560	17.4	560	17.9	SSTEMP
Belden	688	18.5	817	19.4	607	17.7	697	18.6	SNTEMP
Rock Creek	900	19.1	945	19.4	769	18.3	786	18.7	SNTEMP
Cresta	945	19.4	976	19.6	786	18.7	806	19.0	SNTEMP
Poe	976	19.6	981	20.0	806	19.0	810	19.4	SNTEMP

Unimpaired Flow - Scenario 3 -- Chester runoff at 16 C, Dry and Warm year

Stream Reach	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Model used
Seneca	467	17.3	467	17.9	406	17.4	406	17.8	SSTEMP
Belden	509	17.7	559	18.6	444	17.6	478	18.3	SNTEMP
Rock Creek	641	18.4	666	18.9	550	18.0	563	18.5	SNTEMP
Cresta	666	18.9	691	19.3	563	18.5	577	18.9	SNTEMP
Poe	691	19.3	695	20.0	577	18.9	580	19.5	SNTEMP

Assumptions:

1. Historic Almanor meadow water consists of 4 different sources -- runoff, groundwater, spring and surface tribs. Used SSTEMP to simulate heating
2. Used simple SSTEMP for Seneca Reach
3. All heat gain in the present reservoir is ignored.
4. All unimpaired flow data are from PG&E's data base
5. All unregulated tributary flow and temperature data are from Woodward-Clyde Consultants' data measured in 1985
6. Normal and Extreme meteorological condition are compiled by Woodward-Clyde Consultants' as provided in 1985 data report
7. Groundwater and spring waters in historic Almanor are assumed at 11.2 C level, while surface runoff at Chester varied from 16 to 18 C
8. Water temperatures associated with unimpaired condition (Hamilton Branch, Butt Creek and Bucks Creek) are based on measurements from WCC

B. Population and Community Degradation Evidence Does Not Support a Listing

As for the evidence on population and community degradation, PG&E believes that there are five key points that must be addressed and are discussed in detail below. First, much of the data presented is from the 1940s-1980s and no longer accurately reflects river and/or biological conditions. Second, there is significant newer data collected as part of the recent relicensing of the Rock Creek-Cresta Project and the on-going relicensing of the Upper North Fork Feather River Project that should be evaluated in making a listing determination. Third, the fish assemblages discussed throughout the evidence have existed since the construction of Lake Almanor and before several of the hydro-electric projects were constructed in the late 1940s and early 1950s and still exist today. Fourth, new flows and operating requirements were established in the Rock Creek-Cresta reaches under the new license received in October 2001. And finally, the two pictures presented as evidence of earlier fish populations are not credible in the context of making a listing determination as they do not meet the photographic documentation requirements in the Listing Policy. It is imperative that the SWRCB staff review and use the most recent fisheries data available as part of any listing determination..

1. Reports from the 1940s to 1980s

The fact sheet presents data on fish abundance from several reports dating from as early as 1946 to as late as 1989 by Rowely (1955), Gerstung (1973), and Wixom (1989). While this data does provide some value in a historical context, without presenting the most current available information (see response 2, below), an inaccurate picture of the current fishery resources is presented. However, it should be noted that angler creel surveys are not the most appropriate method for making analyses of fish species abundance or presence/absence. Angler surveys are very biased in their ability to accurately reflect the various fish species present in a river due to, but not limited to: sampling equipment (fishing poles) to equally collect all sizes of all fish species present/selective fishing for targeted fish species, non-random distribution of "hot" fishing spots/easy access points, and varying ability of the anglers involved.

The Rowley (1955) angler creel survey information on the Belden reach of the NFFR (between Caribou Powerhouses and the lower end of Gansner Bar) was collected at above pre-project (pre-Lake Almanor) river flows. As acknowledged by Rowely (1955), "The flow in this stream section is unnaturally large and constant throughout the year because of the large storage capacity of the PG&E's Lake Almanor above. Average discharge from the Caribou Powerhouse is about 1,000 cfs, and in the river above the powerhouse the normal flow in June and July in past years was about 100 cfs. Thus, in years past flow in the Caribou Section averaged about 1,100 cfs". An analysis of unimpaired flow data for this reach of river indicates that typical low summertime flows would have been about 600 cfs, almost half of what was typically being released. Also, in the summer of 1954 Rowely (1955) states that flows were even much greater and "averaged 1,700-1,800 cfs during June and July". Consequently, caution should be exercised in using this data set to assess the fish community that might have been present pre-project.

As noted reported by Gerstung (1973), flows decreased in 1969 from about 1,000 cfs to about 100 cfs in NFFR reach below the Caribou Powerhouse, with a subsequent reported decrease in the standing crop of trout from 63 lb/acre in 1954 to 10 lbs/acre in 1969. Considering that the

flows, and overall aquatic habitat decreased by about 90% in this period, it should not be surprising to see this level of decrease in the trout catch. The most recent studies on this reach (see response 2, below) show another way using catchable trout per mile to analyze this data, also presented by Gerstung.

Wixom (1989) describes the Rock Creek-Cresta reaches prior to 1950 as being, "a trophy rainbow trout fishery" with a catch rate of 1 fish per angler hour in 1946. He then continues on describing a declining catch rate with data from 1954, and from 1981-1985. First, it should be noted that data from 1946 should not be considered an average year for comparison purposes. This was the first year following WWII, and relaxation/abolition of gas rationing along with many returning service men and women and life returning to normal, the NFFR would likely have been subject to a higher than normal fishing pressure. Also after up to four years with reduced fishing pressure, the fish population would have had ample time to increase to greater than typical levels leading up to greater than "average" results in the 1946 survey effort. Data reported on between 1954 through 1985 were collected at very different and reduced flow levels than are currently being released, and current angler catch is much greater (see response in 2, below).

2. Data collected between 2000 and 2005 as part of the Upper North Fork Feather River and Rock Creek-Cresta relicensing processes must be used to make a listing determination
As part of the Upper North Fork Feather River and Rock Creek-Cresta relicensing processes, PG&E developed significant fisheries data over the last six years. This data has been provided to the SWRCB, but it is not used in the listing analysis. It is absolutely critical that this most recent information be considered as part of the listing process. Without this data, the current conditions are not accurately described or assessed as part of the listing determination. Below we have summarized key points from the data previously submitted. Further, we have included these reports on the enclosed CD.

Angler creel surveys reported in Appendix E3.1-7 (2000 Angler Creel Survey – Table 3-7, EA Engineering, Science and Technology 2001) of the Application for New License (PG&E 2002) show a catch that is composed 100% of rainbow trout in the Belden Reach (i.e. Caribou Section referred to in Rowely and above). Angler creel surveys for the entire river reach from Lake Almanor to Gansner Bar showed a catch rate of 96% trout (rainbow and brown) and 4% other fish (both non-game and smallmouth bass). Also, catch per hour of trout in the Belden reach during the angler survey conducted in 2000 was 0.66, or twice the calculated 0.33 fish per hour (3,795 trout/11,511.5 hours) from Rowely (1955). Even though flow during the study period was only 140 cfs (end of April through early September) and 60 cfs the rest of the year, the fish assemblage represented by the angler creel surveys of 2000 are more indicative of a cold water fishery than the one inferred by the data in Rowely (1955).

Although the trout population in the Belden reach based on pounds per acre has declined since the reduction in river flow in 1969, the most recent population based studies conducted during relicensing the Upper North Fork Feather River Project in 2000-2002 (ECORP 2003) indicate a population of catchable sized trout in either the top 17% (400 + trout/mile) or 46% (300 + trout/mile) level when compared to the streams reviewed by Gerstung (his table 2)(1973). The

most current information available indicates that there is generally a robust trout population in the NFFR below the Caribou Powerhouse.

In addition to the angler creel data listed above, angler creel surveys have also been conducted in the Rock Creek and Cresta river reaches of the NFFR in 2004 and 2005 as one of the requirements of the 2001 FERC license for this project (FERC No. 1962)(reported to both FERC and the SWRCB). In 2004, the catch rate for rainbow trout was 0.97 per hour and in 2005 it was 0.87 per hour in the riverine portion of each reach, substantially greater than that reported in either the 1954 study, less than 0.3 fish/hr, or in the six year study between 1981 -1986, less than or equal to 0.21 fish/hr, and virtually identical to the 1946 results of 1 trout per hour (it is unknown from the information provided whether this number has been rounded up or down from the data presented in the original study). Also, rainbow trout made up 82.2% of all fish caught in 2004 and 78.5% in 2005, substantially greater than the percentages describe by Wixom (1989), for the 1981-1986 study, less than 23%, in the Rock Creek-Cresta reaches. No information is presented on catch composition from 1946.

In summary, this most recently collected data must be included in the analysis and it clearly demonstrates that there is no significant evidence to suggest population or community degradation.

3. Fish assemblage data show no major changes

The fact sheet states that "The species of fishes present in the North Fork Feather River as of 1950 were: rainbow trout (in abundance), brown trout (in abundance), black bass (large and small mouth), suckers, squawfish (Sacramento pike), hardheads (Mylopharodon), carp, bullheads (cottids), and dace", citing Wales (1952). This appears intended to support other information they present concerning the relative historical abundance of trout in the NFFR, but also lists other native and introduced fish species present as of 1950. However, because no information is provided as to when (seasonally) or where (in the headwaters, or the entire length of the river) in the NFFR this information is supposed to represent, it has limited substantive value. In general, the listed species are what would be expected to occur in this river, based on its overall length, elevation and gradient, and headwater reservoir (i.e., Lake Almanor).

Moyle (2002) describes basically four distinct habitats, or zones, found in Central Valley streams, two of which are present in the NFFR: rainbow trout assemblage and the pikeminnow-hardhead-sucker assemblage (the other two he describes, the roach and deep-bodied assemblages, are not present). Moyle (2002) presents an illustration (Figure 5 in his book) showing how the various assemblages are distributed along the length of a river without a major dam (Deer Creek, Tehema Co.), based on elevation and as a result of gradient and other natural environmental conditions moving from upper to lower elevation. As illustrated and described in text, not all species occur in all river sections necessarily on a year around basis. Presence of any one species is dependent on seasonal conditions, migratory, and or specific spawning needs. As indicted in this figure, the fish assemblage below 550 m (1,804 ft) show a mostly resident population of the pikeminnow-hardhead-sucker assemblage, while the rainbow trout assemblage occurring mostly on a seasonal or migratory basis, with a limited resident population.

The fact sheet goes on to list and enumerate the species of fish collected in the Poe Project, indicating that a single rainbow trout was collected. All of the fish species listed were also present in the NFFR prior to 1950, as described above. The elevation of the river reach sampled for the Poe Project (FERC 2107) generally ranges from 900 ft (275 m) to 1400 ft (430m). As described in Moyle (2002, and illustrated in his Figure 5), the elevation range for the pikeminnow-hardhead-sucker assemblage (described above) ranges from 91 m to 550 m. Consequently, the fish species currently present are representative of a natural, undammed river system and do not provide any evidence to support a listing for the NFFR for temperature.

It is premature to prescribe a salmonid based temperature goal of 21°C to this reach as hardhead are known to occur in the NFFR, Rock Creek-Cresta and Poe river reaches. Hardhead are considered a sensitive species by both the Forest Service and the California Department of Fish and Game. Hardhead typically utilize the highest water temperatures available in their habitat. In laboratory studies, hardhead were shown to prefer water temperatures of 28.4°C (Knight 1985).

4. Any listing analysis must assess the current River flow regime

Since receiving a new operating license in 2001, the Rock Creek-Cresta Project has instituted new flows and other mitigation efforts (gravel augmentation in both the river mainstem and a tributary) resulting in habitat improvements, with additional flow level releases scheduled to begin in 2007 and will be monitored over the next 10 years. Flows during many of the years which the "historical" reports cover was only between 50-100 cfs. Since receiving the new license for the Rock Creek-Cresta Project in late 2001, the new minimum base flows in normal and wet years in the Rock Creek reach vary on a seasonal basis between 180 to 250 cfs and between 220 and 250 cfs in the Cresta reach. Flows are scheduled to increase again in 2007, and the new base flows will range between 260 to 350 cfs in the Rock Creek reach and between 325 to 350 in the Cresta reach. A third 5-year test flow period will begin in 2012, with final flows to be determined based on the results of the first 10 years of study, but base flows may be as high as 525 cfs in Rock Creek and Cresta reaches. Data from this new flow regime is critical in making a listing determination.

5. The historic photographs do meet Listing Policy requirements

The first photograph shows a Native American woman with nine fish. As the comment states, "they appear to be trout." This photograph is not proof of any specific water condition or definitive information on fish species, abundance, or assemblage. The second photograph is simply of two anglers and baskets of rainbow trout. There is no documentation as to when, where, or how they were caught. These photographs are not proof of any specific water condition or definitive information on fish species, abundance, or assemblage in the NFFR – and they clearly do not meet the requirements of section 6.1.4 of the Listing Policy for photographic documentation.

In conclusion, neither the temperature guideline nor the various lines of evidence suggesting population or community degradation provide sufficient accurate and verifiable data to require a listing. Further, important available data on the current conditions of the NFFR are not included

in the analysis – and absolutely must be to make an accurate determination. Therefore, there is insufficient evidence to support a listing of the NFFR for temperature.

III. Water Segments Proposed for listing for Copper

The Lower Bear River Reservoir, Mokelumne River North Fork, and Sugar Pine Creek, were not listed in the 2002 Clean Water Act 303(d) List of Water Quality Limited Segments (approved by the USEPA July 2003). However, these segments are proposed to be listed for dissolved copper in the Revision of the Clean Water Act Section 303(d) List of Water Quality Limited Segments dated September 20, 2006. We believe that much of the data used to propose listing these water segments is not of sufficiently high quality to make the 303(d) listing as required by the state's Listing Policy.

Much of the data collected from March 2000 to January 2003 is not reliable because of the sampling technique and analytical method employed. Many of the laboratory results were flagged as estimates. In addition, none of the data from March 2000 to January 2003 was collected under a Quality Assurance Program Plan (QAPP) which is necessary to ensure that proper sampling, handling, and analytical protocols are used. However, after January 2003 to increase the quality and reliability of the results, the laboratory and sampling methods were changed and a detailed QAPP was developed to ensure that "clean" sampling, handling, and analytical techniques would be used as required by the USEPA guidelines in Method 1669 for Trace Metals sampling. Proper training was also provided to all field personnel per the guidelines in the QAPP. Using the more sophisticated sampling and laboratory techniques, none of the samples from the Lower Bear River Reservoir and the Mokelumne River were above the criterion for dissolved copper. Therefore, there is no evidence that meets the requirements of the Listing Policy that supports a copper listing for the Lower Bear River Reservoir, the NFMR or Sugar Pine Creek.

A. Sampling Technique

The water samples from March 2000 to January 2003 were collected using standard sampling techniques. Because of the extremely low concentrations, samples collected after the January 2003 date used the "Ultra Clean" technique as recommended by the USEPA's Method 1669 protocol for Trace Metals sampling and by the Department of Fish and Game's Marine Pollution Studies Laboratory. Standard sampling techniques can introduce as much as 1.2 ppb error into the results. This was confirmed when field blanks collected using standard sampling techniques results for dissolved copper were as high as 1.2 ppb, as compared to as 0.2 ppb for using "Ultra Clean" sampling techniques.

B. Analytical Method

The water samples collected from March 2000 to January 2003 were analyzed by Severn Trent Laboratories in Pleasanton, California for dissolved copper using USEPA Method 220.0 or USEPA Method 6010B. The associated reporting limit (RL) and method detection limit (MDL) for these methods are 5 ug/L for the RL and 1.0 ug/L to 0.3 ug/L,for the MDL (the MDL was

decreased to 0.3 ug/L beginning in 2002). The MDL is defined (40 CFR 136) and represents the minimum level of analyte that can be detected with 99% confidence that the analytical response is greater than zero.

The RL is generally defined as the minimum concentration of a constituent that, under normal operating conditions, can be reported with relatively good certainty that the result is valid. The RL is set by the analytical laboratory and is generally as much as twelve times the MDL. Concentrations reported between the RL and the MDL are subject to considerable variability, and are reported as estimations. Severn Trent Laboratories provided estimated "J" values for the sample results for concentrations that fell below the RL but that were above the MDL. These estimated "J" values had an approximate error of 60% as defined by Severn Trent Laboratories' laboratory standards.

In a majority of the samples analyzed by Severn Trent Laboratories the sample value was less than the quantitation limit (the reporting limit) and the quantitation limit was greater than the water quality standard/water quality criteria. These samples were collected between 2000 and January 2003, and therefore do not meet the standard used for listing as described in the Water Quality Control Policy Section 6.1.5.5 Quantitation of Chemical Concentration.

To increase the quality of the sampling results PG&E began using the Department of Fish and Game's Water Pollution Control Laboratory in Rancho Cordova, California. Both laboratories analyzed the samples from March 2002 to January 2003 for comparison purposes. The analytical method used by Water Pollution Control Laboratory was American Public Health Association Method 3113 (Standard Methods for the Examination of Water and Wastewater, 18th Ed. 1992) which had a RL of 1.0 ug/L and a MDL of 0.3 ug/L. In addition, standard sampling protocols were used.

Both laboratories' results had the same quality of analytical results. After January 2003, PG&E began using the Department of Fish and Game's Marine Pollution Studies Laboratory in Moss Landing, California and based on their recommendation we incorporated the "Ultra Clean" sampling protocol. Marine Pollution Studies Laboratory is a state certified "Clean Lab" that uses USEPA Method 1638 (*Determination of Trace Elements in Ambient Waters by Inductively Coupled Plasma-Mass Spectrometry*) Marine Pollution Studies Laboratory 's MDL for copper was 0.01 ug/L and the RL for copper was 0.03 ug/L,. The MDL and RL values ensured that analytical results would not be flagged as estimated "J" values and would be reported with greater confidence. This analytical method has a quantitation limit that is lower than the water quality standard, and the measured sample values were greater than the quantitation limit and are sufficient high quality to use for determining listing.

C. Individual Segments

1. Lower Bear River Reservoir Listing for Copper

The fact sheet for the Lower Bear River Reservoir listing for copper states that dissolved copper and hardness values were measured at the top, middle and bottom of the Lower Bear River Reservoir on each of seven dates from March 2002 to October 23, 2002 as presented in a the

Preliminary Supplemental Copper Monitoring Results March – December 2002. Based on this analysis the SWRCB concluded that 3 of 7 average dissolved copper concentrations exceeded their respective average hardness-corrected copper criterion.

This report was preliminary and the SWRCB did not include all of the relevant and available data for this determination, they used a subset of data from a monitoring study conducted by PG&E (PG&E 2004). PG&E provided to the SWRCB staff in 2004, the March 2004 Supplemental Water Quality Monitoring Report (this report is available upon request). This report showed that the total number of sample dates water quality data was collected from the Lower Bear River Reservoir is 13. Samples were taken from the top and bottom of the reservoir over the time period April 23, 2002 to September 9, 2003. During this time the middle of the reservoir was sampled 8 times and only while the lake was stratified. It should be noted that all of the dissolved copper concentrations that were above the respective criteria that were reported in 2002 were "J" flagged estimated values.

This represents 42 discrete samples collected from the top, middle, and bottom of the reservoir (including duplicate samples sent to Water Pollution Control Laboratory for Quality Assurance and Quality Control testing of Severn Trent Laboratories). Of the 42 samples, 10 exceed the hardness-corrected criteria with 9 of the 10 flagged as estimated "J" values. The data is not of sufficiently high quality and do not meet section 6.1.5.5 of the Listing Policy (Quantitation of Chemical Concentration) due to the amount of error associated with the estimates (60% laboratory error plus up to 1.2 ppb from sampling) and should not be used to determine if the water segment should be listed. Additionally, all of these sample results were also below the quantitation limit and the quantitation limit was greater than the water quality standard/ water quality criteria. This is a further reason that the samples collected during 2002 should not be used in the listing analysis.

The samples collected during February through September 2003 were collected using "Ultra Clean" sampling protocols and "trace clean" analytical techniques. In addition, a detailed QAPP was implemented beginning in February 2003 to ensure proper sampling and analytical protocols would be followed. Data collected from February 2003 through September 2003 satisfy the Listing Policy requirements and may be used to determine listing status. None of the 13 samples collected from the top, middle, and bottom of the reservoir exceeded the hardness-based criteria. Therefore, all data that meets the Listing Policy requirements is below copper criteria and thus, there is no evidence to support a listing of Lower Bear River Reservoir for copper.

2. Mokelumne River, North Fork Listing for Copper

Thirty samples were collected July of 2000 to May 2002 for dissolved copper on the North Fork of the Mokelumne River. Three of the samples exceed the criteria for dissolved copper; however, one of these samples was flagged as estimated "J" value. The data is not of "sufficient high quality" due to the amount of error associated with it (60% laboratory error plus up to 1.2 ppb from sampling) and should not be used to determine if the water segment should be section 303(d) listed. In addition the analytical laboratory's (Severn Trent Laboratory) lowest achievable reporting limit (quantitation limit) for samples that were analyzed during the 2000 – 2002 sampling period was higher than the water quality criteria and was higher than the sample

concentrations. Therefore, these data do not meet section 6.1.5.5 of the Listing Policy (Quantitation of Chemical concentration).

Additionally, twenty one (21) samples were collected from March 2005 to November 2005 using the Ultra Clean sampling protocol and were analyzed by the Marine Pollution Studies Laboratory. None of the 21 sample results exceeds the hardness criteria. This data was sent in January 2006 to the SWRCB staff. Thus, there is no data that meets the requirements of the Listing Policy that supports the listing of the Mokelumne River, North Fork for copper.

3. Sugar Pine Creek for Copper

The results for dissolved copper of the three samples collected from Sugar Pine Creek during 2002 are not of "sufficient high quality" to be used to determine section 303(d) listing. The samples were analyzed by Severn Trent Laboratories in Pleasanton, California using USEPA Method 220.0 or USEPA Method 6010B. The samples were collected using standard sampling procedures and not the "Ultra Clean" methods. All three samples were "J" flagged estimated values. We believe the data is not of sufficient high quality due to the amount of error associated with the estimates (60% laboratory error plus up to 1.2 ppb from sampling).

Finally, all three sample results were below the quantitation limit and the quantitation limit was greater than the water quality standard/ water quality criteria. Thus, there is no data that meets the requirements of the Listing Policy that supports the listing of Sugar Pine Creek for copper.

IV. Willow Creek (Madera County) listed for Temperature

The fact sheet listing was based on evidence of temperature exceedances and the decline of native species that could be attributed to temperature.

Since the studies conducted during the period 1986 to 1996 on Willow Creek, PG&E has obtained a Federal Energy Regulatory Commission (FERC) License for the Crane Valley Project (September, 2003). FERC required streamflow conditions have been implemented and the water temperature data represented in the 1986 to 1996 studies are no longer relevant based on the new FERC License conditions issued September 2003. In addition, PG&E has initiated a five-year stream temperature monitoring program, which began in 2005 as part of the new license conditions. The water temperature data from the 2005 study year were provided to the SWRCB. Evaluation of water temperatures in the stream reach is ongoing. Listing of this stream reach is premature until these new studies have been completed and assessment of the stream under the new FERC Licensed conditions and current operating procedures can be completed.

PG&E is initiating a monitoring study of the native aquatic species of Willow Creek in 2007. One aspect of the study plan is to evaluate sensitive fish populations that exist within this stream reach. Hardhead is a sensitive fish species that may occur in Willow Creek. Willow Creek from the confluence of Whiskey Creek to the San Joaquin River is considered Critical Habitat for hardhead by the Sierra National Forest. A major focus of the planned research is to determine if hardhead use this reach for reproduction and the critical parameters for it survival. It is premature to prescribe a salmonid based temperature goal of 21°C to this reach as hardhead are

known to utilize the highest water temperatures available for habitat. In laboratory studies, hardhead were shown to prefer water temperatures of 28.4°C (Knight 1985).

Therefore, the temperature data used to list this water segment is not accurate and that the data collected under the new flow regime should be analyzed to make a listing determination. Further, without evidence that hardhead are extirpated from this reach, it is inappropriate to base temperature criteria on the cold water species listed in the 303(d) fact sheets (Steelhead). Thus, a complete and accurate listing analysis of Willow Creek for temperature must include an assessment of current stream conditions and therefore the proposed listing is premature.

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Predicted Daily Mean Temperatures for Unimpaired NFFR

Unimpaired Flow - Scenario 1 -- Chester runoff at 16C, Normal Hydrology, Normal Meteorology

Stream Reach	JULY Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	AUGUST Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Model used
Seneca	629	18.1	629	19.0	560	17.4	560	17.9	SSTEMP
Belden	688	18.3	817	19.3	607	17.7	697	18.5	SNTEMP
Rock Creek	900	19.0	945	19.3	769	18.2	786	18.7	SNTEMP
Cresta	945	19.3	976	19.5	786	18.7	806	18.9	SNTEMP
Poe	976	19.5	981	20.0	806	18.9	810	19.4	SNTEMP

Unimpaired Flow - Scenario 2 -- Chester runoff at 18C, Normal Hydrology, Normal Meteorology

Stream Reach	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Model used
Seneca	629	18.3	629	18.8	560	17.4	560	17.9	SSTEMP
Belden	688	18.5	817	19.4	607	17.7	697	18.6	SNTEMP
Rock Creek	900	19.1	945	19.4	769	18.3	786	18.7	SNTEMP
Cresta	945	19.4	976	19.6	786	18.7	806	19.0	SNTEMP
Poe	976	19.6	981	20.0	806	19.0	810	19.4	SNTEMP

Unimpaired Flow - Scenario 3 -- Chester runoff at 16 C, Dry and Warm year

Stream Reach	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Q @ beginning, cfs	T @ beginning, C	Q @ end of reach, cfs	T @ end of reach, C	Model used
Seneca	467	17.3	467	17.9	406	17.4	406	17.8	SSTEMP
Belden	509	17.7	559	18.6	444	17.6	478	18.3	SNTEMP
Rock Creek	641	18.4	666	18.9	550	18.0	563	18.5	SNTEMP
Cresta	666	18.9	691	19.3	563	18.5	577	18.9	SNTEMP
Poe	691	19.3	695	20.0	577	18.9	580	19.5	SNTEMP

Assumptions:

1. Historic Almanor meadow water consists of 4 different sources -- runoff, groundwater, spring and surface tribs. Used SSTEMP to simulate heating
2. Used simple SSTEMP for Seneca Reach
3. All heat gain in the present reservoir is ignored.
4. All unimpaired flow data are from PG&E's data base
5. All unregulated tributary flow and temperature data are from Woodward-Clyde Consultants' data measured in 1985
6. Normal and Extreme meteorological condition are compiled by Woodward-Clyde Consultants' as provided in 1985 data report
7. Groundwater and spring waters in historic Almanor are assumed at 11.2 C level, while surface runoff at Chester varied from 16 to 18 C
8. Water temperatures associated with unimpaired condition (Hamilton Branch, Butt Creek and Bucks Creek) are based on measurements from WCC