Pacific Gas and Electric Company®

Rich Gigliotti, Director
Land Services
245 Market Street
San Francisco, CA
94105

Phone: 415-973-7293
Fax: 415-973-6970

Betty Yee
Senior Water Resource Control Engineer
CA Regional Water Quality Control Board – Central Valley
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114
byee@waterboards.ca.gov

July 22, 2009

RE: PG&E's Comment Letter – Central Valley Regional Water Quality Control Board
Basin Plan 2009 Triennial Review

Dear Ms. Yee:

Attached please find Pacific Gas and Electric Company's (PG&E) detailed comments to the Central Valley Regional Water Quality Control Board's (CVRWQCB) 2009 Basin Plan Triennial Review. PG&E appreciates the opportunity to provide comments on this important document.

If you have any questions please contact Ed Cheslak at 925-415-6344.

Sincerely,

Rich Gigliotti
Director, PG&E Land Services

Attachment

PG&E's Comments on the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) 2009 Triennial Review

SUBMITTING ORGANIZATION

Pacific Gas and Electric Company (PG&E)
PG&E's Contact is Ed Cheslak (Senior Consulting Scientist, Land Services)
Phone Number: 925-415-6344.

ISSUE STATEMENT

Many of the beneficial use designations utilized in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) for California's Central Valley were developed and assigned to surface water bodies decades ago. The designations were based upon then-current information. Because much better information about these water bodies is now available, as well as a much better understanding due to three decades of experience, the definitions and application of some of these beneficial use designations need to be updated. PG&E's comments focus on the COLD and WARM components of the following beneficial uses: Cold Freshwater Habitat (COLD) and Warm Freshwater Habitat (WARM). PG&E's comments and recommendations are outlined below.

- More recent data indicate that historic designations for some surface water bodies in the Basin Plan may not be appropriate for all reaches within those water bodies. It would be more effective to identify beneficial use designations for separate water body segments or individual reaches within longer rivers (*i.e.*, for rivers that are greater than 10 to 15 miles or more in total length), and particularly for water bodies with large changes in elevation, species assemblages, and other characteristics.
- The Basin Plan manages any water bodies with both COLD and WARM beneficial use designations as COLD water bodies for the application of water quality objectives. The most current data associated with both COLD and WARM designations suggest that a new designation for a transitional zone may be most appropriate in this situation. This new designation would be applied to a designated segment or reach. Application of COLD water objectives can have unintended consequences if special status warm water species (such as hardhead) occur within a water body that has both designations. Such an approach would ensure proper protection for all reaches of a watershed (*i.e.*, COLD, WARM, and transitional rather than just COLD).

WATERBODIES OF PARTICULAR CONCERN TO PG&E

The detailed comments provided below apply PG&E's general recommendations to four water bodies of particular concern to PG&E located in the Central Valley Regional Water Quality Control Board (CVRWQCB) jurisdiction. They are:

1. Upper North Fork Feather River (NFFR) from Lake Almanor to Lake Oroville;
2. Pit River;

3. South Yuba River between Lake Spaulding and Englebright Reservoir; and
4. Willow Creek in Madera County.

PRIORITY OF ISSUE High Priority

PG&E's RECOMMENDATIONS

Collaboratively review the surface water body definitions and the beneficial use designations for each water body of concern to determine whether the current designations are appropriate for the environmental conditions and biota of each water body, considering currently available data and information. Where appropriate, develop refined water body definitions through segmentation. Collaboratively review and determine whether the current narrative water temperature objectives are applicable to the currently defined reaches for long rivers or any newly defined segmentation. This evaluation should take into account various factors such as changes in species assemblage, elevation changes, and other characteristics specific to the water segments. This type of analysis will ensure that the water bodies are managed in the best possible way for the protection of specific beneficial uses. Ultimately, this effort will make other tasks required of the CVRWQCB much easier to complete; an example is the compilation of the combined 305(b)/303(d) Integrated Report, which relies on information in the Basin Plan to determine whether streams are healthy or impaired for specific beneficial uses.

BACKGROUND ON BENEFICIAL USE DESIGNATIONS AND INITIAL BASIN PLAN DEVELOPMENT

Section 13240 of the Porter-Cologne Water Quality Control Act requires each Regional Board to formulate and adopt water quality control plans (basin plans) for all areas within their region. Also required by the Porter-Cologne Act is the establishment of water quality objectives to ensure the reasonable protection of beneficial uses and a program of implementation for achieving water quality objectives within the basin plans. Title 40, Code of Federal Regulations, Part 131 requires each State to adopt water quality standards by designating water uses to be protected, and adopting water quality criteria that protect the designated beneficial uses. A triennial review of the Basin Plan is also required to assess the appropriateness of existing standards and to evaluate and prioritize basin planning issues.

PG&E's research indicates the CVRWQCB began developing the Basin Plan in the 1960s and early 1970s. Table 1 includes some of the activities and documents that have been identified as instrumental in the preparation of the current Basin Plan. The historical data and information that were used to develop the current version (Fourth Edition) of the Basin Plan - including the designation of beneficial uses - are now outdated by more than 30 years, as is detailed below.

As to PG&E's four water bodies of concern, it appears that little was known at the time of original designations. For the Upper NFFR and Willow Creek water bodies, it appears that no known historical investigations were used to determine the original beneficial use designations (CVRWQCB - Betty Yee, personal communication 2009). For the Pit River, the investigation was conducted in 1962. Any information obtained in that preliminary investigation is incomplete compared to the relatively large amount of information that has been collected in recent years. Finally, the information presented in the 1968 Upper Yuba River Water Quality Control Policy does not contain relevant information for the South Fork Yuba River and it

appears that the CVRWQCB is not able to identify data pertaining to the South Fork Yuba River that may have been used to make the historic Basin Plan designations (CVRWQCB - Betty Yee, personal communication 2009).

It is also important to note that the current practice for establishing beneficial uses in water bodies that are not specifically named in the Basin Plan has likewise become outdated. Current practice designates the same beneficial uses to tributaries as those that are designated for the main river, regardless of species assemblages, physical characteristics, and other parameters unique to the tributary. Similar to PG&E's recommendation that longer rivers may best be designated by segment or reach; tributaries should be separately designated where appropriate information is available, because, as PG&E understands it, the current practice does not rely on any readily available information or data to support the designations.

In sum, a lot of data have been collected in the past 30-years to aid in the management of these water resources. PG&E believes that the COLD and WARM water beneficial use designations - and the application of these designations - should be reviewed and updated, which may include a new transitional designation, in light of the newer, more relevant data. This is especially true if those beneficial uses are no longer applicable under current environmental resource management goals and objectives.

Table 1. Documents and Activities That Were Instrumental in the Development of the Basin Plan for the Central Valley Region (note: the items in this list pertain to the discussion presented in this comment letter).

Date	Description
1962	Pit River Investigation by the CVRWQCB – A short term investigation of the Pit River Basin was conducted for the purpose of defining existing water quality conditions and for reviewing the many factors that contribute to these conditions. Findings of this report were to provide a basis for the optimum management and development of the Pit River Basin.
1963	Water Quality Criteria (Second Edition) by McKee and Wolf – This document was used by the State Water Resources Control Board (SWRCB) and the CVRWQCB to develop the guidelines used to protect beneficial uses for water temperature (McKee and Wolf 1963).
1968	National Technical Advisory Committee (NTAC) to the Secretary of the Interior Report – This report was also used by the SWRCB and the CVRWQCB to develop the guidelines used to protect beneficial uses for water temperature (NTAC 1968).
1968	Upper Yuba River (including tributaries) Water Quality Control Policy – Adoption of the Water Quality Control Policy for the Upper Yuba River by the CVRWQCB.
1969	Lower Feather River (Oroville Fish Barrier Dam to Sacramento River – Water Quality Control Policy (does not contain any information on the Upper North Fork Feather River.
1970	Lower Feather River Water Quality Study Final Memorandum – Cooperative study by the Department of Water Resources and the Yuba County Water Agency; data only pertain to the Lower Feather River.
1971-72	Interim Plan developed –SWRCB selects Bay Valley Consultants (Bechtel, CH2MHILL, Consoer-Townsend & Associates, and Hydroscience) to prepare a comprehensive water quality control plan for the Sacramento River and San Joaquin River Basins; the 'interim plan.'
Early 1970s	Beneficial Uses and Water Quality Workshop – Document that identified beneficial uses of surface and groundwater for each basin; defined existing water quality of surface and groundwater for each basin, and identified preliminary water quality objectives for surface and groundwater. This document is 'missing' and neither the SWRCB nor the CVRWQCB have a copy. This document may contain details regarding how beneficial uses for various water bodies were initially designated.
1973	SWRCB Memo No. 20 – A planning strategy to define water quality objectives (standards) consistent with the local beneficial uses of water and develop alternative water quality management plans that will achieve the objectives. The SWRCB relied on information from McKee &Wolf and the NTAC report for development of the guidelines used to protect beneficial uses.
1974	Bay Valley Consultants Report - Water Quality and Quantity Problems and Alternative Actions, Sacramento River Basin, San Joaquin River Basin, and the Delta.
1974	Bay Valley Consultants Report – Recommended Water Quality Management Plan. This document provided the information for the first edition of the Basin Plan.
1975	First Edition of Basin Plan, Abstract, and Appendices – the water temperature narrative objective from the 'interim plan' was revised in this document to achieve statewide uniformity.
1984, 1986, and 1994	Updates and/or revisions to Basin Plan.
1998	1998 is the Fourth Edition; this edition contains updates through the present year.

DISCUSSION OF SUPPORTING EVIDENCE

Water Segment Delineation Argument

The U. S. Environmental Protection Agency (US EPA) recommends that states partition waters to represent homogeneity in physical, biological or chemical conditions. This segmentation may reflect an a priori knowledge of factors such as flow, channel morphology, substrate, riparian condition, adjoining land uses, confluence with other water bodies, and potential sources of pollutant loadings (both point and nonpoint). Although there is no single default dimension for a segment size, US EPA recommends states utilize these or similar principles when they define the segments used in their water quality standards (US EPA 2006).

PG&E believes for a river that flows through various environments including high elevation and different climates, the river should be split into appropriate river reaches (water segments). These reaches should be based on climates, be elevation dependent, and generally should not be longer than 10-12 miles.

A state should assign a discrete "address" to each water segment, and document the process used for defining water segments in their methodologies. The physical boundaries (beginning and end points) of a segment should be defined in such a manner that a scientifically valid assessment of each and every water segment could be made. The individual size of a water segment will vary based upon the assessment. Water segments should, however, be larger than a sampling station but small enough to represent a relatively homogenous parcel of water (with regard to hydrology, land use influences, point and nonpoint source loadings, etc.).

Other factors may include the following:

- The expected natural variability of the measured criteria associated with the Water Quality Standards.
- The type of water (e.g., a small stream, a wide river, a tidal and stratified estuary, and coastal shoreline).
- Time of travel of a parcel of water in the water body or segment or the magnitude of any tidal excursions.
- The amount of and type of data and information necessary to provide a reasonably accurate characterization of the criteria (or core indicators) associated with the designated uses in the segment or water body.
- Any expected changes in significant influences in the watershed (land use, point or nonpoint sources of pollutants).
- Any site-specific concerns such as patchy or unique habitat distribution patterns or biological population distributions.

North Fork Feather River (NFFR) Evidence in Support of Review/Possible Revision of Historic COLD Freshwater Beneficial Use Designation

PG&E holds FERC licenses for the operation of the Upper NFFR Project (FERC No. 2105), Rock Creek-Cresta Project (FERC No. 1962), and the Poe Project (FERC No. 2107) on the North Fork Feather River. A vast amount of data and information pertaining to water resource management of the NFFR have been collected in order to maintain these licenses.

The CVRWQCB (CVRWQCB - Betty Yee, personal communication 2009) is unaware of any historical investigations or data pertaining to the Upper NFFR that may have been used to determine Basin Plan beneficial use designations for this water body specifically. Without knowledge of the process or rationale involved in making the original designations, and the lack of data available in support of the historic designations, PG&E recommends a collaborative review of the historic designations to determine if they are still appropriate for each reach of the NFFR.

PG&E believes that Upper NFFR designations for COLD and/or WARM beneficial uses should account for separate water segments or river reaches based upon knowledge of factors such as elevation, flow, channel morphology, substrate, riparian condition, climatic influences, confluence with other water bodies, and species assemblages as indicated in Figure 1. Six water segments are shown in the figure for the NFFR between Lake Almanor and Lake Oroville and include Seneca Reach, Belden Reach, Rock Creek Reach, Cresta Reach, Poe Reach, and Big Bend Reach. PG&E recommends a collaborative review with the CVRWQCB of the known available data for each individual water segment to determine whether a COLD,WARM, or a transitional designation of COLD/WARM Freshwater Habitat beneficial use is appropriate for the specific water segments based upon known available data or other evidence.

The Feather River changes substantially as it moves from its headwaters into the Sacramento Valley due to changes in elevation (from over 4,500 ft to 900 ft), gradient (from $\geq$140 ft/mile to $\leq$ 45 ft/mile), climate (up to a summer time average diurnal difference of 10^{o}F for air temperatures), and river flow (average of less than 35 cfs to more than 250 cfs between sections).

There is a 3,100 foot drop in elevation at the end of the Cresta Reach (at the Cresta Powerhouse) compared to the elevation of the waters originating at Canyon Dam. This likely results in much greater climatic influences on water temperature in this stream reach compared to waters upstream at Canyon Dam. Waters in this reach may be more representative of the transitional zone from cold water habitat to warm water habitat. The most recent data on fish species present, relative composition, and total population estimates for this reach are presented in a report prepared by PG&E (2006).

Seven species of fish representing both cold and warm water species were collected in the combined Rock Creek and Cresta reaches during 2005 by electrofish sampling (page 9 of the report). Rainbow trout made up 12% of the total catch, Sacramento sucker 34%, Sacramento pikeminnow 8%, hardhead 12%, smallmouth bass 5%, and sculpin (2 species) 30%. It appears that biological data collected from this reach support the possible basis of a transitional zone from COLD Freshwater Habitat to WARM Freshwater Habitat. This information suggests that it

would be important to ensure that both COLD and WARM Freshwater beneficial uses are managed and protected; rather than just managing for COLD Freshwater beneficial uses.

The end of the Poe Reach (at Poe Powerhouse) is located at approximately 900 feet in elevation. This equates to an approximate 3,600 foot drop in elevation compared to the elevation of waters originating at Canyon Dam (~48.5 miles upstream). This likely results in much greater climatic influences on water temperature in this stream reach as well (average diurnal air temperature differences of 10^{o}F have been observed) compared to higher elevation reaches on the NFFR. These factors should be accounted for in any assessments for designation of beneficial uses within the stream reach rather than relying on historical beneficial use designations that were based on now-outdated historical information.

Figures 2 and 3 present water temperature data in an 'elevation' format for various unregulated streams (Mill Creek, Deer Creek, and Middle Fork Feather River at Milsap Bar) and the East Branch NFFR compared to the NFFR. Figure 2 shows the maximum weekly average water temperature statistics (MWAT); and Figure 3 shows the maximum weekly maximum water temperature statistics (MWMT). These statistics are routinely used by both the CVRWQCB and the SWRCB as water temperature guidelines.

The type of thermal regime and variation in unregulated 'mother nature' water temperatures are compared to water temperatures found in the NFFR. The thermal effects of the East Branch NFFR are also shown in the figures.

Items of interest include:

a) How water temperature varies with elevation (more climatological influences on water temperatures with decreases in elevation, i.e., some degree of natural warming in the NFFR due to increases in air temperatures as elevation decreases),
b) Both US EPA and Sullivan "MWAT' and "MWMT" guidelines are shown here to illustrate the potential problems that may arise when using one water temperature criterion level for rivers that span numerous miles in length such as the Upper NFFR (56+ miles), traverse various elevations, and support various biota (it is increasingly more difficult for the lowest elevation waters to meet these guidelines partly due to physical environmental factors), and
c) Thermal impacts from the warmer waters of the East Branch of NFFR on PG&E's NFFR system are also shown in the figures (Belden above and below the East Branch NFFR demonstrate the warming influence of the East Branch NFFR).

The influence of elevation on water temperatures is also recognized in the scientific and regulatory community; the Colorado Water Quality Control Commission is currently in the process of adopting new water temperature criteria that consider elevation and longitudinal gradients (Todd, et. al 2008). These data were provided to the SWRCB during CEQA processes for the Upper NFFR in 2008.

In summary, PG&E recommends a collaborative review process with the CVRWQCB for the review of currently available data to determine whether the historic designations (COLD, WARM, or a transitional designation of COLD and WARM) are still appropriate in the Upper

NFFR, Belden, Rock Creek, Cresta, and Poe reaches. This evaluation will ensure that all beneficial uses are protected whether they are COLD, WARM, or transitional from COLD to WARM. The lack of historical information or data in support of a single COLD beneficial use designation suggests that this process should be reviewed and updated.

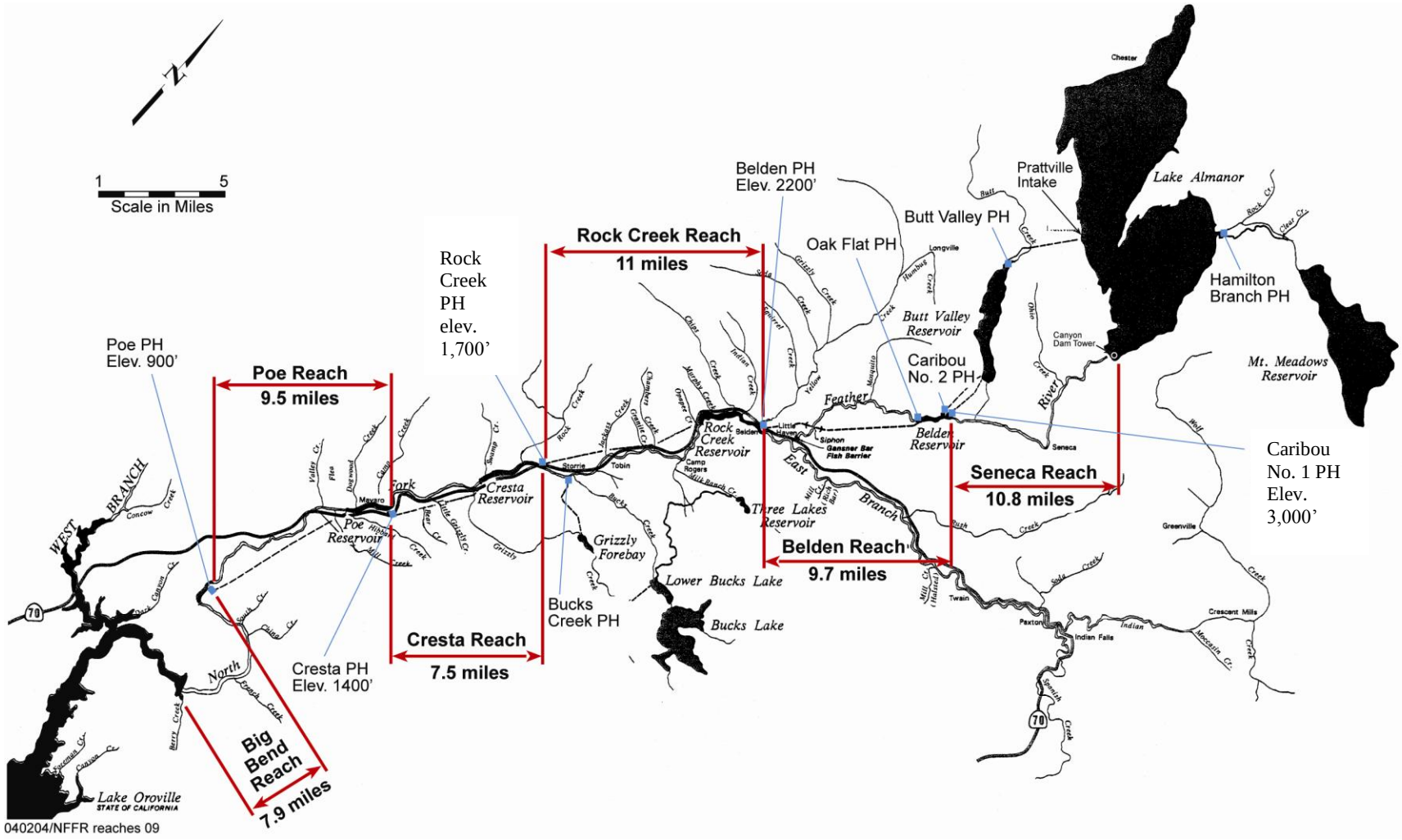


Figure 1. Proposed Water Segment Delineation for the North Fork Feather River between Lake Almanor and Lake Oroville

Figure 2: Maximum Weekly Average Water Temperature Statistics

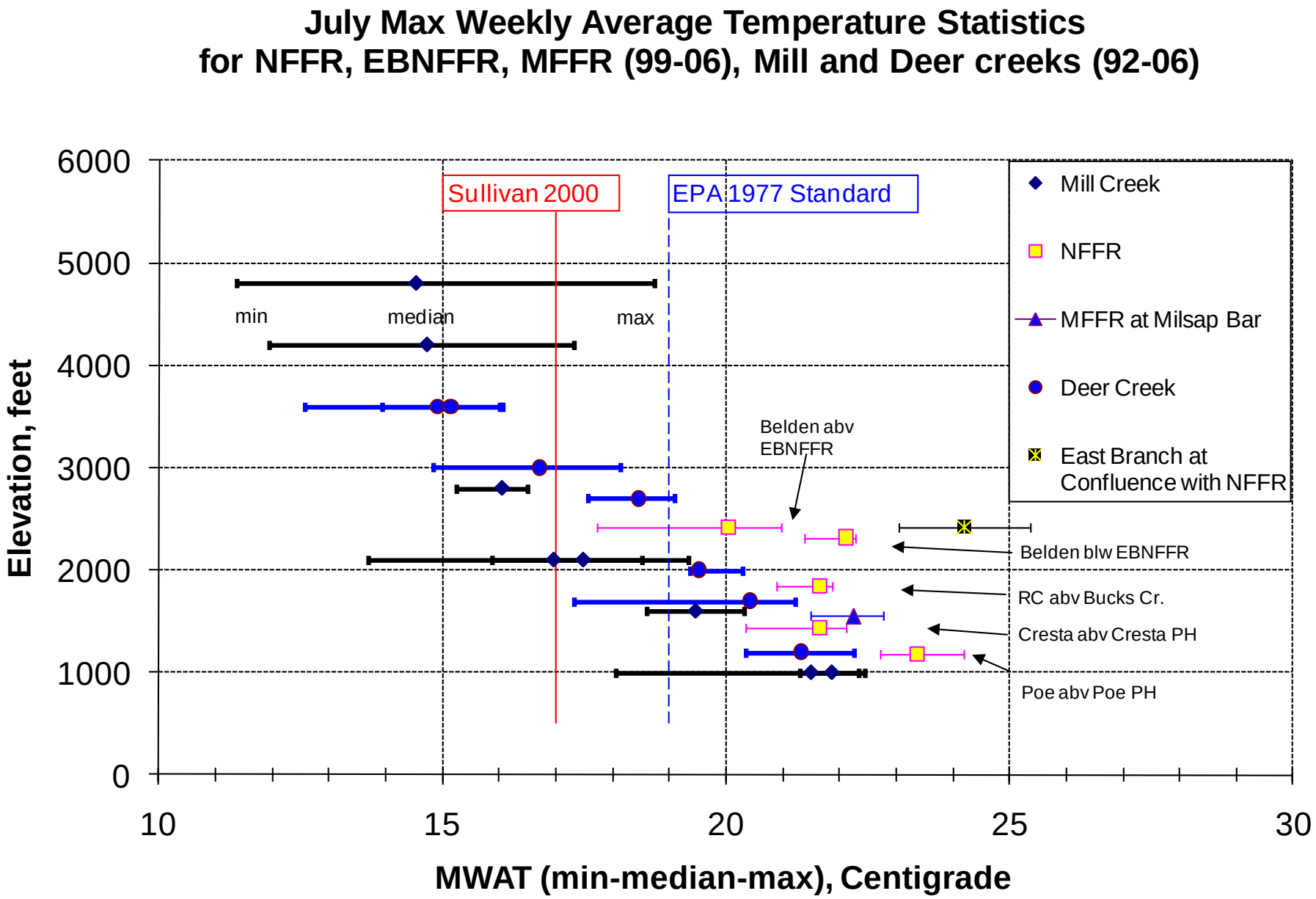
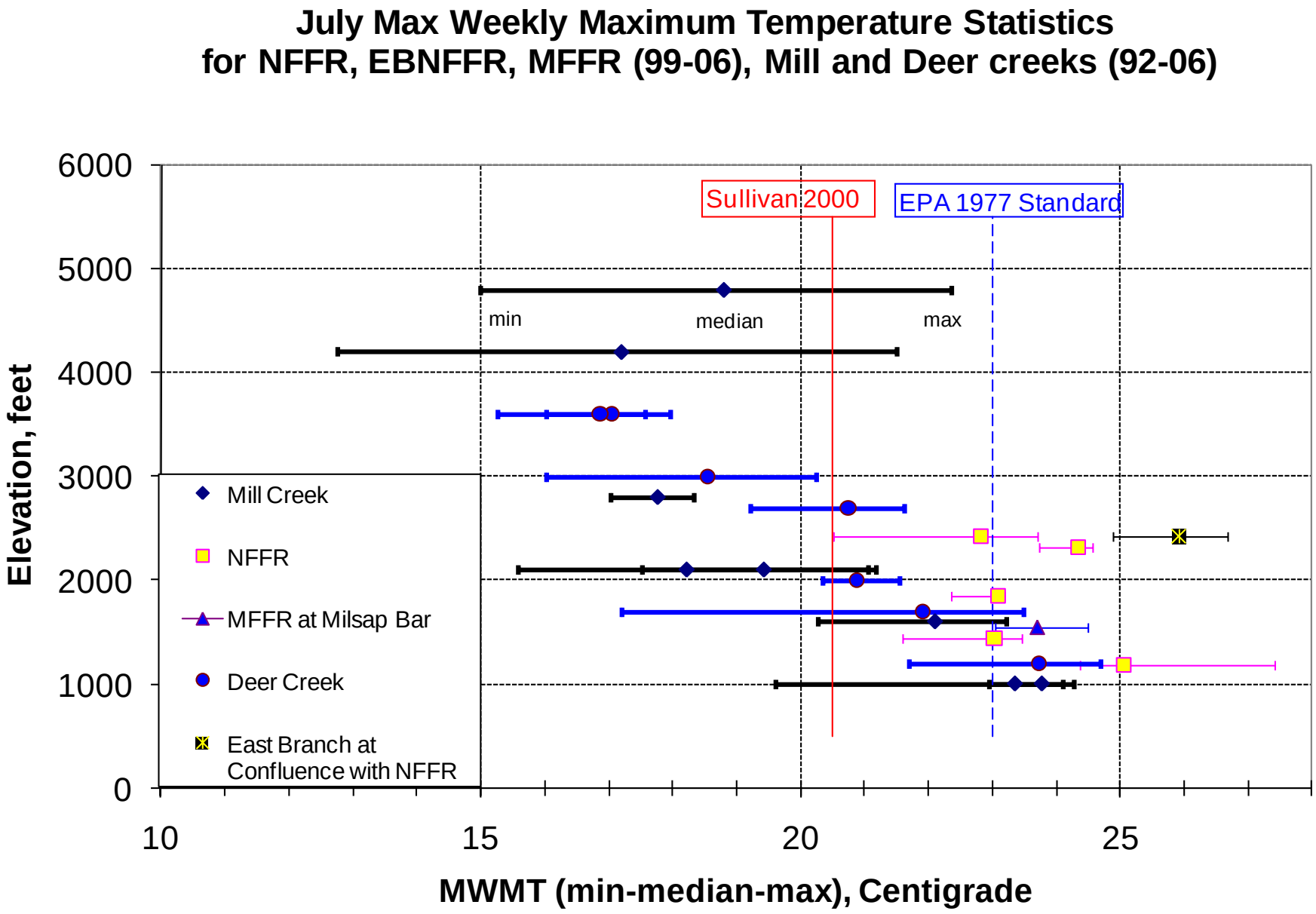


Figure 3: Maximum Weekly Maximum Water Temperature Statistics



Pit River Evidence in Support of Review/Possible Revision of Historic COLD Freshwater Beneficial Use Designation

PG&E holds FERC licenses for the operation of the Pit 1 Project (FERC No. 2687), Pit 3, 4, and 5 Project (FERC No. 0233), and McCloud-Pit Project (FERC No. 2106) on the Pit River. A great deal of data pertaining to resource management of this water body has been collected for each of these licenses through the years since the 1980s.

The historic CVRWQCB beneficial use designation of COLD and WARM Freshwater Habitat was assigned to the Pit River and its tributaries more than 30-years ago. WARM/COLD beneficial uses are only managed for COLD for the application of water quality objectives according to the Basin Plan. In September of 1962 the CVRWQCB conducted a short-term survey of the Pit River Basin (from the North and South forks above Alturas to Shasta Lake) for the purpose of defining existing water quality conditions and for reviewing the many factors which contribute to these conditions (CVRWQCB 1962). Findings of the report were to provide a basis for the optimum management and development of the Pit River Basin water resources.

At the time, results of the study indicated that the upper half of the Pit River (originating near Alturas) was, "…rather sluggish for the most part, with considerable variation in the annual flow." The report further stated that, "…neither is it possible to economically create clear pure water in these reaches that nature has predestined to be of a warm, sluggish, organic laden nature." Irrigation was recognized as the major water use during 1962. The lower half of the Pit River was described as exhibiting characteristics quite different from those of the upper reaches. The spring flow influences of the Fall River and Hat Creek were identified as prime contributors to these differences. The lower half of the Pit River was described, "…to be of excellent quality, and well suited to fishing and recreational pursuits." The report also reached the conclusion that, "…temperature of the Pit River Basin waters will likely be controlled by climatological factors, and by irrigation practices."

As described in the 1962 investigation, the waters of the Pit River today appear to be more of a WARM or WARM/COLD transitional zone in the upper half of the river above Pit River Falls (higher elevation), while the lower half of the river appears to support primarily a COLD Freshwater beneficial use (due to the cold water influences in tributaries to the lower half of the Pit River). However, the entire Pit River is designated WARM and COLD Freshwater habitat. PG&E recommends a collaborative review process with the CVRWQCB for review of the current available data for the Pit River to determine whether the WARM and COLD beneficial use is still appropriate for the entire Pit River under current environmental and resource management conditions.

Generally, water resource management practices suggest providing higher flows from upper elevation locations in a river in order to maintain COLD Freshwater beneficial uses downstream. However, this management practice does not make sense for the Pit River based upon the historic and existing environmental conditions of the upper Pit River compared to the lower Pit River. The cold water provided by the tributaries to the lower Pit River appear to provide a

greater cooling effect to the Pit River compared to increased flows from upstream in the Pit River as described in the example below.

Recent data collected as part of the Pit 1 Project License for PG&E by Spring Rivers Ecological Sciences, LLC (Spring Rivers) show the effects of summer-time flushing flow on the endangered species (Shasta crayfish) located in the project area (Spring Rivers 2009). Shasta crayfish are known to occur in an approximately 600-meter-long reach of the mainstem Pit River that is influenced by colder temperature springs just above the Pit River Falls. The report provides a biological evaluation of the potential thermal impacts of summer flushing flows on spring-fed sections of the Pit River. The water temperature data measured at a coldwater spring during and after the August 2004 flushing flow showed that the majority of the refugia area covered by coldwater habitat under base flow was reduced to zero during the flushing flow.

Thus it appears that for the Pit River, a COLD Freshwater beneficial use designation may be more appropriate in the lower half of the river and is likely dependent on the inflow from the spring-fed streams tributary to the lower Pit River. In contrast, it appears that the transitional WARM/COLD Freshwater beneficial use designation for the upper half of the Pit River (above Pit River Falls) may be appropriate, due to natural processes, and land use management occurring in this half of the river. However, it may be inappropriate to manage this transitional zone as COLD only, with respect to the application of water quality objectives. The current Basin Plan practice does not take into account environmental, physical, or biological factors and may ultimately be detrimental to the water body and the beneficial uses.

In conclusion, Basin Plan beneficial use designations for the Pit River should be based upon currently available data and information. The historic Basin Plan designations may not be appropriate for all reaches in the Pit River, and may result in potentially detrimental resource management practices (e.g., actions that may negatively affect listed species) in order to try to achieve the COLD beneficial use in all reaches of the river. To ensure proper protection of the various beneficial uses in the Pit River, PG&E recommends a collaborative review process with the CVRWQCB to assess the currently available data, determine the appropriateness of the historic designations, and possibly suggest changes to those designations if it is shown that they are inappropriate and do not apply to all reaches within the Pit River.

South Yuba River Evidence in Support of Review/Possible Revision of Historic COLD Freshwater Beneficial Use Designation

PG&E holds a FERC operating license of the Drum-Spaulding Hydroelectric Project (FERC No. 2310) on the South Fork Yuba River. The South Fork Yuba River currently has a COLD Freshwater Habitat beneficial use designation (COLD) in the Basin Plan. There are no known historical data that were used during the development of the Basin Plan to support this designation for the South Fork Yuba River specifically (CVRWQCB, Betty Yee Personal Communication 2009). A Water Quality Control Policy was developed in 1968 for the Upper Yuba River and Tributaries. The Upper Yuba River Policy area included the section of the main stem of the Yuba River above Englebright Reservoir (Rice Crossing), Bullards Bar Reservoir, the Middle Fork Yuba River, the North Fork Yuba River, and all tributaries to the designated reaches. This document did not include any data or information pertaining to the South Fork Yuba River.

The current Basin Plan COLD Freshwater Habitat beneficial use designation may be inappropriate and possibly unachievable in the lower section of the South Fork Yuba River (below Spring Creek) as demonstrated by unimpaired hydrology and biological data now available for the river. Annual maximum water temperatures (such as the 20°C guideline [specific to COLD water species] cited by the CVRWQCB in the 303(d) factsheet for the South Fork Yuba River; from Sullivan 2000) would not be met even in the unimpaired condition in many points along the South Fork Yuba River below Lake Spaulding to Englebright Reservoir. A more realistic designation of beneficial uses might include a designation of COLD for the upper section of the South Fork Yuba River (above Poorman Creek) which is dominated by cold water species, a transitional designation of COLD/WARM from Poorman Creek to Spring Creek, and a designation of WARM for the lower section of the South Fork Yuba River (below Spring Creek) which is dominated by warm water species.

The South Fork Yuba River from below Lake Spaulding to Englebright Reservoir is a 41+ mile length of river. The South Fork Yuba River changes substantially as it flows from below Lake Spaulding to Englebright Reservoir due to changes in elevation (from approximately 5,000 feet in the river below Lake Spaulding to approximately 530 feet at Bridgeport near Englebright Reservoir). There is a steep gradient resulting in approximately a 2,000 foot drop in elevation from below Lake Spaulding to a point in the river that is approximately 1-mile below the confluence with Fall Creek at river mile 35 (approximate elevation at this point is 3,000 feet). The river continues to decrease in elevation gradually reaching a final elevation of approximately 530 feet at Bridgeport near Englebright Reservoir.

Changes in elevation result in changes in relative air temperatures that are encountered within each reach (i.e., relative air temperatures will increase with decreases in elevation and the influence of these warmer air temperatures will be greater in the downstream reaches). Thus, the South Fork Yuba River should be evaluated for beneficial uses by river segment. Figure 4 shows an example of the South Fork Yuba River water segments that are currently recognized by PG&E and many resource agencies; they include Jordan, Rucker, Fall, Canyon, Poorman, and Humbug reaches.

It should also be noted that there are two other short reaches below Lake Spaulding; the "South Yuba below Spaulding Dam Reach" which is 0.2 miles long and goes from Spaulding Dam to Spaulding No. 2 Powerhouse, and the "South Yuba below Spaulding No. 2 Powerhouse Reach" which is 0.7 miles and goes from PH #2 to Jordan Creek confluence. These two reaches would be considered part of the upper South Yuba River in this discussion.

Regulated flows in the South Fork Yuba River in the summer (July-September) are virtually identical to the unimpaired flows in the summer as shown in Figures 5 and 6, respectively. Since the regulated and unimpaired hydrologies in the South Fork Yuba River are virtually identical in the summer, one could expect to see similar water temperatures under both of these conditions. Therefore, it is highly unlikely that the lower South Fork Yuba River under unimpaired hydrology would have ever supported the Basin Plan designation for COLD beneficial uses.

PG&E is currently in the process of relicensing the Drum-Spaulding Project, and water temperature data are being collected between 2007 and 2010 in support of the relicensing effort. Historical data and data collected in 2007 were presented in the Pre-Application Document (PAD) for the project, which is a publicly available document (PG&E 2008). Water temperature data collected in 2008 are available in a Technical Memorandum, which is available to the public online (www.eurekasw.com/NID/default.aspx).

Table 2 shows distribution of fish relative to river mile and water temperature observed during 2004 South Fork Yuba River snorkel surveys (Gast et al. 2005 and PG&E 2008). These data show that there are more pikeminnow in the lower section of the South Fork Yuba River (below Spring Creek) and more trout in the upper section of the South Fork Yuba River (above Spring Creek). These data support the conclusion that the lower, approximately 16 river miles, of the South Fork Yuba River is dominated by warm water species while the upper section of the South Fork Yuba River transitions from being dominated by warm water species to being dominated by cold water species, with the upper 5 river miles represented by cold water species. Stream fish population studies have also been conducted in 2008 and will also be conducted in 2009 as part of the relicensing effort.

Biological data suggest that the upper section of the South Fork Yuba River supports predominantly cold water species, primarily rainbow trout and brown trout (introduced); then the river supports both warm and cold water species in a transitional zone; and the lower section of the South Fork Yuba River supports more of a warm water fish assemblage of native Sacramento pikeminnow and hardhead (Gast et. al. 2005). These findings are consistent with the observed range of water temperatures that have been documented in the South Fork Yuba River between Lake Spaulding and Englebright Reservoir (i.e., the upper South Fork Yuba appears to support a COLD Freshwater beneficial use, the river transitions into a COLD/WARM Freshwater beneficial use, and the lower South Fork Yuba River appears to support a WARM Freshwater beneficial use).

Therefore, PG&E recommends a collaborative review process with the CVRWQCB. Current data (such as water temperature data and biological data) would be assessed to determine the appropriateness of the historical beneficial use designation of COLD Freshwater Habitat for the South Fork Yuba River. Current data appear to support the conclusion that a COLD beneficial

use may be more appropriate only for the upper South Fork Yuba River, while a WARM beneficial use may be more appropriate for the lower South Fork Yuba River.

Figure 4. South Yuba River Suggested Water Segment Delineation

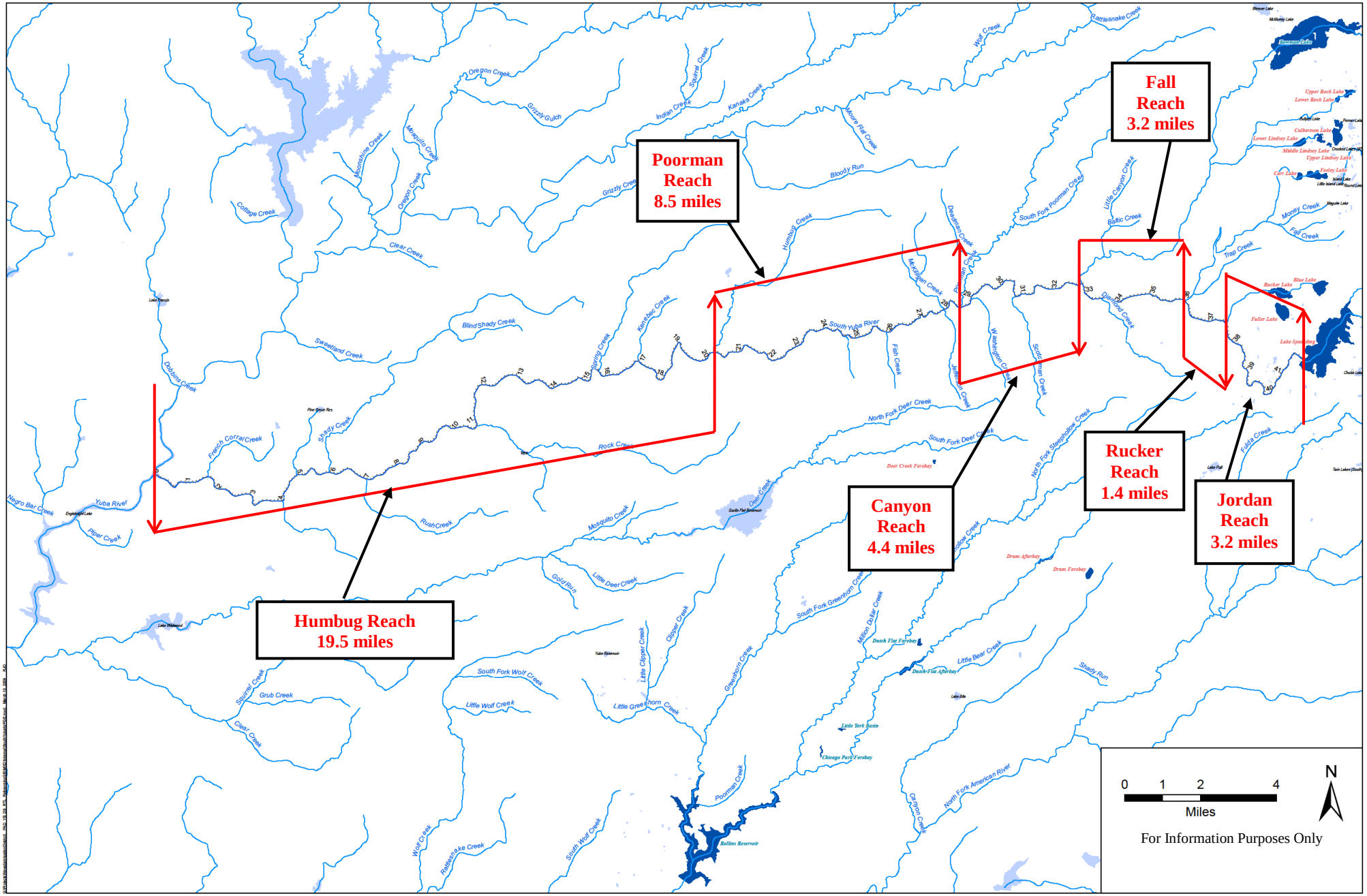


Figure 5: Unimpaired and Regulated Flow in South Fork Yuba below Canyon Creek

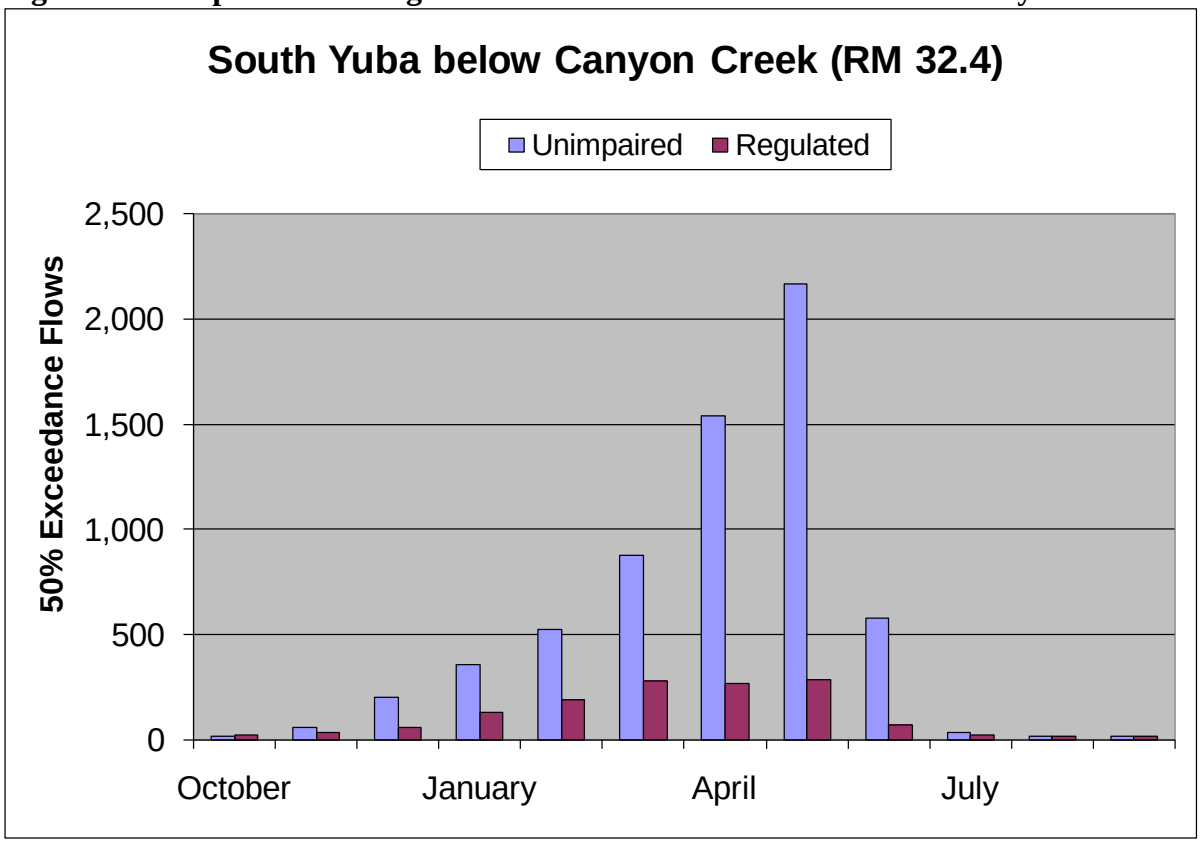


Figure 6: Unimpaired and Regulated Flow in South Fork Yuba at Jones Bar

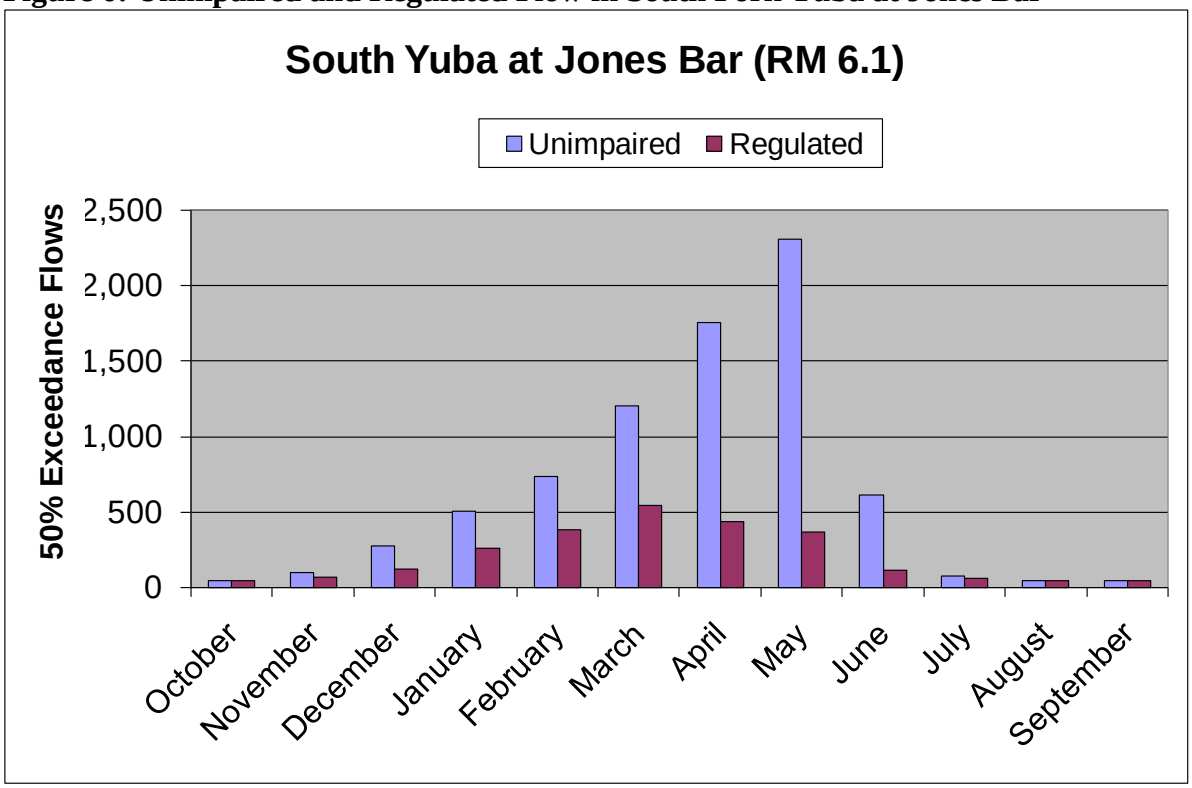


Table 2. Distribution of fish relative to river mile and stream water temperature observed during 2004 South Fork Yuba River snorkel surveys.

River Mile (beginning at head of Englebright Reservoir)[1]	Tributary Inflow	South Yuba Water Temperature (°C)	Rainbow Trout	Pikeminnow Hardhead[2]	Pikeminnow	Hardhead	Suckers	Rainbow (Fry Lane)	Non-game (Fry Lane)
0.0									
3.5		25.1		●*					●
3.9		23.3	●	●*		●			●
4.2	Owl Creek								
5.7		25.1		●*			●		●
6.7		23.1			●		●		
10.4		24.0	●	●*	●				
12.0		20.7	●	●*					●
15.2		22.9	●	●*			●		●
16.0	Spring Creek	21.9	●*	●			●	●	●
18.1		24.5	●*	●			●	●	●
19.7		24.3	●*	●					●
20.6	Humbug Creek	22.8	●*				●	●	
23.3		22.6	●*	●			●	●	
24.5		21.4	●*	●				●	●
27.5		20.9	●*				●	●	
28.1	McKilligan Creek								
28.3		20.3	●*	●*			●		●
28.8	Poorman Creek								
35.8		18.1	●*					●	
36.0		17.3	●*					●	
40.6		17.3	●*						

Source: Gast et al. 2005

1 RM from Gast et al. (2005) slightly different than Licensee's RM measurement.

2 Pikeminnow and hardhead less than 4" in length not discernible.

* Higher population levels (Rainbow trout and Pikeminnow/Hardhead only).

Willow Creek Evidence in Support of Review/Possible Revision of Historic COLD Freshwater Beneficial Use Designation

PG&E holds a FERC operating license for the Crane Valley Hydroelectric Project (FERC No. 1354) located in part on Willow Creek in Madera County. The CVRWQCB's proposed 2008 California 305(b)/303(d) Integrated Report contained a 303(d) water temperature listing for Willow Creek and the beneficial use was listed as COLD Freshwater Habitat (CVRWQCB 2009). One of the lines of evidence listed in the Integrated Report to support the proposed 303(d) listing of Willow Creek included possible changes in relative diversity and abundance of native fish species, specifically hardhead.

PG&E believes that current water temperature and biological data actually support lower Willow Creek (approximately 805 m above the confluence of the San Joaquin River) as having a WARM Freshwater Habitat beneficial use rather than a COLD Freshwater Habitat beneficial use. Hardhead are a California Species of Special Concern and US Forest Service Sensitive Species. The presence of hardhead in lower Willow Creek may substantiate a WARM Freshwater beneficial use rather than a COLD Freshwater beneficial use since hardhead are a warm water species. According to Moyle (2002), hardhead typically occur in streams where summer water temperatures exceed 20°C, and in laboratory studies, hardhead appear to select optimal water temperatures of 24 to 28°C.

PG&E has collected four years of data for a six-year water temperature monitoring study which began in 2005; the study has provided valuable information regarding existing water temperatures under current federally licensed operating conditions for this water body (PG&E 2006, 2007, 2008, and 2009). Monitoring results from the first 4 years of the water temperature monitoring program indicate that water temperatures in lower Willow Creek are in an optimal range for use by hardhead and other warm water species such as Sacramento pikeminnow and Sacramento sucker.

Historical studies indicate that hardhead have been found in most streams of the San Joaquin drainage including lower Willow Creek (Bozemann et al. 1985 and Reeves 1964). Data and information collected in 2007 provide a better indication of the presence/absence of hardhead in Willow Creek (Jones & Stokes 2008). Fish survey sites were located in lower Willow Creek. The study found that a natural waterfall approximately 805 m above the confluence of the San Joaquin River precludes upstream migration of hardhead. The total surveyable reach in lower Willow Creek was therefore 0.5 miles (800 m) above the confluence with the San Joaquin River.

A total of 698 fish were captured during the surveys (native species represented 93% of the total catch and were dominated by Sacramento pikeminnow (~73%), Sacramento sucker (~15%), smallmouth bass (~7%), and hardhead (a total of 26 fish or ~4%)). Other fish species made up 1% or less of the total catch and included rainbow trout, green sunfish, prickly sculpin, and brown bullhead (Jones & Stokes 2008). Hardhead are typically found in association with Sacramento pikeminnow and usually with Sacramento sucker (Moyle 2002), as was the case with this study. Most hardhead in lower Willow Creek were caught in May and July and nearly all the hardhead that were captured in 2007 represented ages 0+, 1+, and possibly 2+ fish (Jones & Stokes 2008). Based upon the presence of young-of-the-year juveniles, it appears that

hardhead may use lower Willow Creek primarily for spawning and early season rearing. Spawning habitat (riffles, runs, and pools with gravel [Moyle 2002]) is available in lower Willow Creek for hardhead. It may be that the viable and healthy population of hardhead from Horseshoe Bend use lower Willow Creek for spawning and early season rearing; after an environmental cue, the young-of-the-year hardhead move back down into the larger pools in the Horseshoe Bend Reach of the San Joaquin River (Price 2002).

As suggested in a PG&E report (Price 2002), nonnative species may also be a limiting factor for hardhead populations in Willow Creek, rather than water temperature. Nonnative game species such as bass, bullhead, and sunfish have been introduced into Bass Lake above the survey area for recreational fishing. They could be washed downstream during high winter and spring flows into lower Willow Creek (Jones & Stokes 2008). Brown and Moyle (1993) found hardhead presence in the San Joaquin River and its tributaries was positively correlated with percentage of native species.

PG&E recommends a collaborative review process with the CVRWQCB to assess currently available data for Willow Creek to determine whether the current COLD Freshwater Habitat beneficial use designation for lower Willow Creek should be changed to WARM. This assessment should be conducted to ensure protection of the special status warm water species that are present in that reach, specifically hardhead.

CONCLUSION

PG&E recommends the CVRWQCB conduct a collaborative review of the historical beneficial use designations in the Basin Plan on a case-by-case basis to determine whether these beneficial uses are adequately informed by current data and supportive of current environmental conditions and biota for each water body. This evaluation would provide the basis for updating beneficial use designations, which in many cases haven't been revised since their inception.

PG&E also recommends the CVRWQCB conduct a collaborative review process to assess whether some water bodies should be further segmented for the purpose of listing beneficial use based on factors such as distance traveled by the water, changes in species assemblage, elevation changes, and other characteristics specific to the water segments. This type of analysis will ensure that the water bodies are managed in the best possible way for the protection of beneficial uses whether they represent COLD, WARM, or a transitional zone of COLD/WARM.

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