State of California –The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
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EDMUND G. BROWN, Jr. Governor
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August 24, 2011

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Betty Yee
Regional Water Quality Control Board
11020 Sun Center Drive #200
Rancho Cordova, California 95670-6114

Subject: Triennial Review for the Sacramento River and San Joaquin River Basins

Dear Ms. Yee:

The California Central Valley Regional Water Quality Control Board (Board) is in the process of reviewing the adequacy of water quality standards for designated beneficial uses for water bodies in the Central Valley as contained in the Basin Plan. Currently, the water quality standards for anadromous salmonids in the Basin Plan are qualitative rather than quantitative. Due to the poor condition of anadromous salmonid populations in the San Joaquin River Basin, there is a need to implement numerical (i.e., quantitative) standards to protect anadromous fish species.

The California Department of Fish and Game (Department) has jurisdiction over the conservation, protection and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species (Fish and Game Code Section 1802). As trustee agency for fish and wildlife resources, we are responsible for providing, as available, biological expertise to review and comment on environmental documents and impacts arising from Project activities, as well as, propose protections to sustain healthy populations of fish and wildlife.

The Board presented twelve priority issues and work plan for the above Triennial Review. Our main comments concern Issue 10: Protection of Central Valley Fisheries and other Aquatic Life. Issue 10 is considered a High Priority, but no Current Action and Current Resources are proposed. Additional resources include a 0.5 PY per year per amendment and Contracts of $500,000 for temperature work. We concur that to address temperature protection will require funding and staff time; however, we believe minimal time and cost is needed because the United States (U.S.) Environmental Projection Agency's (EPA) Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards [EPA 910-B-03-002] (EPA 2003) has established scientifically based numerical water temperature standards for anadromous fish critical life stages. We strongly advocate that the Board adopt these numeric standards in the Basin Plan.

The Department continues to believe that the most significant critical factor limiting anadromous salmon and steelhead population abundance in the San Joaquin River Basin is the presence of high water temperatures during critical life-stages in the east-side tributaries (the Stanislaus, Tuolumne, and Merced Rivers) and the main-stem of the San Joaquin River. Increased water temperatures result largely from insufficient in-stream flow releases

from the lower rim dams, which the Department believes is directly responsible for most chronic stressors affecting anadromous species of the San Joaquin River Basin.

The Department continues to contend that the EPA Region 10 criteria are consistent with the requirements of 18 CFR § 5.9(b)(6) and are appropriate for the San Joaquin River Basin. The Department accepts these criteria because the EPA **completed a very thorough literature review** for water temperatures to protect cold water fish species (trout and salmon), referencing 41 sources that included five issue papers. The issue papers, in turn, referenced approximately 700 citations. As a result, EPA's recommendations are grounded in a broad spectrum of the scientific literature across North America, including California, and parts of Europe and New Zealand for developing chronic protective temperature criteria for anadromous fish populations across multiple generations. This chronic exposure approach is consistent with the emphasis by the Department on reproduction and recruitment success of an entire **population** across each generation. Taking a chronic exposure approach recognizes the evolutionary importance of multi-year class life history strategies of salmon and steelhead. In contrast, standards based on only acute to sub-acute exposure to high temperatures emphasize "tolerance or acclimation" temperatures, which is the survival of **individuals** over a shorter time period.

In addition, with regard to the temperature threshold metric, EPA (2003) stated:

> "This metric is recommended because it describes the maximum temperatures in a stream, but is not overly influenced by the maximum temperature of a single day. Thus, it reflects an average of maximum temperatures that fish are exposed to over a weeklong period. Since this metric is oriented to daily maximum temperatures, it can be used to protect against acute effects, such as lethality and migration blockage conditions. This metric can also be used to protect against sub-lethal or chronic effects (e.g., temperature effects on growth, disease, smoltification, and competition)..."

EPA (2003) also stated:

> "It is important to note that there are also studies that analyzed sub-lethal effects based on maximum or 7DADM temperature values which need not be translated for purposes of determining protective 7DADM temperatures. For example, there are field studies (emphasis added) that assess probability of occurrence or density of a specific species based on maximum temperatures [Issue Paper 1, Haas (2001), Welsh et al. (2001)]. These field studies (emphasis added) represent an independent line of evidence for defining upper optimal temperature thresholds, which complements laboratory studies."

These criteria (e.g., 7DADM) are chronic thresholds to protect anadromous fish populations across multiple generations. In addition, this is an average, meaning a range of values, not

constant values, were used to calculate a criteria value. Elevated daily temperatures across seven days indicate the fish are not being briefly exposed across time. Daily water temperature range is very narrow at higher temperature values (as opposed to a wide range of values) in the San Joaquin River and tributaries, thus the fish are not briefly exposed to elevated temperatures. Also, based upon empirical data, San Joaquin River Basin fish do not have the health sustaining refugia of a brief exposure to optimal cool temperatures during a 24-hour period in the San Joaquin Valley Basin river systems.

To further illustrate how the EPA Region 10 criteria apply to the San Joaquin River basin, we evaluated climatic ambient air temperatures across the historic range for Chinook salmon and steelhead in the lower continental U.S. (Figure 1.) Evaluating a comparison between the coastal region of Washington or Oregon and the southern San Joaquin Valley is inappropriate. As such, we evaluated the entire historic anadromous fish range, because these are the areas where these stocks of fish co-evolved. We compared average daily, mean minimum and mean maximum daily air temperatures for the month of September from 2007 to 2010 (Tables 1, 2 and 3). September was chosen because this is one of the hottest months of the year and this is the time period fall-run Chinook salmon major migration begins into the Delta San Joaquin Valley Corridor. Climatic conditions varied across locations in Idaho, Washington, Oregon, Nevada, and California. However, there were similarities across these states. Three California locations, South Lake Tahoe, Alturas, and Eureka had the coolest average daily temperature and were not significantly different (ANOVA, $P < 0.05$) (Table 1). The second-coolest locations based on average daily temperatures were McArthur, California; Elko, Nevada; Santa Rosa, California; Winnemucca, Nevada; Spokane, Washington; and Seattle, Washington ($P < 0.05$; Table 1). This trend was similar for mean minimum and mean maximum air temperatures (Tables 2 and 3). The primary reason for these similarities is due to oceanic influence along the coastal locations and mountain elevations within the inland locations. Merced and Stockton, California did have the warmest air temperatures for the locations evaluated; however, anadromous fish did not spawn in these areas. Rather, they historically migrated further upstream to sites in higher, cooler elevations, which today either receive less cooling water due to diversion, or are blocked by dams. In summary, no evidence exists to demonstrate San Joaquin River Basin salmon have higher temperature resistance or adaptation, and the environmental conditions for fall-run salmon are consistent across the fall-run range in the lower continental U.S. Thus, EPA Region 10 criteria are valid for and should be applied to the San Joaquin River Basin.

We support the Board's efforts to address other high priority issues as listed and understand your limitations of funding and staff resources. The Department has similar limitations, but remains interested in assisting Board staff to address these issues where applicable and practical. The Board's efforts with CV-SALTS (per Priority Issue 1) are especially commendable. Regarding priority Issue 3: "Regulatory Actions in Agricultural Dominated Water Bodies and Agricultural Conveyance Facilities", the Department recognizes that these water bodies can have unique issues. We caution however, that the Department does not agree in general with the contention of some of the stakeholders that functionality should take precedence over other beneficial uses. It is possible in limited and unique situations

that this could be the case, but each must be well documented and justified. Within the discussion of priority Issue 4, the topics of "long water body reaches" and the perceived conflict of a water body with both COLD and WARM beneficial designations is raised. The Department urges caution in splitting water bodies, because the ecosystem services and functions of a water body are inter-related. The Board may determine in the future that it is more practical to address beneficial uses for a smaller unit of the system, but that decision should be made with care and full knowledge of disadvantages a change could have. For instance, many of our native fish will move through a system as the seasons change. This behavior does lead to specific reaches that need to be maintained as COLD during part of the year and WARM during other times.

If you have any questions regarding these comments, please contact Dr. Andrew Gordus, Staff Environmental Scientist, of my staff at (559) 243-4014, extension 239.

Sincerely,

for Jeffrey R. Single, Ph. D.
Regional Manager

Attachments

cc: Valentina Cabrera-Stagno
Water Division, USEPA Region 9
75 Hawthorne Street (WTR-2)
San Francisco, California 94105-3901

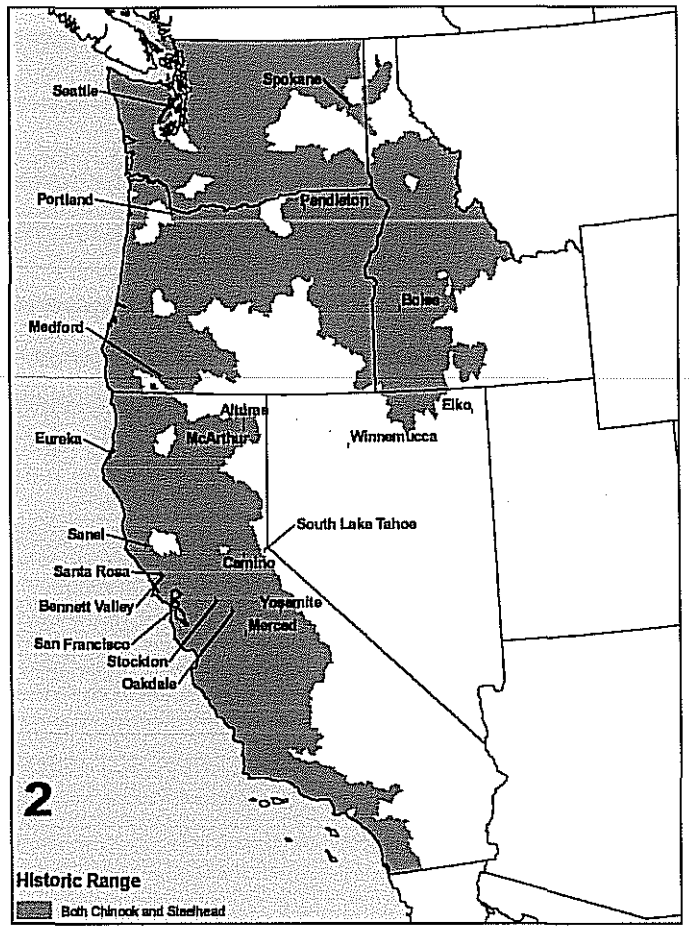

Figure 1. Historic range for Chinook salmon and steelhead in the Pacific north west (Source: www.ecotrust.org).

Table 1. Comparison of daily air temperatures across the Pacific northwest using analysis of variance.

AVERAGE DAILY AIR TEMPERATURES (C) SEPTEMBER 2007 TO 10		
Bars = No Significance $p < 0.05$		
S. LAKE TAHOE	CA	55.5
ALTURAS	CA	57.2
EUREKA	CA	57.5
McARTHUR	CA	59.9
ELKO	NV	61.1
SANTA ROSA	CA	61.1
WINNEMUCCA	NV	61.2
SPOKANE	WA	61.3
SEATTLE	WA	61.3
BENNETT VALLEY**	CA	62.1
PENDLETON	OR	63.1
PORTLAND	OR	64.8
SANEL VALLEY*	CA	64.9
SAN FRANCISCO	CA	66.3
BOISE	ID	67.5
MEDFORD	OR	67.8
YOSEMITE VALLEY	CA	68.3
CAMINO (Placerville)	CA	69.8
OAKDALE	CA	69.6
STOCKTON	CA	73.1
MERCED	CA	73.1

*Mendocino and Lake Counties

**Sonoma County

Table 2. Comparison of minimum air temperatures across the Pacific northwest using analysis of variance.

MEAN MINIMUM AIR TEMPERATURES (C) SEPTEMBER 2007 TO 10		
Bars = No Significance $p < 0.05$		
S. LAKE TAHOE	CA	34.9
ALTURAS	CA	35.0
WINNEMUCCA	NV	38.8
McARTHUR	CA	39.4
ELKO	NV	40.1
SANTA ROSA	CA	45.6
SANEL VALLEY*	CA	46.6
BENNETT VALLEY**	CA	47.1
PENDLETON	OR	48.2
SPOKANE	WA	48.4
EUREKA	CA	50.3
MEDFORD	OR	51.0
YOSEMITE VALLEY	CA	52.9
SEATTLE	WA	53.1
BOISE	ID	53.2
PORTLAND	OR	54.0
OAKDALE	CA	54.5
MERCED	CA	56.0
STOCKTON	CA	56.6
SAN FRANCISCO	CA	57.0
CAMINO (Placerville)	CA	58.0

*Mendocino and Lake Counties

**Sonoma County

Table 3. Comparison of maximum air temperatures across the Pacific northwest using analysis of variance.

MEAN MAXIMUM AIR TEMPERATURES (C) SEPTEMBER 2007 TO 10		
Bars = No Significance $p < 0.05$		
EUREKA	CA	64.1
SEATTLE	WA	69.0
SPOKANE	WA	73.6
SAN FRANCISCO	CA	75.0
PORTLAND	OR	75.1
S. LAKE TAHOE	CA	75.6
PENDLETON	OR	77.5
SANTA ROSA	CA	80.1
ALTURAS	CA	80.4
BOISE	ID	81.3
ELKO	NV	81.5
BENNETT VALLEY**	CA	82.1
McARTHUR	CA	82.7
WINNEMUCCA	NV	83.0
CAMINO (Placerville)	CA	84.0
MEDFORD	OR	84.1
OAKDALE	CA	86.3
YOSEMITE VALLEY	CA	87.0
SANEL VALLEY*	CA	87.2
STOCKTON	CA	89.2
MERCED	CA	89.7

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**Sonoma County