UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404

Exhibit for the Redwood Chapter of the Sierra Club Comment Letter

F/SWR4:WH

May **11,2000**

Ms. Laura Vasquez
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Dear Ms. Vasquez:

I reviewed the April 5, 2000, letter to the National Marine Fisheries Service from Wagner & Bonsignore, consultants for Kenneth and Beatrice Oswald, applicants for water rights Applications 29810 and 30792. Wagner & Bonsignore rejected NMFS' recommendations for mitigating impacts to threatened coho salmon in the Navarro River watershed. They dismissed our recommendations, believing that the recommendations are "...not based on biological needs of fish and should not serve as a basis for protests dismissal conditions", and because benefits "...have not been demonstrated by NMFS." Their view is an apparent misunderstanding of NMFS guidelines for maintaining adequate in-stream flows for fish. Their letter suggests a strategy for appropriating water that, if unchecked, has strong potential to significantly impact threatened populations of anadromous salmonids.

Project Minimum Bypass Flows

By agreeing to maintain a bypass flow equivalent to 60% of the average annual flow, the applicant's consultants acknowledge that the impact of water diversions on fish is a reasonable concern, and that such impacts should be mitigated. Yet at the January 31, 2000, meeting at the SWRCB peer-review workshop on in-stream flow guidelines (attended by principals of Wagner & Bonsignore) scientists from diverse backgrounds rejected the reasonableness of the 60% mean annual standard. NMFS biologists (NMFS 2000) pointed out that 60% of mean annual flow is not a sufficient low flow standard for winter water withdrawals because,

1. It is based on a dry year criterion that places threatened salmonid populations at risk,

2. In-stream flow studies indicate that optimal flows for salmonids are considerably higher than 60% mean annual flow,

3. The SWRCB's analysis is based on the erroneous assumption that there is a typical weighted useable area curve that can be applied to derive an estimate of percent maximum habitat.

. 4. The hydrologic metric, 60% of mean annual flow, is not related to winter hydrology and is greatly influenced by the duration of the low flow season (e.g., streams to the south would be more adversely affected by this standard than more northern streams without a lengthy dry season).

5. The hydrologic metric, 60% of mean annual flow, is not related to biological needs of fish except for a single, unique spawning habitat-discharge relation in one stream reach in Big Sulphur Creek, a tributary of the Russian River. Although not addressed by NMFS (NMFS 2000), it is now worth noting that spawning habitat-discharge relation used to support the 60% mean annual flow guideline was noticeably different from the habitat-discharge relations for other study sites in Big Sulphur Creek (Harding Lawson Associates 1990).

6. Analysis of flow hydro graphs for Russian River tributaries indicates that this standard would appreciably reduce naturally sustained winter flows that provide important spawning habitat for anadromous salmonids (NMFS 2000).

Given these concerns, NMFS recommends that (in the absence of site-specific studies) small water diversion projects of :s 3 cfs or:S 200 acre-ft should maintain minimum bypass flows equivalent to the .estimated, long-term, unimpaired, February median flow. or inflow, whichever is less. The biological basis for this guideline is as follows:

1. The life histories and general habitat needs of salmonids in coastal California streams were reviewed to identify life stages that are potentially impacted by winter water. withdrawals.

2. Spawning was identified as the life stage most likely to be impacted by winter water withdrawals. This was determined on the basis that,

    a. Spawning habitats for salmonid species typically require higher sustained flows than habitats for other life stages such as try or juvenile stages (McMahon 1983; Bjornn and Reiser 1991; Groot and Margolis 1991).

    b. Velocity preferences of spawning salmonids are typically greater than those of try and juvenile stages (Raleigh et al. 1984; Raleigh et al. 1986; Groot and Margolis 1991) .

    c. Winter is the period with highest flows and the time of salmonid spawning and egg incubation.

    d. Overwintering juveniles typically reside in low velocity backwaters and pools

where they may be sensitive to sudden losses of stream flow (Nickelson et al. 1992; McMahon and Hartman 1989). However, overwintering habitat for juveniles does not require the maintenance of flows higher than those needed for spawning, but rather they can be protected by the avoidance of unnatural sudden drops in stream stage in backwaters and pools.

3. Spawning habitat is protected by maintaining bypass flows that conserve "effective spawning habitat" (i.e., the amount of habitat available to complete both the spawning and incubation phases of development). The rationale for protecting effective habitat is that:

Spawning habitat is not effectively utilized unless it is sustained throughout both the spawning and incubation period (Bovee 1982; Bjornn and Reiser 1991). Egg survival in temporarily de-watered redds is variable and dependent on developmental stage, the maintenance of intragravel moisture, vapor pressure gradient, proximity to subsurface flow, and fine sediment concentrations (Reiser and White 1983; 1985). Sac fry, the life stage of salmonids immediately prior to emergence from the gravel, are highly intolerant of de-watering (Becker et al. 1982).

4. The precise flow at which maximum potential effective spawning habitat is maintained can only be determined with site-specific studies. However, the long-term, unimpaired February median flow approximates the maximum effective spawning habitat, because:

a. Spawning habitat for salmonids generally consists of areas with gravel substrates, moderate stream currents (about 1 to 2~ ft/s), and depths of about ~ to *2Y2* ft (McMahon 1983; Raleigh et al. 1984; Raleigh et al. 1986; Groot and Margolis 1991). At low and intermediate stream flows, the quantity of spawning habitat is usually positively related to stream discharge, because stream depth, velocity, and wetted area are positively correlated with stream discharge (Bjornn and Reiser 1991). Thus, as stream discharge increases, so too does the area of streambed covered with flowing water, as well as stream depths and velocities within shallow riffles, the areas most likely to contain gravel substrates important for salmonid reproduction.

b. Although spawning and incubation habitat is generally positively correlated with discharge, natural high flows must be sustained for a substantial period of time in order to be effective. The duration of the spawning and incubation stages is dependent on several factors, including temperature conditions and species. Thirty-seven days is a near minimum length of time required for the completion of reproductive and developmental stages that begin with spawning and end with fry emergence. Thus, spawning habitat must be sustained with flow (including subsurface flow) for 37+ days to be effective.

c. During the periods of record for gaged tributaries in the Russian River, approximately one-half of those water years sustained (or nearly sustained) natural flows as high or higher than the February median flow for time periods sufficient for spawning and egg incubation (NMFS 2000).

d. A minimum bypass flow standard less than the unimpaired February median would potentially reduce effective spawning habitat in approximately one-half the years (NMFS 2000). A minimum bypass flow standard appreciably higher than the unimpaired February median would likely protect natural flows that occur at a frequency insufficient to sustain successful egg incubation and fry emergence.

5. The NMFS recommendation to prohibit withdrawals when flow is less than the February median is intended to protect sustained surface flows that pass over incubating eggs deposited in streambed gravels. Bjomn and Reiser (1991) include water depth above the redd, and surface water discharge and velocity as some of the important variables upon which successful incubation of embryos and fry emergence depend. They state that permeability (the ability of particles in the redd to transmit water per unit of time) and *apparent velocity* (volume of water passing through a given area of redd per unit of time) are two commonly used measures of the suitability of a redd for successful incubation of salmonid embryos. Addressing the relationship between apparent velocity and surface flows, Bjomn and Reiser (1991) state,

> *Apparent velocity of water in redds may increase or decrease with the depth (and quantity) of the surface water (Reiser and White 1981a). Early evidence of this was reported by Wickett* (1954), *who found a direct relation between gage-height readings in a stream and subsurface flow. Chapman et al.* (1982) *also observed decreases in apparent velocity when flow decreased from* 1,982 *to 1,019 m3 Is in the Columbia River.*

6. It is a reasonable assumption that coho salmon and other salmonids resident in coastal streams of California are adapted to historic, unimpaired winter flow conditions. In addition to conserving effective spawning habitat, the unimpaired February median flow guideline conserves "typical" winter flows to which the fish are adapted. Diversions are permitted only during the higher flows of winter. A standard based on the arithmetic monthly median is judged to be a good descriptor of "typical" flows. A monthly average (i.e., arithmetic mean) is a less good descriptor, because the'mean is strongly influenced by a few very high flow events that often happen during winter months. Within the Navarro watershed, February median flow is generally higher than monthly median flows for December, January, and March. Thus, the maintenance of the February median flow would likely protect spawning and incubation habitat of salmonids during all months of the winter.

7. NMFS minimum bypass flow guideline identifies the unimpaired February median flow as an appropriate guideline for watersheds in the coastal watersheds between the Mattole River and San Francisco Bay. This guideline, which is based on winter hydrology, is flexible and may be adjusted, as necessary, for other coastal regions where December, January, or March may have appreciably higher median flows than February. This consideration of winter hydrology permits biologists to adapt recommendations to account for regional variations in winter hydrology. The 60% of mean annual flow guideline does not consider winter flow conditions, nor is it naturally amenable to regional variations in winter hydrology.

Avoidance of On-stream Dams and On-stream Storage

In their letter, Wagner & Bonsignore stated that the Applicant does not agree with the condition to avoid construction of dams across streams if they were historically used by salmonids. The determination of whether the streams were historically or potentially useable by salmonids will require evaluation by a professional fisheries biologist, and be subject to the approval of the resource agencies (NMFS and California Department of Fish & Game). We recommend that the applicant use the services of a qualified biologist to perform such an evaluation in consultation with the resource agencies. The potential impacts of dams and on-stream reservoirs on anadromous fish are stated in our protest letter dated February 22, 2000. Consistent with our most recent protests concerning existing, un-permitted, on-stream dams and storage ponds, we do not object to an on-stream facility, if it is located 1) in a stream reach where fishes or non-fish aquatic species were not historically present upstream, and 2) where the project could not contribute to a cumulative reduction of more than 10% of the natural instantaneous flow in any reach where fish are at least seasonally present, and 3) where the project would not de-water any fishless stream reach, yet does support aquatic invertebrates. By cumulative reduction, we refer to the effects of this and other projects (permitted and un-permitted) as well as diversions under riparian rights. However, if a proposed project is located on a stream where 1) fishes or aquatic invertebrates were historically present upstream, or 2) the project could contribute to a cumulative reduction of more than 10% of the natural instantaneous flow in any reach where fish are at least seasonally present, then we protest that development and strongly recommend that it be converted to an off-stream reservoir project. The uncontrolled and cumulative impacts of such un-permitted dams poses an unacceptable impact to anadromous fish.

Limits to the Maximum Cumulative Rate of InstaneousDiversion

Wagner & Bonsignore reject the need to establish a maximum cumulative rate of instantaneous diversion equivalent to 20% of the "20% winter exceedence flow." They reject on the basis that it would require the construction of large, expensive bypass facilities that would render the project infeasible. Their concern over the need for an expensive bypass facility relates to severe deleterious effect on downstream flows during the filling period for on-stream reservoirs. During filling, the rate of diversion is near 100percent. This is one of several reasons why on-stream reservoirs should not be permitted unless flow in reaches with fish is not significantly affected

(e.g.,<lO%).

Limiting the maximum cumulative rate of instantaneous diversion is very important because it will ensure that stream flows are not "flatlined" or reduced to a constant minimum flow. Limiting the cumulative rate of withdrawal will preserve a near natural hydro graph and provide important high flow and moderate level flows that are important for maintaining natural channel processes and providing favorable conditions for migrating anadromous fish. The need to establish maximum cumulative rates of instantaneous withdrawal is further discussed in our workshop comments (NMFS 2000).

Actually determining the potential cumulative instantaneous rates of withdrawal is an activity appropriately implemented by the SWRCB, Division of Water Rights in allocating new water rights. Water diverted for agricultural purposes and water for fish can be compatible through off stream storage, providing adequate minimum flows, limiting cumulative rates of withdrawal, and, where necessary, measures to avoid fish entrainment and migration barriers. We reject the notion that, because an on-stream dam has already been constructed without a permit or environmental review, it should be allowed and permitted despite its deleterious cumulative impact to fisheries resources.

Provision of Fish Passage acilities

Wagner & Bonsignore state that the reservoirs sought by Applications 29810 and 30792 are not barriers to fish movement, and therefore, fish passage facilities are not necessary. They provide no evidence to support this conclusion. They neither indicate that the existing 20+ foot dams are provided with fish passage facilities, nor provide evidence that anadromous fish do not have the potential to reach these dams.

Access to protect facilities to the Department ofFish & Game

We recommended as permit conditions for these projects, the SWRCB provide CDFG personnel ready access to all points of diversion and places of use for the purpose of conducting random monitoring and compliance inspections. Such activities would compliment the SWRCB enforcement program. We believe this is an appropriate condition because CDFG shares NMFS's obligation to protect fish resources.

To conclude, the applicant's consultant does not resolve NMFS protests concerning Water Rights Applications 29810 and 30792. In its letter, Wagner & Bonsignore dismissed the recommendations ofNMFS as being not based on biology or the biological needs of fish. This is a poor understanding ofNMFS recommendations and guidelines, that are based on biological principles and are recommended in lieu of potentially costly site-specific in-stream flow studies. We believe that adopting 60% of mean annual flow for the minimum bypass flow, the permitting of on-stream dams in fish-bearing streams, or even the uncontrolled development of on-stream dams in small, non-fish bearing streams have strong potential for a significant cumulative impact

to federally listed salmonid populations. We urge you to.adopt our recommendations for mitigating the impacts of water diversions proposed under Applications 30792 and 29810.

We look forward to meeting with you and others at the field investigation scheduled for May 23, 2000. If you have any questions concerning the contents of this letter, please contact Dr. William Hearn at (707) 575-6062.

Sincerely,

James R. Bybee ,
Protected Habitat Manager
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