September 27, 2007

Ms. Diane Riddle
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000
driddle@waterboards.ca.gov

RE: Revised Draft Environmental Impact Report Regarding Consideration of Modifications to the U.S. Bureau of Reclamation's Water Right Permits 11308 and 11310 (Applications 11331 and 11332) to Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River Below Bradbury Dam (Cachuma Reservoir)

Dear Ms. Riddle:

I have reviewed the Revised Draft Environmental Impact Report (RDEIR), dated July 2007. Several new alternatives were proposed within the RDEIR (Alternatives 5B, and 5C) that had not previously been introduced. These new alternatives propose to provide additional water supply for downstream fisheries habitat enhancement. Reestablishment of appropriate passage flows downstream of the dam is essential as a first step in the restoration of wild steelhead populations in the Santa Ynez River system. Emphasis should be placed on restoring, to the maximum extent practical, both the downstream and upstream flows necessary to enable the natural migration of wild-origin fish between the ocean and upstream spawning and rearing areas at the times commensurate with natural fish migration during winter and early spring rainfall events. However, as I stated in my previous opinion regarding the 2003 Draft EIR (Zapel, 2004), reconnection of a passable migration corridor between the available upstream habitat above Bradbury Dam and the Pacific Ocean through the downstream river is a necessary component of recovery of anadromous steelhead populations in the Santa Ynez River system. The literature clearly indicates that the great majority of available oversummering rearing habitat and spawning habitat for steelhead lies above the Bradbury Dam reservoir (Chubb, 1997).
Successful recovery of these endangered wild anadromous fish will only be possible in the Santa Ynez if passage around Bradbury Dam is provided, along with sufficient downstream flows to ensure successful upstream adult steelhead migration and juvenile steelhead downstream migration from and to the Pacific Ocean, respectively. The alternatives proposed in the RDEIR do not satisfy these requirements, as they do not provide sufficient downstream passage flows, and the RDEIR as currently proposed is therefore unlikely to restore a viable natural Santa Ynez River steelhead population. Without access to the available original spawning and rearing habitat above Bradbury Dam, it is unlikely that steelhead populations will recover, and in fact the lack of access to upstream habitat may lead to eventual extirpation of wild-origin anadromous steelhead in the Santa Ynez River system as a result of nonviable reproductive populations downstream of the Dam.

In my prior opinion regarding the 2003 Draft EIR, I stated that an evaluation of adult and juvenile fish passage is warranted, described several potentially feasible methods of passage, and recommended further studies be conducted to determine the most effective solution for the Santa Ynez River. These comments are still pertinent to the RDEIR. Based on my review of the RDEIR, my prior reviews of

available documents, studies, and proposed actions relating to the Santa Ynez River, and my participation in these administrative proceedings, I still believe that additional studies regarding the feasibility of restoring passage to upstream habitat above one or more of the three storage reservoirs for wild-origin anadromous steelhead are justified and necessary, and are of critical importance in eventual restoration of anadromous steelhead populations in the Santa Ynez watershed. I recommend that these studies should focus on investigation of alternative means of providing adult wild-origin steelhead fish passage to spawning habitat above Bradbury Dam, and effective emigration of wild-origin juvenile steelhead smolts located above Bradbury Dam downstream to the ocean. These investigations should be based upon fish passage criteria established by the California Department of Fish and Game and the National Marine Fisheries Service, and be prepared by an independent consultant, under the auspices of the State Water Resources Control Board, subject to review by the regulatory and trustee agencies (i.e., State Water Resources Control Board, California Department of Fish and Game, U.S. Bureau of Reclamation, and National Marine Fisheries Service.)

Santa Ynez River Fish Passage Release Flows Analysis

The upstream passage corridor leading adult spawning anadromous steelhead to Bradbury Dam must be supplied with sufficient flows to enable fish to reach trapping facilities or spawning areas in the vicinity of Bradbury Dam, including Hilton Creek. Alternatives 5B and 5C in the RDEIR are a first step in providing more reliable annual flows in sufficient quantity to enable a continuous migration corridor to the Dam from the Pacific Ocean. In addition, future flow studies should be considered an integral part of the evaluation of fish passage alternatives for moving fish above Bradbury Dam, as discussed below. Siting of any fish trapping or collection facility is highly dependent on available flow regimes within which wild-origin adult upstream migrant steelhead can reach the facility for collection and transport upstream.

Santa Ynez River Fish Passage Feasibility Analysis for Bradbury Dam

Based on similar studies of fish passage alternatives for other large dams throughout the Pacific Northwest and California, I believe that the lack of adequate migration corridor flows below the Dam, coupled with the absence of any upstream passage facilities leading to upper watershed spawning areas is the primary cause of the almost complete extirpation of wild Santa Ynez steelhead populations. Lack of upstream passage to the upper watershed has completely eliminated all anadromous wild steelhead in the upper watershed. As I've stated above, the available habitat area for spawning and rearing above the Dam is of several orders of magnitude greater than that below the Dam. Unless that habitat is made available once again through a focused, adaptive management program of adult fish transport upstream past the Dam, and downstream juvenile steelhead downstream past the Dam on their way to the Pacific Ocean, there is no hope of restoring wild steelhead to the Santa Ynez. The following studies are proposed as a means of exploring the viability of upstream and downstream passage within a phased, adaptive program that will allow integration of new information as it becomes available in future years, the unique topographical and hydrologic characteristics of the upper Santa Ynez, and the behavioral tendencies of wild steelhead into a continuous program of improvement that can build on the successes of the past year's work toward the eventual goal of restoring unrestricted access to the entire upper watershed. An adaptive, flexible program of upstream and downstream passage investigation will

minimize initial capital investment, and permit flexibility in reaching the goal of successful restoration of wild steelhead populations within the bounds of available science and funding.

Underlying Principles

To approach an assessment of the feasibility of providing fish passage on the Santa Ynez River, a phased and systematic methodology is recommended, framed by the following underlying principles.

- Assemble a wide array of possible passage alternatives for both upstream and downstream migrants
- Do not reject any fish passage alternative without adequate, detailed analysis
- Assume passage is feasible, rather than assuming it is not feasible, since there are numerous examples of fish passage practices regularly throughout the United States in widely varying geographic/geologic circumstances
- Comprehensive, objective analysis performed under the auspices and direct supervision of the public-trustee responsible agencies:
    - California Department of Fish and Game
    - NOAA Fisheries
    - Bureau of Reclamation
- Public participation via formal advisory consultation with water diversion/delivery contractors, public interest conservation groups, and any other interested parties, and
- Implementation in a phased, experimental approach under adaptive management methodology with measurable, objective performance criteria for gauging the success or failure of various actions as part of the experimental approach.

This assessment, performed by fish passage specialists from each of the public trustee agencies, should be done in as transparent a fashion as possible, with quarterly progress summaries made available to all interested parties, and Phase I should be completed in a timely fashion, within a period of 12-18 months. The Bureau, in consultation with the Department and NOAA, should begin any field work to implement fish passage recommendations emerging from the feasibility study within 6-12 months of receiving the recommendation.

Recommended Phased Study Approach

Clearly, any fish passage feasibility study done on the Santa Ynez River should be performed in a phased, adaptive management protocol. This begins with an analysis of temporary measures that might be taken at existing low steelhead population levels, and progresses to less temporary measures when fish passage actions taken at existing low population levels become effective at improving and stabilizing the size of the run in the Santa Ynez River (the goal of any fish passage program). For each of the phases in this stepwise approach, objective, measurable performance criteria must be established beforehand in order to provide a yardstick against which to measure success or failure of proposed fish passage actions to be taken.

Phase I of such an approach begins at current, low (endangered) population numbers, a starting point. The methodology consists of following up serial questions about feasibility: Can spawners be effectively trapped? Can they be safely transported? Do they use the translocation site habitat for spawning? Are more smolts produced as a result? Can smolts be effectively trapped and transported below Bradbury Dam? And so forth.

Phase II begins when Phase I results have shown that it is feasible to trap adult upmigrant spawner steelhead in the Santa Ynez River, and downmigrating smolts, have shown that spawners and smolts may be translocated without undue mortality, and that smolt production is rising over time in the Santa Ynez River as a result of these efforts, such that overall returning spawner numbers move out of the tens to the hundreds. More discussion of Phase II is given below.

Phase III would be implemented when the results of the less temporary measures proposed in Phase II begin to likewise show further improvements in run size on the Santa Ynez River, and returning spawners gain in numbers from the several hundreds to perhaps a thousand or more returning spawner steelhead in years the sandbar is open at Surf. See below for further discussion of Phase III.

Concurrent with Phase I of the fish passage feasibility study, but separate from such study, complementary studies should be undertaken or overseen by the responsible trustee agencies to examine carrying capacity and habitat qualities of all locations accessible to transported spawner steelhead, and an analysis or review of existing trout population genetic structure (above and below dam) should be completed to answer questions about any potential genetic effects, positive or negative, of translocating migrating spawner steelhead to above-Dam habitats. In fact, several studies have already been completed by the US Forest Service (Chubb, 1997) and the Cachuma Conservation and Release Board (Entrix & CCRB, 2006) characterizing some of the available habitat throughout the upper watershed area. The existing information could be readily expanded upon in the proposed work to obtain more complete estimates of carrying capacity of the upper watershed. There is no information required from these complementary studies to begin Phase I fish passage feasibility study, however, these studies can be useful to inform and manage subsequent fish passage implementation Phases.

Possible Alternatives for Overall Feasibility Analysis of Upstream Migrant Collection and Passage

As described above in the discussion of underlying principles, no alternative should be dismissed casually. Each should receive complete and detailed analysis before an assessment of feasibility is made. An explicit cost-benefit analysis should be provided for each component of the feasibility study. Some of the alternatives that should be analyzed are listed below, but this is by no means a comprehensive list; that list should be compiled by the Fish Passage Feasibility Study team.

- Complete fish ladder or fishway over Bradbury Dam
- Hilton Creek as partial instream passage route in addition to fish ladder with controlled descent into Cachuma reservoir (coupled with downstream migrant collection actions)
- Upstream migrant trap and haul facility on bureau property at stilling basin or in Hilton Creek
    - Instream on Hilton Creek: simple floating picket weir and temporary trap, and/or
    - Instream on mainstem on Bureau property: same floating picket weir, or a more permanent concrete weir and holding tanks

- Trap types: adaptive management will determine method depending on critical factors such as streamflow, debris, number of fish expected, etc. but may include a floating picket weir, or a more permanent concrete weir and holding tanks
- Transport methods: Again, adaptive management will determine the optimal method or combination of methods based on critical factors such as weather, road conditions, numbers of fish, holding capacity, etc. Methods may include ground vehicle, barge, or air transport.
- Release site:
    - Santa Cruz Creek and tributaries (closest tribs)
    - Mainstem between Red Rock Day Use Area and Gibralter Dam
    - Mono and Indian Creeks
    - North Fork Juncal
    - Mainstem above Gibralter Reservoir
    - Mainstem above Juncal
    - Alisal Creek above Alisal Dam

Possible Alternatives for Overall Feasibility Analysis of Downstream Migrant Collection and Passage (including both kelts and smolts collected in a common facility)

Clearly, moving spawners to good spawning and rearing habitat is only half of the issue of moving anadromous fish around dams. Downstream migrants, both adults (kelts: spawned out adults returning to the sea again) and smolst, must also be accounted for. A variety of methods are available to avail downstream migrating fish of effective passage to the ocean, placed at various locations about the reservoir and system.

- Floating collector at the reservoir outlet works: Facility would include holding tanks
- Floating collector/s at tributary inlets to Cachuma Reservoir: Facility/ies would include holding tanks
- Instream collectors on tributaries: Facilities with holding tanks either on board or shore-based, depending on the specific site constraints
- Floating collector barge with pumped attraction flow: Facility may or may not include guide nets in the reservoir
- Transport methods: adaptive management will determine optimal transport methods depending again on critical factors such as weather, road conditions, holding capacity, streamflows, debris, number of fish, etc.
- Downstream migrant release sites:
    - Mainstem below Bradbury Dam
    - Intermediate site between Bradbury Dam and the lagoon
    - Lagoon

Phased Implementation Protocol based on Adaptive Management Principles

For each of the implementation phases, objective and measurable criteria for determining success or failure should be established as yardsticks to gauge the results of actions against each question posed.

Phase I: Low Population Size Methodology—a starting point

Phase I Steps 1 through 4 actions (described below) could be accomplished entirely within one winter adult migration season, provided at least several dozen adult fish were trapped successfully. Radio telemetry tags would be attached to all transported adult fish. Step 5 could be accomplished that same year in the spring with screw and/or ramp traps in tributaries where spawning was observed by trapped and transported adult fish. Step 6 could be accomplished over the course of the following one or two years with the same screw or ramp traps deployed in spring and summer and possibly in winter, with adult trapping and transport occurring in each winter migration season. Step 7 would be accomplished beginning in the second spring following the initial adult trap and transport action, and would be continued every spring and early summer thereafter with screw traps, ramp traps, or temporary floating collectors in the reservoir to sample smolt-ready fish produced. Control groups could be established by collecting naturally produced juveniles from tributaries in which no trapped adults had been placed. Step 8 could be accomplished beginning in the second year following the initial adult trap and transport action by moving smolting steelhead downstream via several transport methods. Step 9 would begin as early as 4 seasons following the initial adult trap and transport action.

Step 1: Test Adult Trapping Efficacy

Question: Can adults be trapped with any regularity during migration period?

Suggested Method: Temporary upstream migrant trap facility at Bradbury Dam and/or Hilton Creek consisting of a hand-placed temporarily anchored floating picket weir assembly and temporary trap with/without holding tank.

Step 2: Test Transportation Efficacy

Questions: What is survivorship rate of transported adults under different transport length scenarios?
What is most effective method to transport: truck, barge, , helicopter, some combination?

Suggested Method: Test different fish transfer, tagging, and transport methods to selected upstream release sites. Evaluate fish stress levels and note injury or mortality rate if any, route difficulty and trip timing, staffing needs to accomplish collection, transfer, and release activities, and behavior and disposition of fish once released.

Step 3: Test Release Efficacy, Alternate Release Sites

Questions: Do released adults move upstream or downstream?
Are some release points better than others to facilitate movement of spawners to spawning habitat?
Are some tributaries better than others at facilitating this? (This is a larger question and cross-relates to habitat surveys of tributaries)

Suggested Method: Radio-telemetry tags on released fish to monitor movement, using radio receivers positioned at strategic locations along the stream alignment. Note movement trends, congregational behavior if any, also timing of movement; correlate with stream discharges as recorded by available gages.

Step 4: Monitoring of use of spawning habitat by adult spawners

Questions: Do released adults actually use tributary or upper basin mainstem and/or tributary spawning habitats?

Are redds produced?
Suggested Method: Radio telemetry tags on released fish with on-ground spawning surveys

Step 5: Monitoring YOY production from redds
Questions: Do YOY fry successfully emerge from redds?
What is survivorship rate of fry to juveniles in tribs or upper basin mainstem rearing habitat?
Suggested Method: Temporary downstream migrant fry/smolt trap facility in tributary streams, monitoring, and either direct release or transport to release site below Bradbury Dam. Trapping method could be screw trap, hand seine, or ramp trap, depending on staffing availability.

Step 6: Monitoring juvenile survivorship in tributary/upper mainstem habitat
Question: What is survivorship rate of juveniles in tribs and upper mainstem?
Suggested Method: Same as above, repeated over the course of the summer, fall, and winter, using mark/recapture methods.

Step 7: Test smolt trapping and, Monitoring for Smolt production
Questions: Are smolts produced?
Can successful smolt trapping be carried out?
Suggested Method: Traps can be partial sample collection such as floating tributary conical or ramp traps, or more permanent full collection gulpers. Start with a floating instream smolt/fry trap and/or hand or boat seine to determine smolt readiness and estimated production, graduate to larger capacity, more permanent facilities in reservoirs if production is successful.

Step 8: Test Transport of Smolts below Bradbury Dam
Question: Can trapped smolts be effectively transported below Bradbury Dam?
What is most effective method of transporting smolts? Truck, Barge, Helicopter?
Do smolts transported below Bradbury Dam move downstream after release?
Are there ways to facilitate downstream movement (fences, flow pulses, etc?)
Suggested Method: Again, test various transport methods. Evaluate direct and delayed mortality, homing return efficacy, labor effort, weather and road constraints, load timing and holding capacity, etc.

Step 9: Monitoring for return of tagged smolts (pit tags, fin clips, etc)
Question: Can smolts be effectively tagged so that returning adult migrants can be tied to trap-and-transport-assisted smolt production?
Suggested Method: Pit tags, freeze marks, dye tags, and/or coded wire tags on a selected sub-sample of smolts. May be acceptable to use adipose fin clip marking method also if known straying from hatchery stock to the Santa Ynez is limited.

Phase II. Moderate Population Size Methodology

If the low population size efforts result in increased numbers of adults returning below Bradbury Dam, a moderate-duty system designed, say, for up to 1,000 annual adult spawners, could be tested in a phased adaptive management protocol similar to the one described above.

Such a system might include a semipermanent barrier weir and trap across both Hilton Creek and the mainstem with water-to-water transfer of captured fish from trap-to-transport tank and tank-to-release point. Pump-back attraction flow might be desirable to enhance adult fish attraction efficiency. Design and construction of such a semi-permanent trap facility would require approximately 2 years at the outside, assuming construction permits could be obtained without appeal from regulatory agencies. This activity could begin as early as the same winter season of the initial adult trap and transport action, with actual construction delayed until results of the initial spawning success and juvenile survival tests had been accomplished.

An alternative to trapping low in Hilton Creek and the nearby mainstem would be to use Hilton Creek as a partial ladder, ensuring configuration and attraction flows so that upmigrating adults are facilitated in finding Hilton Creek attractive. Integrated with the plunge-pool and chute barrier modifications, Hilton Creek at the highest elevation of US Bureau of Reclamation property can be modified to trap upmigrating spawners to be transported around Cachuma Reservoir into, for example, the closest high-quality tributary, Santa Cruz Creek and its tributaries.

Another permutation of this that should be given serious evaluation is the feasibility of constructing a small ladder or fishway from the upper Bureau property boundary on Hilton Creek upward and over the dam (less than 100 foot lift) using a false weir with a controlled variable length descent chute into a receiving pen in the Reservoir just below the Bureau's maintenance and office facility near the spillway gates. Fish may then be held in good condition for sorting, genetic identification as necessary, and subsequent transport to receiver tributaries for spawning. Design and construction of such a ladder and descent system would require approximately two to three years, and such effort could begin as early as the initial adult trap and transport action.

Phase II juvenile collection would be effected by construction of one or more floating collectors in the Cachuma and possibly Gibraltar reservoir, with or without guide nets. Design and construction of a floating collector that could be placed in either reservoir could be accomplished within 3 years, and could be initiated at beginning of the initial adult trap and transport action in Phase I.

Phase III. Higher Population Size Methodology

If the first two phased steps prove successful, a larger, high-service trap system designed for up to several thousand adult spawners annually in high water years should be evaluated. This might consist of a permanent concrete barrier dam at Hilton Creek and across the mainstem at the foot of Bradbury Dam, a permanent ladder and constant head holding system, hopper hoist system, brail crowder panels, and associated handling equipment with at least three 1,000 to 2,000 gallon aerated, refrigerated tank transport systems. Pump-back attraction flow at the trap ladder entrance would facilitate adult fish attraction efficiency. This larger, permanent adult trap could be designed and constructed within 4 to 5 years from inception, and could begin concurrently with the initial adult trap and transport action.

In both Phases II and III, juvenile fish collection and bypass systems would likely be required for Bradbury Dam and reservoir, and, depending on locations selected for adult release, Gibralter Dam/Reservoir, Juncal Dam/Reservoir, and Alisal Dam/Reservoir as well. Several feasible alternatives for collecting and bypassing smolt steelhead exist. Permanent, full-stream width instream barrier-type

collectors are not recommended due to the volume of woody debris and sediment in high flows rendering instream devices relatively unreliable. Development and evaluation of floating collectors located at the inlet of each tributary below adult release points into the respective reservoirs should be studied.

An alternative that should also be evaluated is the relative survivorship of downstream migrating smolts within the reservoirs with a structured experimental design using multiple collectors at several key locations along the length of the reservoirs and at or near the Dam sites. Design and construction of floating collectors could be accomplished within 4 years of, and concurrently with the initial adult trap and transport action. Smolt survival studies could accomplished during the first outmigration season following the initial trap and transport action, which is likely to be from one to three years following inception of Phase I. These studies would be continued concurrently with the conceptual design of the juvenile collection system. The preferred site for collection would become known as a result of the smolt survival studies, with the final design of the smolt collection system dependent upon the preferred location.

Such floating collectors would include attraction flows provided by low-head electric pumps supplied with fixed-grid or generator power to produce attraction flows between 30-250 cfs. Each collector would include a barge with transfer boat and holding tanks, sorting and handling facility, and water-to-water transfer of juvenile fish to downstream transport tank system or bypass pipe to shore-based facility.

The simplest collector system would include a single floating collector at each dam, located near the existing outlet works. Reservoir migration survival studies would be required to verify the feasibility of this option. This can be accomplished via through-reservoir survival and radio tag tracking studies to assess potential losses to predators and migration success.

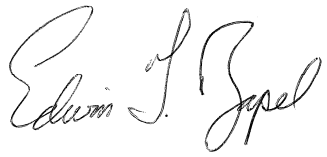
In the event that through-reservoir studies show an at-dam collector undesirable or infeasible due to poor survival in transit through the reservoir, individual collectors would likely be required at each tributary inlet into which adults have been transported and released. Each inlet collector would include an exclusion barrier net positioned far enough out in the reservoir to provide low average net approach velocity to below the structural strength of net material. Design and construction of multiple juvenile collectors would be accomplished at the same pace as for a single collector, with the required construction period increased proportionately to permit completion of each individual unit.

Alisal Dam, Alisal Creek, Tributary to Santa Ynez River below Bradbury Dam

For access above and below Alisal Dam, the scale of a passage system similar to that discussed above would be proportionally less than the systems designed for the much larger storage dams on the mainstem Santa Ynez River. A juvenile collection system may consist of nothing more than bypass outlets designed to meet bypass criteria for smolts (30fps max. velocity, smooth interior, gradual bends>3 diameters in radius, no exit plunge in excess of 25 fps, etc.) A small fish ladder for adult passage might be feasible, and, if not, a simple floating picket weir or fixed Braille weir can be used. Design and construction of an adult passage system for Alisal Dam would require no more than 2 years, and such effort could begin entirely independent of mainstem Santa Ynez fish passage facility study and design. Similarly to the studies proposed above for the upper Santa Ynez fish passage, the Alisal Dam

work would include monitoring of spawning success in the tributaries to the Alisal Dam reservoir, juvenile survival and outmigration, predator-induced mortality, and all other issues associated with development of a fully successful passage program. To gauge success of this adaptive program for progressive enhancement of fish passage and production, a long term monitoring program would be required to continually improve the understanding of fish behavior, habitat requirements, and to guide additional phases of the adaptive passage program.

Respectfully Submitted,



Edwin T. Zapel, P.E.

Literature Reviewed

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Cachuma Conservation & Release Board& Entrix, 2006. Adaptive Management Committee, Draft Upper Basin Study – Habitat Synthesis, Memorandum. December 11, 2006.

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