October 7, 2003

Andrew Fecko
State Water Resources Control Board
Division of Water Rights
1001 I Street
Sacramento, CA 95812
facsimile: (916) 341-5400

VIA FACSIMILE

RE: Cachuma Project – Comments On SWRCB's Draft Environmental Impact Report

Dear Mr. Fecko:

The Environmental Defense Center is submitting comments, on behalf of California Trout, regarding the State Water Resources Control Board's Draft Environmental Impact Report for the proposed Modifications to the U.S. Bureau of Reclamation's Water Rights Permits 11308 and 11310 to Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River.

Per my phone message, we are submitting these comments by facsimile and by email. Following is the facsimile portion of our submission, which is comprised of Attachments 1-16 to our comment letter. I will be sending you separately, by email, our comment letter and Attachments 17-21. A courtesy copy of our entire submission will also be mailed to you today.

Please call me if you have any questions.

Sincerely,

Karen M Kraus

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Staff Attorney

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October 7, 2003

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VIA FACSIMILE AND EMAIL

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

Dear Mr. Fecko:

The Environmental Defense Center ("EDC") submits these comments regarding the State Water Resources Control Board ("SWB") Draft EIR for the proposed Modifications to the U.S. Bureau of Reclamation's Water Rights Permits 11308 and 11310 To Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River Below Bradbury Dam ("DEIR") on behalf of our client California Trout ("CalTrout"). CalTrout is a non-profit river conservation organization with a substantial interest in the public trust resources of the Santa Ynez River including the endangered Southern California Steelhead.

In sum, we submit that the DEIR fails to comply with the California Environmental Quality Act ("CEQA," California Public Resources Code §§21000 et seq.) because the DEIR:

- fails to adequately identify the project objectives and fails to provide the specificity required;
- fails to analyze a reasonable range of alternatives that fulfill the basic objectives and substantially lessen or avoid significant impacts;
- fails to include alternatives that will protect public trust resources;
- includes a vague and unstable project description;
- fails to include an appropriate baseline for measuring protection of public trust resources;

- lacks an adequate analysis or mitigation for many project impacts; and
- fails to analyze consistency with applicable laws and policies.

For these reasons, CalTrout submits that this document is inadequate for the SWB to rely on in making its final decision as to whether the Bureau of Reclamation's water rights permits for the Cachuma Project should be modified to protect public trust resources. The DEIR should be revised in accordance with this comment letter and re-circulated for public and agency review and comment.

In particular, the DEIR should be revised to analyze the three alternatives proposed by CalTrout: the IFIM Alternative, Public Trust Alternative, and Maximum Beneficial Use Alternative.

I. The DEIR Fails to Adequately Identify the Project Objectives and Fails to Provide the Specificity Required by CEQA.

Under CEQA, objectives must contain the basic underlying project purpose. A clearly written statement of objectives helps identify a range of reasonable alternatives that can fulfill most of the underlying purposes of the project (CEQA Guidelines Section 15124(b)). In this case, the DEIR apparently includes a CEQA objective to provide "appropriate protection of public trust resources," however, this objective lacks definition. As such, this objective is too vague for CEQA purposes and too ambiguous to determine if the alternatives can fulfill it.

A. The DEIR Fails to Adequately Define the Project's Objective of Protecting Public Trust Resources.

The DEIR limits its identification of public trust resources to the resources "that occur" at Lake Cachuma and along the Santa Ynez River below Bradbury Dam. This definition is incomplete because it does not also address the public's use and interest in those resources. *See* National Audubon Society v. Superior Court of Alpine County, 33 Cal. 3d 419, 446 (1983). Accordingly, the DEIR must also identify the specific public uses that the SWB is striving to protect in the Santa Ynez River. The uses traditionally protected by the public trust include navigation, commerce and fisheries. The doctrine has since been extended to include the public's interest in recreational fishing, preservation of resources in a natural condition, ecological study and aesthetic enjoyment. *See* Marks v. Whitney, 6 Cal. 3d 251 (1977); National Audubon, *supra,* 33 Cal. 3d at 434-435.

In addition, the DEIR fails to accurately or adequately describe the historic public trust resources of the River. "Historically, the Santa Ynez River supported the largest steelhead run in southern California." (Shapovalov 1945, Attachment #1) "Prior to the building of Cachuma/Bradbury Dam project on the Santa Ynez River (completed in 1952) professional fishery biologists estimated that up to 25,000 adult steelhead migrated into the Santa Ynez River on an annual basis into the 1940s and produced progeny into the millions annually.

These steelhead provided a flourishing recreational fishery and efforts to rescue some of their fry providing for stocking of streams in both Santa Barbara and Ventura Counties." (August 28, 2003 letter from Ed Henke Historical Research to Mr. David Young of the Bureau of Reclamation and Ms. Kate Rees of the Cachuma Operations and Maintenance Board, Page 1, Attachment #2). Thus, the public use of that fishery, as well as the public's interest in the Santa Ynez watershed in a natural condition, for ecological study, and aesthetic enjoyment are public uses that must be considered under the public trust doctrine. These interests should be explicitly incorporated into the CEQA objectives for this project.

Moreover, in circumstances such as these, where previous water allocation decisions have been made without any consideration of public trust resources, and such decisions have already significantly impacted the public's use and interest in those public trust resources, protection of public trust resources should involve some level of restoration. It is not enough to only assess the resources "that occur" now. In order to clearly define the objective of providing "appropriate protection of public trust resources" in the Santa Ynez River, the SWB must also assess the condition of public trust resources prior to alteration of the natural hydrology of the river, and use this baseline information to help identify the conditions that would have to be restored in order to preserve the public's interest in those resources.[1] For example, Shapovalov estimated the pre-Bradbury dam run size at 13,000 to 25,000 in 1944. See also, Preliminary Report of Thomas P. Keegan 2003 (Attachment #19).

Assessing the historical conditions and restoring them is also consistent with the Porter-Cologne Act and the federal Clean Water Act, pursuant to which the Regional Water Quality Board has designated several beneficial uses for the Santa Ynez River (including migration and spawning).[2]

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[1] The feasibility of restoring public trust resources to their natural condition is a separate question. Although the Board may approve a diversion or allocation of water despite foreseeable harm to public trust resources, it must always "bear in mind its duty as trustee to consider the effect of the taking on the public trust." National Audubon, supra, 33 Cal.3d at 446. Thus, preliminary to any final decision regarding the feasibility of particular measures, the Board must first identify and assess the past and potential impacts to public trust uses from the Cachuma Project and the measures necessary to restore those uses.

[2] Whether these beneficial uses are being achieved should be evaluated in light of the overarching objective of the Clean Water Act ". . . to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 101. The SWB has previously interpreted "physical integrity" to mean the maintenance of "the temperature, hydrologic regime, geomorphology, and other physical characteristics . . . within the ranges that fully supports the beneficial uses historically provided by that water" (emphasis added). March 11, 2003 letter from Arthur G. Baggett, Jr. to U.S. EPA, p. 6 (comment on ANPRM on Definition of "waters of the United States"). Similarly, the SWB has identified "biological integrity" as meaning that "the biological processes and diversity and abundance of organisms associated with a water body are within the ranges historically supported by that water" (emphasis added). Id. at 7.

The SWB should identify these conditions in terms of a measurable population-based objective or success criteria This may include identifying an increasing population range over time (e.g., X,000 – Y,000 adults by year Z and A,000 to B,000 by year C), an average (e.g., D,000 adults), or a defined increasing population trend (e.g., P% per year excluding years of below average rainfall). (Keegan 2003). Without clarifying the vague objective by providing a measurable performance standard, i.e., success criteria, there is no way to ascertain if the alternatives in the DEIR, or if other alternatives, can fulfill most of the underlying objectives as required under CEQA. Additionally, as noted below, defining this CEQA objective as a measurable success criteria will facilitate effective use of the Adaptive Management strategy proposed by the Bureau.

Finally, the use of the term "appropriate" to qualify public trust resource protection as an objective is vague and undefined. One interpretation of this term is that it is meant to articulate the Board's public trust responsibility: that is, the Board's obligation "to take the public trust into account in the planning and allocation of water resources, and to protect public trust resources, whenever feasible" (emphasis added). National Audubon, *supra*, 33 Cal.3d at 446. If this is the case, then the Board should clarify the project objective as "protection of public trust resources, to the extent feasible," and should identify the specific factors it will consider in determining whether or not it is feasible to protect public trust resources, so that the DEIR project alternatives can be evaluated for their ability to fulfill this objective. [3]

B. The DEIR Fails to Define the Project's Objective of Protecting Public Trust Steelhead Resources Above Bradbury Dam.

One objective appears to be to protect public trust resources and water rights downstream from Bradbury Dam. However, to protect steelhead downstream from Bradbury Dam as a public trust resource, the SWB must consider the fact that the vast majority of steelhead habitat is above the dam. Moreover, an objective limited to protection of downstream public trust resources is inconsistent with the September 25, 2000 hearing notice, the May 29, 2003 letter from Peter Silva to the Cachuma Service List, and the August 13, 2003 letter from Peter Silva to the Cachuma Service List. These communications from the SWB all indicate that the scope of the Phase 2 Hearing (one purpose of which is to determine whether modifications to the Bureau's water rights permits are necessary to protect public trust resources) includes consideration of impacts to public trust resources above Bradbury Dam as well as requirements to address those impacts. The EIR should specifically set forth the project objectives consistent with the SWB's stated objectives for its decision regarding Reclamation's water rights permits, and include public trust resources above Bradbury Dam that are affected by the Cachuma Project.

[3] Note, however, that under Fish and Game Code section 5937, sufficient water is required to keep steelhead in "good condition," regardless of the potential adverse impacts to other users.

Such an objective is called for under the Public Trust Doctrine, which protects public trust **uses**. National Audubon, *supra*, 33 Cal.3d at 446. To the extent a public trust use (e.g. an anadromous fishery) is impacted by a water diversion, the SWB has jurisdiction to consider and remedy the impact whether or not the impact is above or below the diversion. In this case, the Cachuma Project has impacted steelhead along the entire Santa Ynez River: blocking access of steelhead above the dam ("landlocked") to the ocean, and blocking steelhead below the dam ("anadromous") from accessing the majority of spawning and rearing habitat. The US Forest Service notes that at least 40% of the watershed is now blocked to steelhead migrating up from the ocean, that the best spawning habitat was concentrated in the mid to upper third of the river basin, and that the population has plummeted from 10,000 - 20,000 down to less than 200 since construction of Gibralter and especially Bradbury Dams. (Santa Ynez Steelhead Restoration Feasibility Study, Draft, June 3, 1997, Attachment #3.) Limiting the public trust objective to protection of steelhead below the dam is therefore inconsistent with the legal obligation under the public trust doctrine. It is also inconsistent with modern ecological theory, restoration ecology practice, and modern resource management practice, all of which evaluate waterway impacts from a watershed perspective. Reiterating the public trust objective in basin-wide terms would help ensure that the intent of the objective is met: that public trust resources are protected.

CalTrout believes that despite the approximate 98% to 99% reduction in the steelhead population in the Santa Ynez River estimated by the US Forest Service (U.S. Forest Service Santa Ynez Steelhead Restoration Feasibility Study, 1997) and by CalTrout, the public trust interest in this species can be restored and preserved. However, meeting this objective will be significantly impaired if the Board limits its consideration to steelhead and the limited habitat available below the dam and to below-dam measures. "The Santa Ynez River historically supported one of the most productive steelhead runs in southern California and still contains substantial amounts of high quality spawning and rearing habitat within the watershed, with a majority of the spawning and rearing habitat located above Bradbury Dam." (September 19, 2001 letter from Rebecca Lent, Ph.D of NMFS to Harry Schueller, Chief, Division of Water Rights, SWB, Attachment #4.) See also, CDFG Steelhead Restoration and Management Plan, February 1996, Page 196 ("The construction of the Cachuma Project (which includes Bradbury Dam) in the early 1950s eliminated access to nearly all historic spawning and rearing habitat"), Attachment #5; NMFS Biological Opinion at 1; and Forest Service's 1997 Santa Ynez Steelhead Restoration Feasibility Study. According to evidence CalTrout submits for your consideration, the available spawning and rearing habitat below the dam is relatively insignificant compared to that available above the dam, and is of significantly lower quality (Keegan 2003).

By clarifying the public trust protection objective in this manner, the lead agency will ensure proper consideration of a range of alternatives capable of fulfilling the public trust project objective, as required under CEQA. More specifically, by clarifying the geographic scope of the public trust protection objective, the SWB will clarify whether fish passage

alternatives should be considered as potentially feasible alternatives to protect the public trust resources.

The operation of the dam continues to block migratory access to a significant majority of, and the most suitable steelhead spawning and rearing grounds in, the River system. Despite this fact the DEIR does not mention the ongoing impact to migration caused by the dam. Nor does it discuss the impacts of the dam on the landlocked steelhead (i.e., preventing access to the ocean and thereby interfering with a significant portion of the steelhead life cycle). "At the currently suspected low population size (<200 spawning adults) even minor disturbances could be devastating," (U.S. Forest Service Santa Ynez Steelhead Restoration Feasibility Study, Page 15). Steelhead above Bradbury Dam need to be reconnected to steelhead below Bradbury Dam in order to eliminate this threat of extinction and restore and preserve the public trust in the steelhead resource in the River (Keegan 2003). Therefore, the objectives should reflect the Public Trust Doctrine and the SWB's articulation of the scope of its decision regarding Reclamation's water rights permits and ensure consideration is given to public trust resources throughout the Santa Ynez River that are impacted by the Cachuma Project – not merely those that happen to occur below the dam.

C. The DEIR Fails to Identify Other Relevant Requirements That Define SWB Objectives.

1. *The DEIR Fails to Identify Compliance with Fish and Game Code §5937 and other Fish and Game Policies.*

Fish and Game Code §5937 requires the owner of a dam to allow sufficient water to pass over, around or through a dam to keep in "good condition" any fish that exist below the dam. The Board has previously stated that Fish and Game Code Section 5937 "is a legislative expression concerning the public trust doctrine that should be taken into account when the SWRCB acts under its public trust authority." See, e.g., Decision 1644, p. 30 (Lower Yuba River, March 2001, citing California Trout, Inc. v. State Water Resources Control Board, 207 Cal. App. 585, 626, 631 (1989)). In addition, the Board has stated that operation of the Cachuma Project is subject to the requirements of Fish and Game Code § 5937 (Order No. WR 95-2 (1995)). Reclamation's compliance with Fish and Game Code Section 5937 should therefore be included as a project objective.

The phrase "good condition" is not defined in the Fish and Game Code or in the DEIR. However, Dr. Peter B. Moyle defines it at three successive levels: individual, population, and community. "To satisfy Section 5937, a fish has to be in good condition at all three levels … At the individual level, fish in good condition needed to be healthy … At the population level, to be in good condition under my (and the DFG) definition, each population must: (1) be made up of healthy individuals … (2) have multiple age classes, … and (3) have a viable population size … large enough so it will not go extinct from random factors or unusual events, such as a major drought . . . At the community level, 'good condition' . . . means that a dynamic assemblage of fish exists that will predictably inhabit a given range of

environmental conditions, usually the historic range that existed on or near the site prior to the construction of a given dam." (Statement of Peter B. Moyle 2003, Attachment # 20.)

The DEIR should be modified to include as an objective, compliance with Fish and Game Code Section 5937, including Dr. Moyle's definition of "good condition."

2. *The DEIR Fails to Identify Compliance with Article X, § 2 of the California Constitution.*

The DEIR fails to identify Article X, Section 2 of the California Constitution and Water Code Section 100 which require that water resources be put to beneficial use "to the fullest extent of which they are capable." These legal requirements also prohibit the waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of water. The SWB is directed, under Water Code Section 275, to take all appropriate proceedings or actions to prevent violations of the reasonable use standard.

The DEIR should be modified to include as objectives: (1) the achievement of maximum beneficial use of water in the Santa Ynez River; and (2) the prevention of waste, unreasonable use and unreasonable method of use of water in the Santa Ynez River.

B. Proposed Project Objectives.

Objectives are suggested below to guide formulation of an adequate range of feasible alternatives in the EIR:

1. Protect public trust resources along the Santa Ynez River whenever feasible, both below and above Bradbury Dam;

2. Protect downstream water rights in the Santa Ynez River below Bradbury Dam;

3. Restore a healthy, sustainable steelhead run in the Santa Ynez River for the public's enjoyment and use;

4. Keep steelhead in Santa Ynez River in good condition pursuant to Fish and Game Code §5937;

5. Make maximum beneficial use of water in the Santa Ynez River; and

6. Prevent waste, unreasonable use and unreasonable method of use of Santa Ynez River water.

II. The DEIR Fails to Analyze a Reasonable Range of Alternatives that Fulfill the Basic Objectives and Substantially Lessen or Avoid Significant Impacts.

Under CEQA, an EIR must analyze a range of reasonable alternatives that fulfill most of the basic underlying objectives of the project (CEQA Guidelines §15126.6(a)). Factors that may be used to eliminate an alternative from consideration in an EIR include: failure to meet most of the basic objectives, infeasibility or inability to avoid significant impacts (CEQA Guidelines Section 15126.6(c)). The alternatives in the DEIR are comprised of alternative modifications to the terms and conditions of the Bureau's SWB water rights permits and are limited to flows consistent with the Biological Opinion's ("BO") "target flows." These alternatives are too narrow and do not fulfill the basic underlying objectives of protecting public trust resources as set forth above.

The DEIR merely repackages the same alternative – implementation of the BO - with different water supply impact mitigation measures (the 3 series) and with alternative methods for delivering water to downstream interests (the 4 series). With regards to protection of public trust resources, Alternatives 3A – 3C are essentially identical and 4A and 4B differ from 3A – 3C insignificantly. Under CEQA, an EIR must analyze a range of reasonable alternatives (CEQA Guidelines Section 15126.6(a)). In this case it is clear that the EIR does not present a range of alternatives to protect public trust resources and instead presents only the BO as the method in which to purportedly fulfill the public trust protection objective.

As an example, the evaluation of impacts to steelhead caused by the 3 and 4 series alternatives concludes that the quantified impacts of the 3 and 4 series are virtually identical (see Tables 4-42, 4-43, 4-44, 4-45 and 4-46). Thus, while the alternatives do differ with regards to recreational and oak tree impacts caused by surcharging and with regards to delivering water to downstream users, the alternatives do not differ meaningfully with regards to their ability to protect public trust resources along the river and thus in their ability to fulfill the project's basic objectives. Compared to current operations and other alternatives such as those proposed herein by CalTrout, these options do not result in significant improvement of steelhead habitat and do not fulfill the public trust objective. (Keegan 2003.)

Feasible alternatives that include measures in addition to those in the Fish Management Plan ("FMP") and BO and that may be capable of restoring and preserving the public trust in the steelhead resource must be considered to ensure that the EIR conforms to CEQA's requirements and analyzes a range of alternatives that are capable of fulfilling the basic project objectives. For example, the EIR should analyze alternatives that incorporate water release requirements for fish in excess of the BO's target flows, and that also incorporate the BO's non-mandatory conservation recommendations. The SWB must expand its alternatives analysis beyond the narrow focus of the BO and include other approaches to protecting steelhead.

In addition, all of the alternatives identified in the DEIR assume the continued implementation of Order No. WR 89-18. This order is the culmination of a series of SWB decisions designed to ensure protection of downstream water rights holders. These decisions did not weigh or consider public trust uses of the water, and may therefore be incorrect in light of current knowledge or inconsistent with current needs. There is no legal basis to assume that implementation of Order No. 89-18 should continue without an assessment of the impacts of that Order on public trust resources. In fact, "the case for reconsidering a particular decision . . . is even stronger when that decision failed to weigh and consider public trust uses." National Audubon, *supra*, 33 Cal.3d at 447. Thus, in order to fulfill its public trust responsibilities, the SWB should modify the DEIR to include an assessment of the impacts of implementation of WR 89-18 on public trust uses (including the impacts of withholding water from release until called for by downstream water rights holders and the impacts of timing and amount of water releases). At least one alternative that includes modification of 89-18 should be included for consideration in the EIR, as discussed below. (See CalTrout's Public Trust Alternative, Maximum Beneficial Use Alternative and IFIM Alternative described below.)

III. The Alternatives Analyzed in the DEIR are Incapable of Restoring or Preserving the Public Trust in Steelhead and thus do not Fulfill the Project Objective.

The DEIR project objectives apparently include protecting the public trust resources and the downstream water rights on the Santa Ynez River below Bradbury Dam. As discussed above, protecting the public trust resources in the Santa Ynez River includes restoring and preserving the steelhead fishery, as well as the public's interest in the Santa Ynez watershed in a natural condition, for ecological study, and aesthetic enjoyment. The DEIR alternatives merely consist of the mandatory measures in the BO with options for surcharging and with options for delivering water to downstream water rights holders. These alternatives do not fulfill the public trust resource objective. NMFS has only concluded that these measures are "not likely to jeopardize the continued existence of the Southern California steelhead ESU," and are "not likely to destroy or adversely modify steelhead critical habitat" (BO at page 68). In other words, the BO concludes that the proposed measures will not cause a decline of this highly endangered species. While the DEIR alternatives, since they are based on the BO, do not further jeopardize southern steelhead, they also do not improve conditions in the Santa Ynez River much beyond the historical operations and thus are not capable of restoring or protecting public trust resources.

"Because these alternatives are based on Reclamation's proposed action which NMFS analyzed in its biological opinion, they address only the more limited issue of ensuring the continued existence of the Southern California steelhead ESU, rather than the larger issue of recovery of the ESU." (September 19, 2001 letter from Rebecca Lent, Ph.D to Harry Schueller, Chief, Division of Water Rights, SWB, Page 5.) The BO does not address, nor is it intended to address, the fundamental issue before the SWB – what River conditions above and below Bradbury Dam must be restored to achieve restoration and protection of the steelhead runs and other public trust resources of the Santa Ynez River.

The EIR finds numerous beneficial impacts to steelhead as a result of the 3 and 4 series of alternatives (which implement the BO). However, the DEIR fails to demonstrate that these modest improvements are adequate to protect the public trust resources of the river, which is one of the two key objectives currently identified in the DEIR. Avoiding jeopardy to an endangered species is environmentally beneficial but does not necessarily equate with protecting public trust resources pursuant to the Public Trust Doctrine or maintaining fish in "good condition." Steelhead have been reduced by approximately 99% in the Santa Ynez River (i.e., 10,000 – 20,000 to <200) (U.S. Forest Service Santa Ynez Steelhead Restoration Feasibility Study) and are an endangered species. Even tripling a population that has been reduced by 99% still results in a population that has been reduced by 97%. Some meaningful level of recovery is necessary to ensure that steelhead are in good condition and are protected as a public trust resource.

The currently proposed alternatives may modestly enhance current conditions for the seriously endangered southern steelhead if the target flows are mandatory, but they are not capable of achieving the public trust objective or of maintaining them in good condition below the dam. (Keegan 2003.) In addition, Keegan identifies several deficiencies in the DEIR's analysis and conclusions regarding protection of public trust resources, including the methodology and criteria for evaluation of passage flows, the methodology and criteria for evaluation of instream flows for spawning and rearing and lack of consideration of impacts of dam to migration. Keegan also identifies the importance of the lagoon for smolt rearing, and the DEIR's failure to consider this portion of the watershed in its analysis.

The DEIR does not identify any alternatives capable of achieving the project objectives, much less evaluate their feasibility. As discussed below, feasible alternatives other than the measures required by the BO are available. In addition to the BO-based alternatives, the EIR should evaluate alternatives that include measures to restore and preserve the steelhead fishery, as well as the public's interest in the Santa Ynez watershed in a natural condition, for ecological study, and aesthetic enjoyment. CalTrout has identified additional feasible alternatives below, including measures in addition to those in the BO, for instance the "Conservation Recommendations," fish passage around Bradbury Dam, increased mandatory target flows, etc., that will be more effective at protecting public trust resources than the BO's measures alone. Absent such alternatives, the EIR is inadequate because the current alternatives are not capable of fulfilling the project objectives.

IV. The DEIR Suffers from Lack of a Clear, Stable Project Description.

The DEIR fails to include a clear project description, as required by CEQA. Under CEQA, an EIR must include: a map, preferably topographical, depicting the project's precise location and boundaries; a clearly written statement of the objectives sought by the proposed project; a general description of the proposed project's technical, economic, and environmental characteristics; a statement describing the intended uses of the EIR, including a list of the agencies that are expected to use the EIR in their decision-making, a list of permits

and other approvals required to implement the project, and a list of related environmental review and consultation requirements mandated by federal, state, or local laws, regulations, or policies. CEQA Guidelines §15124. The project description must be accurate and consistent throughout an EIR. "An accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR." County of Inyo v. City of Los Angeles (1977) 71 Cal.App.3d 185, 195 (italics in original). "An accurate project description … is necessary for an intelligent evaluation of the potential environmental effects of a proposed activity." McQueen v. Board of Directors of the Mid-Peninsula Regional Open Space District (1988) 202 Cal.App.3d 1136, 1143.

In this case, the project description is comprised of the vague statement that "the project analyzed in this EIR consists of potential modifications to Reclamation's existing water rights permits to provide appropriate protection of downstream water rights and public trust resources on the Santa Ynez River downstream of Bradbury Dam." (DEIR, p. 3-1.)

First, the project description reads like a statement of project objectives, rather than a description of a proposed project. Second, it improperly limits protection of public trust resources to those downstream of Bradbury Dam, in contradiction to SWB orders and actions cited above. Finally, the DEIR relies on various alternatives to fill out the project description; however, the descriptions of such alternatives are flawed because (1) they fail to specify whether "target flows" are mandatory minimums or are contingent upon surcharging; (2) they fail to specifically identify what "other measures" are included in the project description; and (3) they include adaptive management without providing any mandatory guidelines or requirements.

A. The Description of Alternatives is Vague and Unclear Because it Fails to Specify Whether "Target Flows" are Mandatory Minimums or are Contingent upon Surcharging.

1. *The DEIR Fails to Describe Whether "Target Flows" are Mandatory.*

The DEIR's alternative project descriptions are vague and unclear with regards to the requirement for "target flows" pursuant to the BO. The use of the term "target" is confusing, because the DEIR does not identify whether target flows are enforceable mandates or mere goals, to be determined at the Bureau of Reclamation's discretion. This hinders assessment of the alternatives' impacts and the alternatives' abilities to fulfill the objectives pursuant to CEQA.

The DEIR's project description for the alternatives is flawed because it refers to and relies upon unclear target flow release requirements contained in the BO[4]. The BO and thus

[4] On pages 6 and 7, the BO describes reservoir storage and spill conditions that dictate target flows at downstream points along the river. For instance, the BO refers to a minimum of 2.5 cfs target flow that is to be maintained at Highway 154 in a year when the reservoir storage

the DEIR do not specify whether the "target flows" are minimum requirements that must be met at all target sites at the specified times or are contingent upon reservoir surcharging and water accounts for fish releases. The DEIR relies on the BO's vague "target flows" as part of the alternatives description but, like the BO, it fails to specify that the "target flows" are mandatory minimum flows. Therefore the alternative project descriptions are not defined with enough specificity, and it remains unclear if the target flows – a primary element of this project – must be made at all times to support endangered steelhead or only after infrequent reservoir surcharging provides water into accounts for the steelhead.

Due to the EIR's failure to specify whether or not the target flows are mandatory minimum flows (i.e., required regardless of surcharging), impact evaluation by the public and by the lead and responsible agencies is impossible. Without knowing if the flows would be available every year or only following reservoir surcharging, it will be extremely difficult to evaluate the relative impacts of alternatives. For example, the DEIR states that Alternatives 3A – 3C and 4A and 4B in the DEIR include "releases to meet long-term rearing and passage *target* flows under the Biological Opinion." (DEIR, page 3-9, emphasis added.)

The DEIR should be revised to indicate whether the target flows are mandatory. If so, the DEIR must specify that the long-term target flows are mandatory minimums to be met at the target sites and between the target sites and the dam and are not dependent on surcharging. By specifying for its readers that the flow requirements are mandatory minimums and providing a stable project description, the EIR will adequately describe the alternative projects and will foster informed impact assessment and comparison of alternatives.

2. *Beneficial Impacts to Steelhead Reflect DEIR Assumption that Target Flows are Minimum Mandatory Requirements.*

The DEIR's biological impact assessment section assumes that the target flows are minimum mandatory requirements, but the DEIR does not describe them as such and instead relies on the unclear BO. Alternative 3 and 4's modest beneficial impacts to steelhead are largely derived from "higher releases for rearing under these alternatives" (DEIR page 4-101). However, the DEIR fails to acknowledge that the long-term target flows "required" under the BO and incorporated in the alternatives descriptions may be dependent on infrequent reservoir surcharging and thus may not be reliable flows necessary to protect public trust resources. The BO is unclear as to whether long-term target flows are only required if infrequent[5]

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level drops to below 120,000 but is above 30,000 AF (i.e., without surcharging occurring that year). However, the BO also describes flow accounting (page 8) in which it appears that water will be available for steelhead releases only when water is stored during surcharging (approximately every third year on average). Thus the BO and as a result the CEQA alternatives descriptions are ambiguous regarding whether target flows are contingent upon surcharging or are mandatory minimums to be met at all times.

[5] Cachuma Reservoir currently spills an average of one out three years.

surcharging has occurred. Therefore, the DEIR's reliance on the ambiguous BO as part of the project description results in inadequate alternative project descriptions for Alternatives 3A – 3C and 4A and 4B, which compromises the public's, the lead agency's and the responsible agencies' ability to understand the environmental effects and the alternatives' abilities to fulfill the objectives.

If the BO's long-term, post-3.0 foot surcharging target flows are dependent on infrequent surcharging, the beneficial steelhead impacts of Alternatives 3A – 3C and 4A and 4B may actually be less beneficial than current conditions because under the current conditions the interim target flows, while less, are at least guaranteed at all times. To support the conclusions that Alternatives 3 and 4 benefit steelhead more than Alternative 2's guaranteed flows do, and to support the findings in Tables 4-42 through 4-46, **the SWB should make it very clear that for the purposes of describing the EIR's alternatives that the long-term flows prescribed in the BO are minimum mandatory requirements to be met at the target sites and throughout the reach above the target sites all times regardless of surcharging**.

3. *Alternative 3A Suggests that Long-Term Target Flows are Required Independent of Surcharging but the DEIR Fails to Describe the Target Flows as Mandatory and not Contingent upon Surcharging.*

Alternative 3A requires releases as described in the BO, but does not include reservoir surcharging. This implies that the long-term post-surcharging target flows are mandatory and independent of surcharging. However, since the DEIR relies on the vague BO as a major part of the alternative project descriptions, it needs to clarify for CEQA purposes that the long-term target flows are *minimums* that must be provided between the dam and the target sites at all times regardless of surcharging. If the DEIR instead continues to rely heavily on the BO - without clarification regarding target flows – then the impact assessment should be changed to reflect that the long-term flows for steelhead under Alternatives 3 and 4 would only be made if water was present in the limited accounts developed during surcharging years (only ~1/3 years on average). Under this scenario, target flows may not be met unless the reservoir was surcharged and therefore the modest beneficial steelhead impacts of Alternatives 3A, 3B, 3C and 4A and 4B would be considerably less than as stated in the EIR. If the target flows are not clarified and remain contingent upon surcharging, the EIR should analyze whether these alternatives benefit steelhead as much as Alternative 2, which does have guaranteed, albeit lesser flows, does. Until the long-term target flows included in Alternatives 3A – 3C and 4A and 4B are clarified, they must be considered non-mandatory goals dependent on surcharging and the Adaptive Management Committee ("AMC"). With non-mandatory target flows dependent on surcharging and the AMC, public trust resources would be less protected than as described in the DEIR, and the steelhead impact assessment would require considerable changes to reflect the unreliable nature of long-term target flows.

4. *Target Flows At Highway 154 Are Not Being Met.*

During the SWB site visit on September 8, 2003, COMB described significant difficulties with measuring and maintaining flows at the Highway 154 Target Site. In fact, despite the BO's interim (pre-3.0 foot surcharge) target flows of 1.5 to 2.5 cfs at Highway 154 (depending on whether the reservoir has more than or less than 120,000 AF in storage), there was no surface flow or even ponded water at Highway 154 or within view upstream or downstream on September 4, 2003. (See photographs, Attachment #6.)

According to COMB, this was reportedly due to gravel accumulation in the river at this location; however the BO requires surface flows (not subterranean flows) of 1.5 to 2.5 cfs to support steelhead. The BO target flows are not being met, indicating that the target flows are not mandatory minimum flows, at least in the opinion of COMB and of the Bureau, which operates the Cachuma Project. Since the DEIR alternatives rely on the BO's target flows, how can the SWB assure the public and responsible agencies that the target flows will be monitored, met and verified?

The Bureau surely knows how much water has to be released from Bradbury Dam to meet the target flows at Highway 154, and steps should be taken to ensure this target flow is met and verifiable at all times. However, if it proves ineffective to measure flows at Highway 154, where the project sponsors propose to measure flows pursuant to the BO, the project itself should be modified to make sure the flow is meeting minimum target flows and can be verified at a more downstream location. Surface flow should be continuous from Bradbury Dam downstream to the chosen, technically functional flow measurement site.

B. The Description of Alternatives is Inadequate for Failing to Describe what "Other Measures" are Included.

The descriptions of Alternatives 3A, 3B, 3C, 4A and 4B include "other steelhead conservation actions described in the Biological Opinion (and the Fish Management Plan)," but fail to specify those actions. Under CEQA, a project description must provide enough information to facilitate evaluation of the alternatives' impacts and abilities to fulfill the project objectives. In this case, without knowing if the alternatives descriptions include all or some of the "steelhead conservation actions" or any of the BO's non-mandatory "conservation recommendations" it is difficult or impossible to determine if the alternatives meet the project objectives of protecting public trust resources. Do the alternative descriptions include all steelhead conservation actions in the FMP and BO including the BO's Conservation Recommendations?

C. The Project Description Is Not Stable Because The Adaptive Management Committee can Reduce the Target Flows Without Approval by the SWB, Without a Public Process, and With No Defined Guidelines for Changing the Target Flows.

"Adaptive Management" is part of the description of the alternatives. Through adaptive management, management strategies are changed when and if needed in order to attain a pre-determined goal or standard for success. According to the DEIR, an Adaptive Management Committee ("AMC") appears to have the authority to reduce the target flows or determine that target flows need not be met. No clear criteria are set forth for when the AMC can modify the target flows, and the DEIR contains no discussion of whether such changes would be subject to future environmental analysis. As a result, the project description is not stable and the public and lead agencies cannot assess the alternatives relative impacts or ability to fulfill the objectives.

Without established success criteria, adaptive management is not an effective tool to protect and enhance steelhead or steelhead habitat. Adaptive Management is described in Principles for the Restoration of Aquatic Ecosystems (USEPA 2000) as follows:

> **Monitor and adapt where changes are necessary.** Every combination of watershed characteristics, sources of stress, and restoration techniques is unique and, therefore, restoration efforts may not proceed exactly as planned. Adapting a project to at least some change or new information should be considered normal. Monitoring before and during the project is crucial for finding out whether goals are being achieved. If they are not, "mid-course" adjustments in the project should be undertaken. Post-project monitoring will help determine whether additional actions or adjustments are needed and can provide useful information for future restoration efforts. This process of monitoring and adjustment is known as adaptive management. Monitoring plans should be feasible in terms of costs and technology, and should always provide information relevant to meeting the project goals.

(Emphasis added.) As noted by USEPA above, measurable goals or success criteria are necessary for adaptive management because without such criteria, there is no way to know when or if to modify the management approach. See also, Successful Adaptive Management – The Essential Need for Pre-Determined Fisheries Performance Objectives, Jim Edmondson, February 3, 2000, Attachment #14; Keegan (2003).

The SWB's Battle Creek Salmon and Steelhead Restoration Project DEIR/S includes an Adaptive Management Plan ("AMP"). Appendix D of this document includes the draft AMP and describes the importance of having measurable criteria for success. Amongst these criteria, "The first four adaptive management objectives specifically address fish populations in an effort to measure the progress toward the AMP goal of restoring chinook salmon and steelhead populations to the point they are viable and fully utilizing ecosystem carrying capacity. To do this, accurate assessments of the population size, trends in productivity, population substructure, and population diversity will be critical." As noted above, absent measurable, population-based criteria for success, adaptive management is ineffective because there is no way to ascertain whether the project is achieving those criteria and thus there is no way to determine when or even if to modify management approaches.

The DEIR should provide a more specific project description and objective including average number(s) of steelhead (or a range) that constitute good condition and protection of public trust resources, and that can be used as a goal for adaptive management. With numerical standards for success, the SWB will have a yard stick to ascertain if the alternatives will render fish in good condition and protect public trust resources pursuant to the CEQA project objectives. In addition, the Bureau's use of adaptive management will have a measurable goal and can thus be an effective management strategy.

The SWB's EIR must clearly describe Alternatives 3A – 3C and 4A and 4B as requiring the target flows as mandatory minimum flows that are to be met or exceeded at the target sites and throughout the reach above the target sites at all times pursuant to the BO's schedule, regardless of water being present in limited accounts accrued through infrequent surcharging, and regardless of the AMC.

D. Recommendations for project description.

To address the problems with the stability of the project description, CalTrout proposes that:

1. The project and alternatives descriptions shall be revised to ensure that the BO-prescribed target flows are mandatory minimum flows, to be met at the target sites and throughout the reaches between the target sites and Bradbury Dam at all times;

2. The project and alternatives descriptions should be revised to state with specificity which "other measures" are included;

3. The Adaptive Management Committee can increase but not decrease target flows; and

4. Compliance with the target flows shall be verifiable at all times by the public and responsible agencies by checking one of the USGS gauging stations which already provide a "real time" report that is available over the internet. For example, see "USGS 11128500 SANTA YNEZ R A SOLVANG CA," which is available at http://waterdata.usgs.gov/nwis/uv?site_no=11128500.

V. The Environmental Baseline Should be Modified to Analyze Protection of Public Trust Resources.

The DEIR uses a suitable CEQA baseline to assess impacts of Alternatives 3A – 3C and 4A and 4B compared to current conditions with BO interim flows being made (Alternative 2). It also uses the recent historic baseline (operations under WRO 89-18,

Alternative 1) to show how the current operations (Alternative 2) have improved conditions for steelhead somewhat.

As discussed above, however, the SWB must also assess pre-Cachuma Project conditions in order to determine whether the DEIR objectives are met by any of the alternatives. Only through identification of the historical, pre-project steelhead population conditions is it possible to identify the conditions the SWB is seeking to restore and preserve. Thus, an assessment of pre-Cachuma Project conditions is necessary for this DEIR to adequately support the SWB's decision regarding the measures necessary to protect public trust resources in the Santa Ynez River, including measures necessary to restore and maintain steelhead in "good condition."

VI. The DEIR Fails to Include Adequate Analysis or Mitigation for Many Project Impacts.

A. The Indirect Water Supply Impacts Associated With the Use of Alternative Water Supplies May be Avoided or Mitigated to Less than Significant.

The SWB EIR finds that none of the Alternatives result in significant direct or indirect water supply impacts based on average annual yield (DEIR page 4-33). According to the EIR, Alternative 3A may result in an indirect Class I impact (e.g., saltwater intrusion caused by groundwater pumping along the coast and/or air pollution caused by seawater desalination) if the member units utilize these two alternative water sources to ensure supply exceeds demand during critical drought years. However, this preliminary conclusion in the DEIR utilized inaccurate per capita demand projections. According to Pacific Institute, the DEIR over-projected future demands by failing to account for increased future water use efficiency attributable to ongoing conservation programs, such as the replacement of old toilets with low-flow toilets, which are required (Pacific Institute's October 6, 2003 Comments on the Draft EIR, Attachment #18). Therefore, the EIR should reevaluate the potential reductions to water supply during critical droughts based on accurate future per capita demand figures, and should reduce the Class I indirect impact to Class II or Class III if appropriate.

According to the DEIR, this potentially significant indirect impact can be avoided if the member units utilize increased water conservation and/or implement drought contingency plans during critical drought years instead of utilizing feasible increased water conservation. (Pages 4-40 – 4-43.) However, during such critical drought years used for the DEIR's impact analysis, emergency measures are typically imposed to reduce demand, and this would lessen the need for alternative supplies that might cause indirect impacts (Pacific Institute 2003). While the DEIR finds that the indirect impacts associated with alternative water supplies during critical droughts can be avoided or mitigated through conservation, the DEIR does not provide sufficient detail regarding the feasibility of water conservation measures that can negate the need for alternative supplies and thereby avoid the indirect impacts associated with them.

CalTrout concurs with the DEIR that reductions in water supply would, if ever, only occur during critical droughts, and that the indirect impacts can be avoided through increased conservation. Our evidence specifically confirms that the critical drought-time water supply reductions of the proposed alternatives and CalTrout's alternatives described below can be avoided or substantially minimized through feasible conservation measures to the point that increased use of alternative supplies would not result in significant indirect impacts such as saltwater intrusion from coastal aquifer pumping and air pollution from the desal plant. CalTrout has researched the feasibility of reducing the demand for water through urban water conservation and determined that it is feasible to utilize water conservation to avoid potentially significant indirect impacts caused by increasing use of alternative water sources during critical droughts (Pacific Institute 2003). Therefore, while further analysis is warranted, even without surcharging and its significant impacts to recreation, oaks and habitats, Alternative 3A and CalTrout's Public Trust, IFIM, and Maximum Beneficial Use Alternatives would likely not result in significant direct or indirect water supply impacts, even during drought years. We submit that the CalTrout Alternatives are environmentally superior feasible options that the SWB should consider in its CEQA process and hearings.

B. <u>The Biological and Recreational Impacts of Alternatives 3B, 3C, 4A and 4B Can and Should be Mitigated More Thoroughly.</u>

CalTrout supports surcharging if deemed necessary by the SWB to protect public trust resources in the river or to mitigate significant water supply impacts, if any, associated with fulfilling the project Objectives. However, the impacts of surcharging are considerable and the EIR should adequately evaluate alternatives that can avoid those impacts (e.g., water conservation and alternative supplies) as well as the impacts caused by surcharging (e.g., loss of oak trees and recreational facility inundation). Alternatives which protect steelhead and keep steelhead and their population in the river in good condition, and which minimize or avoid water supply impacts without causing significant secondary impacts to oaks, lakeshore habitats and recreation, are environmentally superior to the proposed project.

1. *Impacts to Oak Trees Require Additional Mitigation.*

The DEIR finds that the loss of 452 oak trees around Lake Cachuma caused by Alternatives 3B, 3C, 4A and 4B's surcharging element is a Class I significant impact that may be mitigated to less than significant as a result of tree planting over time. However, while CalTrout supports surcharging if needed for steelhead protection, we note that impacts of surcharging on oak trees are currently not proposed to be fully mitigated to less than significant because the DEIR finds on page 4-121 that there is not adequate area onsite to accommodate oak tree planting at the 3:1[6] ratio included as mitigation for the impact of the

[6] The proposed replacement of 3:1 for oak trees removed by the project is not consistent with Santa Barbara County's standard mitigation for replacement of oak trees, which is 10:1 for live oaks and 15:1 for deciduous oaks. The use of a 3:1 replacement ratio does not account for high mortality typically encountered with oak tree replacement program, and does not

3.0 foot surcharge (Alternatives 3C, 4A and 4B). No off-site oak tree planting locations are identified. The sheer numbers of oaks to be removed by surcharging under these alternatives underscores the need for additional mitigation to ensure that surcharging, if necessary, does not result in significant impacts to oak trees.

Approximately 10% of the 452 trees are rare Valley Oaks (*Quercus lobata*). According to the County of Santa Barbara's CEQA Thresholds and Guidelines Manual, removal of one native specimen tree or one rare native tree is a potentially significant effect, and removal of 10% of the trees on a project site may also be considered a significant impact (County of Santa Barbara, Environmental Thresholds and Guidelines Manual (Jan. 1995), pp. 6-9 – 6-10, Attachment #8). In addition, the DEIR notes that temporal impacts to oaks will be significant during the time the replacement trees are becoming established.

The DEIR is inconsistent and should be changed. It currently states that not enough space is available to mitigate oak losses caused by the 3 foot surcharge (page 4-121) yet finds that *the impacts to oak trees can be mitigated to less than significant* after 10 years (page 4-115). Adequate supplemental sites to accommodate oak tree replacement are needed before the SWB can find that impacts to oak trees will be mitigated to less than significant. In addition, considering success rates for previous oak tree replacement projects and the County's standard oak replacement ratios, unless replacement ratios are increased to 10:1 for live oaks and 15:1 for deciduous oaks, impacts to oak trees will not be sufficiently mitigated. The Bureau should team up with Santa Barbara County, the United States Forest Service and landowners to identify feasible off-site planting opportunities in the Santa Ynez Valley to mitigate significant impacts to oaks to less than significant.

Given the lack of space to mitigate for the loss of oak trees onsite at 3:1, the inadequate 3:1 ratio proposed to replace mature oaks, the impacts to rare native deciduous oak trees and specimen trees, the number of oaks to be removed, and the time it takes to replace mature oaks by planting acorns, additional mitigation for impacts to oak trees must be evaluated in the EIR. Additional mitigation should be required of the Bureau off-site, such as at adjacent private campgrounds, public lands, golf courses or ranches.

2. *Impacts to Oak Woodlands Require Mitigation.*

While the DEIR finds loss of oak trees to be a significant impact, it fails to find a significant impact to oak woodland habitats removed by surcharging. Impacts to oak *woodlands* are related to but are distinct and in addition to impacts to oak *trees*. Twenty-four

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adequately address temporal loss of mature oaks, some as old as 200 years (Santa Barbara County Oak Protection Program EIR and Oak Tree Protection Ordinance excerpts, Attachment #7). When the Bureau undertook its seismic retrofit project in 2000, it planted oaks at a 10:1 ratio (Final Supplemental EA/FONSI for Bradbury Dam Seismic Modification Project). A 3:1 mitigation replacement ratio for oaks is insufficient to reduce impacts to less than significant, and additional mitigation of this impact is feasible.

acres of oak woodland habitat would be lost under the 3 foot surcharge alternatives. According to the attached County of Santa Barbara's CEQA Thresholds and Guidelines Manual, impacts to oak woodlands:

> "may be considered significant due to changes in habitat value and species composition such as … habitat fragmentation, removal of understory, alteration to drainage patterns, disruption of the canopy, or removal of a significant number of trees that would cause a break in the canopy or disruption in animal movement in and through the woodland."

The DEIR did not evaluate or consider these factors when concluding that impacts to oak woodlands would not be significant. The surcharge alternatives would remove a substantial amount of oak woodland habitat, considered environmentally sensitive by the CDFG and by Santa Barbara County. Surcharging would change the drainage patterns causing the death of up to 452 mature trees and would affect the canopy area. The surcharging would remove rare native deciduous oaks and oaks that may act as raptor perches and nest and roost sites. The alternatives would remove understory through inundation, thus removing portions of the oak woodland plant community in addition to the trees. Certain oak woodland understory plants and wildlife species that may be affected by the project are rare (Catalina mariposa lily, a CNPS 4 species, Santa Barbara Bedstraw, a CNPS 4 species, Fish's milkwort, a CNPS 4 species, Hoffman's sanicle, a CNPS 4 species, Silvery legless lizard, Cooper's hawk, California Species of Concern, and Ringtail, a Fully Protected Mammal pursuant to the Fish and Game Codes), but the EIR does not mention or evaluate impacts to oak woodland understory species and wildlife species including rare species, or to oak woodland habitat. As noted in CDFG's September 30, 2003 comment letter regarding the Bureau of Reclamation and COMB's draft EIR/S, there should be mitigation proposed for loss of oak woodland habitat and understory (e.g., oak woodland habitat and understory restoration). The only proposed oak tree replacement would be in an active-use park where replacement of understory species and oak woodland habitat is not feasible.

Therefore, given 1) the County's adopted standards for determining when impacts to oak woodlands are significant in Santa Barbara County, 2) the lack of space onsite to mitigate impacts to oak trees and habitats, 3) the inadequate 3:1 proposed oak tree replacement ratio, 4) the loss of rare oak trees, 5) the temporal impacts associated with replacing mature oaks with seedlings, and 6) the lack of proposed mitigation of impacts to the oak woodland plant community, the SWB EIR should reevaluate impacts to oak woodlands based on these thresholds and identify impacts to oak *woodlands* and to oak *trees* as two significant Class I impacts that cannot be mitigated absent additional space for oak tree and oak woodland habitat (including understory) planting/restoration.

3. *Impacts to Chaparral RequireMitigation.*

In addition, the permanent loss of 35.9 acres of chaparral due to inundation caused by the proposed surcharging should be considered a Class I impact rather than a Class III impact

and should be mitigated. The County's Environmental Thresholds and Guidelines Manual, pp. 6-3 – 6-5 (Attachment #9), includes a methodology for evaluating impacts to native habitats. This method entails determining if the habitat type is rare or common, how large the area to be removed will be, if it is designated as environmentally sensitive by the County, if it is a habitat link to other areas, if it is pristine or disturbed, if it supports rich or diverse plant or animal life, and is it a viable habitat. Other than a conclusory statement regarding the abundance of chaparral in the area, the DEIR did not undertake this evaluation.

The County Thresholds and Guidelines Manual sets forth what projects may cause significant impacts. These include projects that substantially:

a) reduce or eliminate species diversity or abundance;
b) reduce or eliminate quality or quantity of nesting areas;
c) limit reproductive capacity through losses of individuals or habitat;
d) fragment, eliminate, or otherwise disrupt foraging areas and or access to food sources;
e) limit or fragment range and movement; or
f) interfere with natural processes such as fire or flooding upon which the habitat depends.

The Thresholds and Guidelines Manual the sets forth examples of areas where impacts to habitat are presumed to be insignificant. These include:

a) Small acreages of non-native grassland if wildlife values are low.
b) Individuals or stands of non-native trees if not used by important animal species.
c) Areas of historical disturbance such as intensive agriculture.
d) Small pockets of habitats already significantly fragmented or isolated, and degraded or disturbed.
e) Areas of primarily ruderal species resulting from pre-existing man-made disturbance.

Finally, the Threshold and Guidelines Manual describes "Impact Assessment Factors" used to help determine the significance of impacts to habitats. These factors include size of area to be impacted, the type of impact (e.g., degrade versus remove habitat), and timing (e.g., is it a permanent loss or temporary). Given these factors and the types of impacts listed above, as well as the list of impacts that are typically not significant, using the County's methodology, the EIR would find the impact to chaparral significant. The reasons for this finding include the large area to be impacted, the fact that the chaparral habitat would be removed from the area rather than merely degraded, the permanent nature of the impact, ecological connections between chaparral and other habitats nearby, and the presence of rare species that live in the chaparral[7]. Such species may include Plummer's baccharis, Hoffman's nightshade, loggerhead shrike, coast horned lizard, desert woodrat, Santa Barbara bedstraw, Ocellated Humboldt lily, Fish's milkwort, Hoffman's sanicle and Camas lily (Biological

[7] The DEIR fails to describe or assess the presence of rare species in chaparral that would be affected by the surcharging alternatives (DEIR at Page 4-105, and 4-113).

Assessment for Tajiguas Landfill Expansion Project, Hunt and Associates, May 29, 2001). The EIR should evaluate impacts to chaparral and associated rare species pursuant to the County's established methodology, should find these impacts potentially significant, and should prescribe appropriate mitigation measures including a 2:1 replacement of chaparral acreage removed by the project (similar to the mitigation that the County will undertake as part of its Tajiguas Landfill Expansion Project, that will eliminate a similar number of chaparral acres).

4. *The Mitigation Measures for Impacts to Recreation are Speculative.*

The impacts of surcharging on recreation are stated in the DEIR to be Class II (i.e., significant but mitigable to less than significant). However the DEIR notes on page 4-143 that these impacts would be Class I "if the relocation of a critical facility does not occur prior to surcharging, or is deemed infeasible due to funding." There is currently substantial disagreement between the Bureau and Santa Barbara County Parks Department regarding which agency would have to pay for relocation of these facilities, and the County may not be in a financial position to afford such actions. The Bureau has taken the position that County Parks must pay to relocate the facilities and the County believes the Bureau should pay to relocate the facilities because the Bureau is being required to surcharge the reservoir. (Feb. 19, 2002 letter from Chuck Evans to Board of Directors (CCRB), Attachment #10).

Relocation and / or modification of the eighteen facilities listed in Table 4-51, including Bait and Tackle Shop, UCSB Crew Building, trails, picnic areas, stairs, docks and boat launch ramps, and sewer lift stations, will cost at least $10.4 million according to the DEIR, and may cost as much as $12 million according to the County in Attachment #13. This may be an infeasible cost for the County. The County is applying, or may apply, for grants to pay for the relocation of these facilities. However, under CEQA mitigation measures must be known, feasible and effective. Kings County Farm Bureau v. City of Hanford (1990) 221 Cal.App.3d 692. Securing competitive grant funding, with restricted funds available, is not a certain proposition and cannot be relied upon to mitigate impacts from Class I to Class II.

CalTrout supports the concept of surcharging, but only if necessary to provide some of the water needed to protect public trust resources. However, there is enough question over the feasibility of mitigating the adverse recreational impacts of surcharging, including who will pay for it, to conclude under a reasonable scenario that recreation impacts will require additional, reliable mitigation. Additional mitigation measures or alternatives, such as phasing in surcharging as facilities and biological resources are replaced, would help minimize these significant impacts. Water conservation and/or alternative water supplies may be sufficient to eliminate the need for surcharging and avoid the above impacts while freeing up sufficient water for steelhead protection.

VII. CalTrout's Proposed Public Trust Alternative, Maximum Beneficial Use Alternative and IFIM Alternative are Feasible and are Capable of Fulfilling the CEQA Project Objective of Appropriate Protection of Public Trust Resources.

While the SWB's decision is likely to be months away and must be made after FEIR certification, under CEQA, the SWB cannot adopt an alternative if there is another feasible alternative that fulfills most of the basic project objectives and avoids or substantially lessens a significant impact. CEQA Guidelines §§15002(a)(3) and 15021(a)(2); Public Resources Code §21081(a)(3); Mountain Lion Foundation v. Fish and Game Commission (1997) 16 Cal.App.4th 105, 134. "The Legislature finds and declares that it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." Public Resources Code §21002. The lead agency's decision with regards to the feasibility of alternatives must be based on substantial evidence in the record. Citizens for Goleta Valley v. Board of Supervisors (2d Dist. 1988) 197 Cal.App.3d 1167. Decisions regarding whether or not alternatives substantially lessen or avoid significant impacts must also be based on evidence in the record. When the SWB acts in this matter, it is limited in which alternative it can approve. It must ensure that the alternative it approves is feasible and results in the fewest, and / or substantially least severe, significant impacts of all the alternatives in the administrative record.

A. Alternative 3A is the Environmentally Superior Alternative of Those Analyzed in the DEIR.

CalTrout agrees with the SWB DEIR that Alternative 3A is environmentally superior to all other alternatives considered in the DEIR.[8] Alternative 3A is the environmentally superior alternative because it results in fewer, and less significant, Class I, unavoidable impacts than the other alternatives. It also results in fewer Class II and Class III impacts. It results in only one purported potential Class I indirect impact, related to the increased or renewed use of alternative water supplies (e.g., desal) to compensate for potential reductions in water supplies predicted to occur only during the "critical drought" year. These reductions result from the BO's target flow requirements for passage, spawning and rearing coupled with the lack of surcharging in Alternative 3A. The alternatives that use 1.8 foot or 3.0 foot surcharging (3B, 3C, 4A and 4B) result in a greater number of Class I impacts (to oak trees, habitats and recreation) than 3A does (the indirect impact of developing alternative water supplies during critical drought years) and are therefore environmentally inferior to Alternative 3A.

[8] However, as discussed above, it still fails to achieve the basic objective of protecting public trust resources in the river.

The indirect impacts associated with Alternative 3A during critical droughts can be avoided through enhanced water conservation according to Pacific Institute. 3A also avoids the impacts of surcharging and is therefore environmentally superior to other alternatives in the DEIR. Alternatives that include enhanced conservation avoid the indirect effects of Alternative 3A, and may avoid the need for surcharging and thus avoid the recreational and biological impacts. CalTrout supports analysis of measures to reduce the biological and recreational impacts of surcharging if surcharging is needed to reduce indirect water supply impacts. However the evidence CalTrout submits shows that water conservation and alternative supplies can mitigate the drought-time water supply impacts and that surcharging (and its impacts to oaks, vegetation and recreation) may not be necessary. Therefore the DEIR properly identifies Alternative 3A as the environmentally superior alternative in the DEIR. **Nonetheless, 3A does not fulfill the basic objective of protecting the public trust resources and the EIR must consider new alternatives that can feasibly protect steelhead without causing significant secondary impacts.**

B. CalTrout's Alternatives will Meet the Project Objectives and Reduce or Avoid Project Impacts.

CalTrout offers the following alternatives for consideration in the environmental review process for the proposed action. These alternatives are offered because they are consistent with the objectives discussed above, are feasible, and are capable of fulfilling the objective of restoring and preserving the public trust in the Santa Ynez River steelhead. Obtaining additional information is still necessary in order to determine the full range of measures that should be implemented to protect public trust resources and comply with Fish and Game Code §5937. However, in the interim, CalTrout's alternatives better fulfill the project objectives because they feasibly maintain steelhead in a better condition than proposed in any of the DEIR alternatives through increased rearing flows, and they require the studies necessary to make a final decision regarding protection of steelhead as a public trust resource.

1. *IFIM Alternative*

The IFIM Alternative is described as Alternative 3A2 in the 1995 Cachuma Contract Renewal EIR/S ("EIR/S"). This alternative is identical to the CalTrout Public Trust Alternative – and both are based on the same 1989 Physical Habitat Simulation System - except for one significant distinguishing feature. Under the IFIM Alternative, the flows specified as minimums are required every year regardless of whether or not it is a drought year. According to the EIR/S, under Alternative 3A2, "operational criteria would be modified to improve instream resources," "the Cachuma Project would be operated to improve environmental resources, and "would give first priority to meeting the water supply needs of the Member Units, followed by the water requirements of the environment" (excerpts from Final EIS/EIR for Cachuma Project Contract Renewal, Attachment #10).

This alternative would significantly improve habitat for spawning, rearing and passage (Keegan 2003), however it could result in a greater need to tap alternative water supplies

during critical drought years compared to CalTrout's Public Trust Alternative. Despite its potentially greater drought-time water supply reduction, the report prepared by Pacific Institute suggests that this reduction (and any indirect impacts related to it) could be mitigated through conservation. The IFIM Alternative is capable of fulfilling the project objectives, including compliance with the Fish and Game Code section 5937. Therefore the SWB should analyze this alternative in the EIR.

2. *Public Trust Alternative*

CalTrout proposes the Public Trust Alternative as a feasible method potentially capable of fulfilling the public trust objective and compliance with § 5937, until additional information is available to make a final determination on instream flow and other measures that may be needed to comply with the Public Trust Doctrine and Fish and Game Code §5937. CalTrout's Public Trust Alternative incorporates the measures of the BO and FMP, however it replaces the BO's fish release requirements with the fish release requirements adapted from Alternative 3A2 in the 1995 Cachuma Contract Renewal EIR/S. These flows were determined using a physical habitat simulation system ("PHABSIM") [9] and are based on sound hydrological modeling accepted as part of that certified EIR/S. Under this alternative, the flows cannot be reduced by the AMC and are not contingent upon surcharging. Surcharging is not part of this Alternative, but can be accommodated if deemed necessary. CalTrout's Public Trust Alternative also includes the Conservation Recommendations of the BO, including studies, and a re-opener provision for the SWB permit that states that the SWB will affirmatively review the permit terms when NMFS releases the steelhead recovery plan.

This alternative would result in similar adverse environmental impacts as Alternatives 3A, 3B, or 3C depending on whether or not surcharging to 3 feet occurs, but unlike those options it may fulfill and at a minimum it comes closer to fulfilling the public trust objective. The SWB should evaluate this option's potential to fulfill the objectives and its relative impacts compared to those of the EIR's alternatives which do not come close to achieving the basic project objective. This alternative could also include time series habitat monitoring to verify that the PHABSIM predicted outputs occur.

The specific project elements are described below:

a. Releases of water to protect steelhead and other public trust resources.

[9] The PHABSIM is part of the Instream Flow Incremental Methodology ("IFIM"), a decision-making tool to determine instream flow. This method has been identified as a preferred methodology by the CDFG to develop instream flow recommendations. (June 23, 1987 letter to Jim Edmondson from Pete Bontadelli (CDFG), Attachment#12.) Keegan (2003) discusses the benefits of this methodology compared to methodology supporting the flow regime in the DEIR alternatives.

Releases from Cachuma Reservoir would be required to augment any natural River flows to maintain the following minimum surface stream flows to enhance fish passage and steelhead spawning and rearing habitat primarily between Bradbury Dam and Refugio Road:

- 48 cfs 15 February to 14 April for spawning, then
- 20 cfs to June 1 for incubation and rearing, then
- 25 cfs for one week for emigration, then
- gradually decrease releases to 10 cfs by 30 June, then
- hold at 10 cfs to 1 October for steelhead rearing and resident fish, then
- 5 cfs the rest of the year for resident fish.

These flows may not completely restore and preserve the public trust resources or return and maintain steelhead in good condition, but the best information available suggests that these come the closest, and so they should be 1) analyzed in the EIR and 2) implemented as an interim measure until additional studies are completed. These flows are not dependent on surcharging or presence of water in accounts. Based on hydrological modeling done in Section 6.1 of the Contract Renewal EIR/S, the above minimum stream flows could be maintained at both San Lucas and Alisal bridges in all years; however CalTrout's Public Trust Alternative implements the BO's long-term target flows during dry years. CalTrout's analysis of the potential to reduce the demand for water use by the COMB member units indicates that indirect impacts of alternative water supplies can be avoided through increased water conservation. The Pacific Institute (2003) concludes that between 5,000 and 7,000 AFY of water can be cost-effectively conserved, and that demand can thereby be reduced so that the impacts of a critical dry year are considerably less.

b) Other measures in BO.

CalTrout's Public Trust Alternative includes all of the proposed operations, maintenance and conservation actions described on pages 4 – 15 of the BO, except that 1) reservoir surcharge is optional and only included if water conservation and alternatives supplies would not result in less impacts than surcharging; 2) "Flow-Related Fish Support Measures" and "Flow Accounting" are replaced by the flow regime described above; 3) "Adaptive Management" includes measurable performance standards pursuant to Keegan's recommendation; and 4) the AMC can increase but not decrease flows rates specified above. The remaining BO actions incorporated into the Public Trust Alternative (also included in the DEIR's Alternatives 3 and 4) include: water rights release ramping, Hilton Creek Water Supply, limitations on "State Water Deliveries," "Emergency Winter Operations," "Maintenance Activities," Hilton Creek passage impediment and barrier removal projects, "Fish Rescue," "Conservation Easements," "Tributary and Mainstem Enhancements," "Watershed Monitoring Program," and "Public Education and Outreach."

In addition, CalTrout's Public Trust Alternative includes all "Terms and Conditions" that implement that 15 Reasonable and Prudent Measures in the BO. Finally, this alternative also includes the three "Conservation Recommendations" described on pages 81 –

82 of the BO. The DEIR acknowledges that the BO's "Conservation Recommendations" - not clearly described as part of any alternative in the DEIR - were designed to contribute to the recovery of the species. These Recommendations include studies of 1) steelhead passage around Bradbury Dam[10], 2) alternative methods for delivering downstream water rights water to protect steelhead (e.g., modifications to WRO 89-18's mandate that the river be dewatered before any down stream water rights releases can be made), and 3) how the operation of the Cachuma Project has affected the river geomorphology and habitat for steelhead. Under the Public Trust Alternative, the goal for fulfilling the conservation recommendations is two years after the SWB's decision regarding modification of the Bureau's water rights permits.

In order to reinforce observations made during the September 8, 2003 site visit, CalTrout submits for the SWB's consideration evidence that the physical and ecological features relating to habitat for steelhead (e.g., gravel beds, depth, size and frequency of pools, bedrock outcroppings, geology, springs, riparian habitat, etc.) are more conducive to steelhead spawning and rearing in the portion of the river and its tributaries above Cachuma Reservoir than those below it (Statement of E.A. Keller, October 6, 2003 (Attachment 21); Keegan 2003). In fact Dr. Keller notes that the River below Bradbury cannot be returned to anything like it was prior to Bradbury Dam. As discussed above, the majority of stream habitat suitable for steelhead in the SYR Watershed lies above Cachuma, therefore this area will be an important component of protecting the public trust steelhead resource if passage is provided. The attached list indicates that there may be as much as 422 miles of blue-line and intermittent river and tributary miles (Attachment #13). Other evidence submitted also indicates that fish passage will be necessary to restore the public trust (Keegan 2003). The USFS assessed the potential to restore steelhead in the Santa Ynez River and finds that restoring access above the three major dams on the SYR could increase the steelhead run conservatively from current population estimates of approximately <200 fish[11] to 1,800 to 4000 adult fish (USFS Santa Ynez Steelhead Restoration Feasibility Study, 1996, page 15).

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[10] The DEIR fails to describe how the Cachuma Project impacts steelhead migration and fails to offer alternatives that would provide steelhead passage around Cachuma as a feasible way to protect public trust resources and fulfill the project objectives. The DEIR's discussion of impacts to steelhead (Section 4.1.1) describes the environmental conditions in the vicinity of the project and says: "These conditions have been influenced by past and ongoing operations of the Cachuma Project, which directly affect fluctuations of the reservoir and the amount and timing of flows below the dam." It emphasizes the dam's impact on downstream flows but it does not mention the impact to steelhead migration caused by past and ongoing operations of the Cachuma Project and Bradbury Dam absent fish passage. This is how the Cachuma Project most severely impacted and continues to impact steelhead as a Public Trust resource. In order to protect steelhead for the Public Trust, the alternatives must include a thorough fish passage study.

[11] The BO on Page 17 finds that the run on the Santa Ynez River was less than 100 adult fish in 1996.

The attached Opinion of E.T. Zapel (October 3, 2003) (Attachment #17) demonstrates that there are at least several feasible methods of securing passage around Bradbury and other Santa Ynez River dams, and that an evaluation of adult and juvenile fish passage is warranted to determine the most effective solution. Therefore, CalTrout's alternatives include a term and condition in the Bureau's water rights permits requiring a detailed feasibility study of alternative methods of fish passage, based on the Zapel recommendations, and with input and concurrence by NMFS and CDFG. The report would be required by a date certain following the SWB's decision in these proceedings to ensure the actions potentially necessary to protect the public trust are not put off indefinitely.

c) Re-opener Clause.

The Bureau's permits already include a provision ensuring that the SWB retains jurisdiction to protect public trust resources. Given that additional studies are still necessary to determine the full range of measures necessary to protect public trust resources, implementation of these studies should be incorporated into the permits, and the SWB should include a provision in the permits to affirmatively revisit the public trust issue when these studies are complete. Specifically, this alternative includes a re-opener provision that automatically triggers reconsideration of the water rights permits by the SWB after NMFS releases its draft and final steelhead recovery plan and once the other studies (e.g. fish passage, long term flow regimes, use of ANA and BNA water, etc.) are completed. This is an important component of the Public Trust alternative in that it recognizes that additional information may still be necessary for the SWB to fully assess what measures should be incorporated into Reclamation's water rights permits to restore and preserve public trust resources in the Santa Ynez River, and ensures that as this information becomes available it can be considered and incorporated into the permit terms in a timely manner.

3. *CalTrout's Maximum Beneficial Use Alternative.*

The EIR is deficient for not analyzing an alternative that would include dual utilization of water stored in the Below Narrows Aquifers ("BNA") and Above Narrows Aquifers ("ANA") for subsequent groundwater recharge releases more continuously for steelhead and other aquatic resources. Currently, this water is released in large pulse flows during several weeks after the River bed aquifer (and thus the River) above the narrows has been dewatered by 10,000 acre feet, typically in August or September. The Maximum Beneficial Use Alternative is identical to the CalTrout Public Trust Alternative except that it includes continuous releases of the ANA and BNA water to support rearing and other steelhead life stages in the river. It would include studies, required as part of a modified term and conditions in the Bureau's water rights permits to evaluate how to implement WRO 89-18 water rights releases more continuously to better protect and support steelhead and recharge the groundwater basins concurrently. CDFG, on page 198 of the 1996 Steelhead Restoration and Management Plan, recommends investigating "the feasibility of modifying the release schedule of water released from Bradbury Dam to downstream water users so that it provides benefits to fish and wildlife." In 1997, CDFG noted that "Currently, the water is released on

an as-needed basis as called for by the Santa Ynez River Water Conservation District, which provides relatively little benefit to aquatic species and habitat." In addition, NMFS recommends similar studies in the BO's Conservation Recommendations. Additional hydrological studies, amongst others, are necessary to better understand how the Cachuma Project can be operated to protect steelhead. Such studies should include how the water currently stored for subsequent pulse releases to recharge groundwater aquifers downstream from the dam pursuant to WRO 89-18 may be used conjunctively through continuous releases for groundwater recharge and to support steelhead in the river.

While the water agencies' settlement uses the term "Conjunctive Use," the release of downstream water rights water in a large pulse in September after the ANA have been dewatered by 10,000 AF or more, as called for in the Settlement and WRO 89-18, does little to benefit steelhead. In fact, it may be detrimental to steelhead (Keegan 2003). True conjunctive use would make efficient dual use of the downstream water rights releases in a pattern that would maximize benefits of use to steelhead and to downstream users. To accomplish this, WRO 89-18 could be modified so that the downstream releases can occur continuously and not only after the river alluvial aquifer above the narrows has been dewatered by 10,000 AF. The Maximum Beneficial Use Alternative includes water rights permit terms and conditions requiring the Bureau to work with CDFG and NMFS to study utilizing the ANA and BNA water conjunctively for fish and groundwater replenishment.

This approach may enhance public trust resources such as wetlands and steelhead throughout the river by providing more continuous flows. While it may slightly increase instream growth of riparian vegetation more than the current alternatives, this is not considered a significant impact for other alternatives in the DEIR or by the Flood Control District, as described below. It requires investigation, however, it could result in protection of public trust resources by releasing water that is destined to be released anyway. This released water would benefit steelhead with the goal of protecting steelhead in good condition in the river below the dam, while at the same time recharging downstream aquifers.

The EIR, or subsequent studies required of the Bureau by the SWB as part of the water rights permits, should consider how much water may be available through alternative water supplies and water conservation and assess how much of the BNA and ANA water should be utilized under this conjunctive use scenario. Given that conservation alone may provide several thousand acre feet per year, only a portion of the ANA and BNA may be necessary for this conjunctive use, and the remainder would remain in the reservoir for future releases as needed to keep the downstream aquifer recharged and/or as a drought buffer. The SWB should require a study of this alternative before determining what measures are necessary to protect steelhead as a public trust resource. Using the downstream water rights releases stored from the ANA and BNA conjunctively for continuous rearing flow support, this alternative is consistent with an objective of maximizing beneficial use and preventing unreasonable use. Also note that this is consistent with the BO's conservation recommendation.

VIII. The DEIR Fails to Analyze Consistency with Applicable Plans and Policies and Fails to Acknowledge the Project's Inconsistency with such Plans and Policies, Resulting in a Potentially Significant Land Use Impact.

As part of an EIR, CEQA requires an analysis of the project's consistency with the plans and policies of all agencies with jurisdiction over the project to ensure that potential environmental issues are not overlooked. The CEQA Guidelines Appendix G (Environmental Checklist Form) and Appendix I set forth the format of a sample Initial Study, which includes a checklist of potential environmental effects that should be assessed, if applicable, in every EIR. Included in this list of 16 categories of potential environmental effects is Impact IX, "Land Use Planning" Impacts. Within this category is Impact IX(b), "Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect" (Appendix G of CEQA Guidelines, Attachment #15; see also CEQA Guidelines Section 15063(d)(5)). This DEIR does not analyze Land Use Impacts including conflicts with existing plans and policies.

For instance, the DEIR must assess consistency with the CDFG Steelhead Restoration and Management Plan for California, CDFG Steelhead Restoration Policies such as the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act (Fish and Game Code Section 6900 et. seq.), and other pertinent Fish and Game Code sections including §5937, because the CDFG has jurisdiction over many aspects of this project pursuant to Fish and Game Code Section 1601. Streambed Alteration Agreements are required for project elements including modifications to the lakeshore (surcharging), to tributaries (passage improvements), and to the mainstem (modified flows and their physical effect on stream bank morphology, fish and wildlife and vegetation). The project is not consistent with the state-approved CDFG Steelhead Restoration and Management Plan's policies and recommendation regarding additional investigation into fish passage at Bradbury Dam.

In addition, the DEIR must assess consistency with the Porter-Cologne Act and the Clean Water Act, including the Basin Plan, and must assess compliance with the beneficial uses because the Regional Water Quality Control Board has jurisdiction over portions of the project including release of water into the river and tributary projects. The alternatives identified do not achieve beneficial use protection and raise consistency issues with the Basin Plan. The project does not achieve beneficial use of the State's waters with regards to migration, spawning, rare species, cold water fish, wildlife habitat, municipal water supplies and other beneficial uses. These beneficial uses were identified pursuant to the federal Clean Water Act (Section 303), and whether they are being achieved should be evaluated in light of the overarching objective of the Clean Water Act – ". . . to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 101. The SWB has previously interpreted "physical integrity" to mean the maintenance of "the temperature, hydrologic regime, geomorphology, and other physical characteristics . . . within the ranges that fully supports the beneficial uses historically provided by that water." March 11, 2003

letter from Arthur G. Baggett, Jr. to U.S. EPA, p. 6 (comment on ANPRM on Definition of "waters of the United States"). Similarly, the SWB has identified "biological integrity" as meaning that "the biological processes and diversity and abundance of organisms associated with a waterbody are within the ranges historically supported by that water." Id. at 7. As discussed above, the DEIR does not even identify or assess the historical conditions of the Santa Ynez River and the steelhead population. Nor do any of the alternatives in the DEIR include measures that would be capable of restoring steelhead migration, spawning and rearing to its historical conditions or even significantly. The DEIR does not address how these alternatives are consistent with the Basin Plan. Furthermore, the DEIR does not address how increased water conservation and/or use of alternative supplies or conjunctive use of downstream water rights releases for fish rearing could result in placing the State's water to higher use by better fulfilling the beneficial uses specified in the Basin Plan.

Additionally, Santa Barbara County has approval authority over some project elements (tributary passage and enhancement projects, relocation of recreational facilities and authorizing use of County Parkland for oak tree mitigation plantings). Thus, the SWB should provide a detailed assessment of the proposed project's consistency with the Santa Barbara County General Plan, including the Conservation Element, to ensure that the proposed project is in compliance with locally adopted standards for protecting the environment from impacts.

As discussed above under the discussion regarding the DEIR's objectives, the project's consistency with the Public Trust Doctrine, Fish and Game Code §5937, Article X, Section 2 of the California Constitution, and Water Code Section 100 are especially integral to the project's evaluation. The DEIR needs to analyze the alternatives' respective consistency with these provisions.

IX. Other Comments Regarding the DEIR.

A. Flood Control Impacts, Page ES 6, Table ES-1

The DEIR finds potential flood hazard impacts to be adverse, yet the COMB/Bureau DEIR/S and the Flood Control District have not classified this impact as adverse. The Santa Barbara County Flood Control District ("District") submitted a September 3, 2003 letter to the SWB regarding the DEIR (Attachment #16). The District made it clear that it does not intend to and has no funds to conduct maintenance in this section of the river. It has no permits and no sites for habitat mitigation that would be required. Moreover, this section of the river above the Narrows is not characterized by the low lying flood prone fields below the Narrows and the threat of flooding is much lower. The threat of bank erosion may exist in this reach, however, continuous flows would promote riparian vegetation that could stabilize the river banks in this reach, reducing bank erosion.

Page 4-24 of the DEIR states that the impact would occur regardless of the project because the BO requires releases for fish. Is this statement then not true of all impacts related to increased releases for fish?

The DEIR finds that the potentially adverse flood hazard impact could be mitigated by increased river maintenance by the Santa Barbara County Flood Control District, but the EIR fails to analyze the feasibility of this mitigation measure. Neither the SWB nor the project applicant can direct the District to begin clearing the river and the District has stated that it does not intend to begin clearing the river in this reach.

With regards to increased river maintenance by the District, the EIR fails to assess the impacts, the permitting issues, and the funding and habitat mitigation difficulties identified by the District. Pursuant to CEQA, the impacts of mitigation measures must be described and assessed, but they have not been. This impact is not expected to be significant and the EIR should dismiss discussion of this infeasible, unnecessary and problematic mitigation proposal.

B. Protection of Public Trust Resources in other Streams affected by the Cachuma Project.

Page 2-1 describes the Cachuma Project Facilities as including four dams on creeks supporting Public Trust and Fish resources on the South Coast of Santa Barbara County, which receive Cachuma water deliveries. These dams impound water in these streams and do not make releases to support public trust resources. The DEIR fails to address the SWB's duty to protect the public trust resources on these creeks that are affected by the proposed ongoing operation of the Cachuma Project under new SWB permit terms and conditions. It is currently unclear whether the Bureau operates all or some of these dams, which are part of the Cachuma Project. At least one of these creeks (Tecolotito / Glen Annie) supports red-legged frogs and supported steelhead prior to the construction of Glen Annie Dam as part of the Cachuma Project.

As with the Santa Ynez River, the SWB has a duty to comply with the Public Trust Doctrine and must ensure that all public trust impacts from the Cachuma Project are considered and mitigated whenever feasible and protect steelhead and other public trust resources in Tecolotito / Glen Annie Creek in good condition. The State Water Board should require additional information from the Bureau regarding its operation of Cachuma Project support facilitites, including the Glen Annie / Tecolotito Dam, require target flows below the dam to be sustained for fish, wetlands and other public trust resources, and subsequently revisit the matter to rule what measures, including fish passage, flows and/or restoration may be required to protect the public trust resources in all waterways affected by the Cachuma Project.

C. Cumulative Impacts.

The proposed project will cause impacts to biological resources along the lake shoreline. The Cachuma Reservoir Resource Management Plan is being developed by the Bureau. This project may also cause impacts to the same resources affected by the SWB's project, including raptors and rare species. In addition, the County Flood Control District has

an ongoing vegetation removal project in the Lower Santa Ynez River (at Lompoc) and the river clearing project has resulted in significant impacts to riparian habitats and rare species according to environmental review conducted for that project upon its initial undertakings during the 1990's. Therefore the EIR must analyze and mitigate the cumulative impacts of these projects.

D. Infiltration into Tecolote Tunnel, Page 2-4.

The DEIR notes that 2000 AFY infiltrates Tecolote Tunnel from surrounding aquifers as part of the Cachuma Project. The EIR should evaluate the impact of this infiltration on natural resources, such as riparian areas and springs. Specifically, where would this water infiltrate to otherwise? Would it support public trust resources or fisheries that are now deprived of water due to the project operation and resulting infiltration into the tunnel (e.g. Tecolotito Creek, Ellwood Creek, or Tecolote Creek)? Such evaluation is necessary to ensure that the SWB can protect public trust resources affected by the Cachuma Project. The objectives should be broadened to include protection of all public trust resources affected by the Cachuma Project, including those outside of the Santa Ynez River Watershed, to ensure the SWB fulfills its duties under the Public Trust Doctrine. The SWB's duty is not limited to protecting only those public resources within the Santa Ynez Watershed, and thus should consider assigning adequate water from to 2000 AFY of infiltration to support public trust resources in affected streams and the river. Also, is this 2,000 AFY factored into the member agencies' yield from the Cachuma Project? This should be considered another potentially feasible source of water for reducing the indirect, potentially significant impacts associated with increasing alternative water supplies during critical droughts.

E. Implementation of BO Measures, Page 2-12.

The DEIR states that the Bureau is currently implementing these measures from the BO. However, it fails to specify the progress of the Bureau in accomplishing these requirements. The Bureau is not meeting the BO's deadlines for: 1) maintaining target flows at Highway 154; 2) studies of alternative ways to deliver water pursuant to WRO 89-18 to protect steelhead better; and 3) developing alternative passage flow releases strategies. BR did not meet this BO deadline. This is relevant to the SWB's considerations and EIR because if the Bureau is not complying with the BO or meeting the deadlines of the BO, then the SWB reliance on the BO to protect Public Trust resources appears to be unwarranted. Full implementation of the BO is adequate only to prevent further jeopardy of steelhead and is inadequate to protect steelhead as a public trust resource or to keep steelhead below Bradbury Dam in good condition.

Conclusion

CalTrout supports the SWB's lead agency status in this matter and shares the SWB's concern that COMB and the Bureau have a largely duplicative EIR/S for essentially the same project. While we agree that the SWB is the proper agency under CEQA to consider the

environmental effects of the proposed modifications to the Bureau's water rights permits to protect public trust resources, the SWB's DEIR is inadequate pursuant to CEQA and is inadequate to support the SWB's decision as to whether the Bureau's water rights permits should be modified to protect public trust resources.

The DEIR must be revised to identify all of the relevant objectives required by law; to ensure a clear, stable and specific project description; to include a range of alternatives that will fulfill the basic project objectives; and to include a full analysis of the baseline, project impacts and potential mitigation measures and alternatives. In particular, the DEIR should be revised to analyze the alternatives suggested by CalTrout, as these alternatives will not only reduce project impacts but they are the only alternatives that will fulfill the project objective of protecting public trust resources and comply with other state laws, plans and policies.

Sincerely,

_____	_____
Karen Kraus	Brian Trautwein
Staff Attorney	Environmental Analyst

Attachment

1

REPORT ON RELATION TO MAINTENANCE OF FISH RESOURCES OF PROPOSED DAMS AND DIVERSIONS IN SANTA BARBARA COUNTY, CALIFORNIA

By Leo Shapovalov

Bureau of Fish Conservation

California Division of Fish and Game

October 21, 1945

as requested in Comment on Santa Barbara Basin Report of U.S.B.R. dated June 1945. 1 cc for U.S.B.R. 1 for Col. Hyatt and 1 for Hom

REPORT ON RELATION TO MAINTENANCE OF FISH RESOURCES OF PROPOSED DAMS AND DIVERSIONS IN SANTA BARBARA COUNTY, CALIFORNIA

A. Santa Ynez River

The Bureau of Reclamation, Region II, has listed for consideration the construction of three dams on Santa Ynez River and a fourth dam on a tributary, Salsipuedes Creek.(1) The water from the resulting reservoirs would be used for irrigation, domestic purposes, flood control, and groundwater replenishment. A tunnel for diversion of water to the Santa Barbara area is also proposed in connection with one of the dams.

The Santa Ynez River rises near the boundary line between Santa Barbara and Ventura counties and flows nearly due west to its entrance into the Pacific Ocean at Surf, about 8 miles northeast of Point Arguello Lighthouse. The total length of the River is approximately 92 miles. The greater part of the basin is included in the Los Padres National Forest.

From a fisheries viewpoint, the Santa Ynez River is of major importance as the spawning grounds and nursery of the largest steelhead run in Southern California, and the

(1) U. S. Bureau of Reclamation, Region II, Report on undeveloped land, water and power resources of California and their utilization in a post-war construction program. 45 pp. (mimeogr. hnd), with appendices and maps. Sacramento, Calif., April, 1944.
U. S. Bureau of Reclamation, Region II, Basin Report, Santa Barbara County, California, Water Resources and Utilization. Sacramento, Calif., June, 1945.

source of the majority of the game fish stocked in the waters of Santa Barbara, Ventura, and San Luis Obispo counties.

Proposed Development

Santa Rosa Dam is proposed for a point approximately 25 miles above the mouth of the River, for purposes of flood control and retardation of water for percolation. No height is listed for the earth fill dam. The gross storage capacity would be 150,000 acre-feet.

Cachuma Dam is proposed for a point 47 miles above the River mouth, for irrigation. Water would be conveyed from the reservoir through the Santa Ynez Mountains by the proposed Tequepis Tunnel to the Santa Barbara area, where it would be used for irrigation. No height is listed for the earth fill dam. The gross storage capacity would be 200,000 acre-feet.

Casuenas Dam would be located on Santa Ynez River 74 miles above its mouth and about 2 miles upstream from the present Gibralter Dam. Of earth construction, it would be 217 feet high, including a freeboard of 20 feet. Water from the reservoir would be conveyed through the Santa Ynez Mountains to the Santa Barbara area by the existing Mission Tunnel from the present Gibraltar Reservoir. It would be used for irrigation and domestic use.

No specifications nor the exact location are listed for the proposed Salsipuedes Dam on Salsipuedes Creek, a

tributary stream which enters Santa Ynez River about 16 miles above its mouth. The stored water would be used for percolation to the underground basin.

Fishery Management and Conservation Program

The spawning run of steelhead enters Santa Ynez River from the Pacific Ocean following the first heavy rains of the wet season. The largest numbers enter during the period December-March. The fish spawn in the main stream and in practically all tributaries below the present Gibraltar Dam, with the heaviest spawning taking place in the portions above the proposed Cachuma Dam. The young steelhead hatch, emerge from the gravel and, after a year or two of residence in fresh water, migrate down stream to the ocean during the spring and summer months. Fishing for adult steelhead is limited to the main stream as far upstream as the Buellton Bridge, 34 miles above the river mouth, during a season extending from November 1 through February 28. The young steelhead may be caught during a season extending from May 1 through October 31, except in the lagoon, which is closed as a nursery area.

Data from the annual creel census indicate that in 1941, the latest year for which figures are available, 4,375 anglers caught 262,000 trout in Santa Barbara County. The Santa Ynez River and its tributaries form the major trout water in the County. The streams of the Sisquoc River system are the next most important. All other streams are of relatively minor importance.

The size of the spawning run is indicated by the estimate of an experienced employee of the California Division of Fish and Game that the numbers of adults are comparable to those at Benbow Dam on South Fork of Eel River, where from 13,000 to 25,000 fish have been counted each year during the past six years. The very large size of the run is indicated by the fact that in 1944 the California Division of Fish and Game rescued 1,936,980 young steelhead from the partially dry bed of Santa Ynez River above the site of the proposed Gaehuma Dam. These fish probably represented only a small fraction of the young steelhead produced, since large numbers migrated downstream prior to the start of rescue operations or remained in localities inaccessible to the rescue crews.

Similar rescue operations are carried on each summer. Approximately 62 per cent of the rescued fish are planted in live waters of Santa Ynez River and its tributaries below Gibraltar Dam, to provide the nucleus for future spawning runs into the River, 9 per cent are stocked in Gibraltar Reservoir, to maintain the summer sport fishery in the Reservoir and the spawning runs of resident steelhead from it into its tributaries, and 29 per cent are distributed into various streams of Santa Barbara, Ventura, and San Luis Obispo counties, to provide summer angling and to augment the runs of anadromous steelhead in streams less favored with spawning grounds than the Santa Ynez.

Attachment

2

SEP - 2 2003

Ed Henke
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August 28, 2003

Mr. David Young
Env. Specialist, U.S. Department of the Interior
Bureau of Reclamation
South-Central California Area Office
1243 N Street
Fresno CA 93721

Ms. Kate Rees
Cachuma Operations and Maintenance Board
3301 Laurel Canyon Road
Santa Barbara CA 93105

RE: **Comments from an historical and current perspective, and concluding recommendations for the restoration of the endangered Southern Steelhead (Oncorhynchus mykiss irideus, Haplotype V) of the Santa Ynez River System. Comments are relative to both the preparation of an EIS/EIR and the urgent need for the governance to modify the present permit terms and conditions of the U.S. Bureau of Reclamation's Water Rights Permits 11308 and 11310 (Applications 11331 and 11332), with such modification mandatory for restoring in-stream values, public trust assets, the people's property downriver from the Cachuma/Bradbury Dam Project.**

All such preparations and ultimate recommendations by the governance should have identical starting reference points commencing with applicable public policy decisions such as: California Environmental Quality Act, National Environmental Protection Act, Federal Clean Water Act, Federal Endangered Species Act, California Department of Fish and Game Code, and the Public Trust Doctrine.

Dear Ms. Rees:

Prior to the building of the Cachuma/Bradbury Dam project on the Santa Ynez River (completed in 1952), professional fishery biologists estimated that up to 25,000 adult steelhead migrated into the Santa Ynez River system on an annual basis into the 1940s and produced progeny into the millions annually. These steelhead provided a flourishing recreational fishery and efforts to rescue some of their fry provided for stocking of streams in both Santa Barbara and Ventura Counties.

Correspondence from John R. Gardner (liaison officer for the Director, U.S. Fish and Wildlife Service) to Dr. Paul Needham, U.S. Fish and Wildlife Service, Stanford University, dated October 10, 1944 confirmed previously established values of the Santa Ynez River system steelhead resources, which were accepted by both state and federal professionals in the field, as having an economic value of $10 for each adult steelhead. Additionally, they concluded that steelhead progeny (fry and juveniles) in total had a similar value. (In 1941, 4,375 anglers harvested 262,000 trout in Santa Barbara County. Principal source: Santa Ynez River system. For example, 92,000 fry were rescued from the Santa Ynez River and stocked in the Santa Maria River.) Gardner, using 20,000 adult steelhead as an annual average, stated that the in-

Attachment

3

Kroeger

SANTA YNEZ STEELHEAD RESTORATION FEASABILITY STUDY
LOS PADRES NATIONAL FOREST
SANTA BARBARA RANGER DISTRICT
DRAFT 6/3/97

Prepared by: Sara Chubb Forest Aquatic Biologist

Southern California steelhead populations have decreased to less than 5% of their historical size and range and are in immediate danger of extinction (Nehlsen et al., 1991). The Santa Ynez River once supported runs of 10,000-20,000 anadromous steelhead but numbers have dwindled to less than a few hundred (CDFG 1955). Sea-run steelhead currently have access to less than 40% of their historic habitat.

Steelhead are currently being reviewed by the National Marine Fisheries Service for listing under the Endangered Species Act. In preparation for a likely listing in August, many agencies are conducting analyses of ongoing or upcoming projects which could impact steelhead. A multi-agency "Technical Advisory Committee" has initiated a study of the feasibility of providing fish passage and restoring steelhead to the historical spawning and rearing habitat in the upper Santa Ynez River basin. The Forest Service manages the majority of these upper basin areas and has interest, issues, and concerns in the actions being considered.

The USDA Forest Service also is taking measures to conserve and restore steelhead in preparation for possible listing and under the interim National "PacFish" direction (USFS 1995), soon to be incorporated into the Forest Land and Resource Management Plan as part of a Riparian Conservation Strategy (USFS 1994). Los Padres National Forest is in the process of establishing "Riparian Habitat Conservation Areas" (special management zones), applying new standards to projects and ongoing activities, and managing to meet specified habitat objectives so as to lead to steelhead recovery. Watershed analyses are required in order to determine the most effective approach to managing for steelhead restoration. At this time, a full interdisciplinary watershed analysis is not possible. This report specifically addresses and summarizes what is know about the potential habitat that could be made available to steelhead trout in order to support a informed decision. This report is a techical fisheries report and does not constitute the only interests of the Forest Service. Additional input should be sought from Santa Barbara District personnel regarding the implications of any major proposed changes to local management of water, people, and/or fish.

THE HABITAT

The Santa Ynez River basin encompasses ____ acres of oak-woodland and chaparral. The Santa Ynez River flows 92 miles in a westerly direction from headwaters to the Pacific Ocean. The continuity of the river is punctuated by the three large reservoirs, Jameson about 4 miles from headwaters, Gibraltar about 8 miles further downstream, and Cachuma 12 miles more. The lower Santa Ynez below Cachuma Reservoir (Bradbury Dam) flows over 65 miles before reaching the ocean.

Downstream from Bradbury Dam, temperatures, flows, and a general lack of suitable rearing habitat are the primary limitations on steelhead production. Only the uppermost section from Bradbury Dam to Solvang (14 miles) is thought to be currently capable of supporting spawning and rearing steelhead. Riffles represent less than 5% of these reaches. Pools are common (>50% of the habitat) but may have adverse water quality for late summer holding habitat. The abundance of exotic and potentially predatory exotic bass and sunfish is

also a concern. Of the tributaries to the lower Santa Ynez, Salsipuedes Creek currently has the highest potential for steelhead spawning and rearing. Rearing habitat and access to rearing habitat appears to be a greater limiting factor than spawning habitat within the lower Santa Ynez River. (Entrix 1994)

Cachuma Reservoir is managed as a stocked cold and self-reproducing warm water fishery. A component of self-reproducing trout may also inhabit the reservoir, spawning in the tributaries and inflowing Santa Ynez.

Cachuma Creek drains the south facing slopes of the San Rafael Mountains and flows 7 miles before reaching Cachuma Reservoir. Cachuma Creek is fished at a moderately intense level. The mainstem of Cachuma Creek and the lower end of Lion Creek support moderate densities of resident trout with a put-and-take stocked fishery established near the easy access roads. Several natural bedrock falls and mineral deposits may serve as barriers to upstream fish movements midway up the drainage. Habitat is characterized by cobble runs with small boulder pocket water and bedrock controlled pools. Water flows and temperatures may limit trout production during some years. Late summer siltation sometimes is evident, perhaps related to historic mining, grazing, and roads in the upper watershed. The high intensity burn over 10% of the steep surrounding slopes contributed to increased sedimentation and some additional downcutting after the Marre fire in 1993.

Santa Cruz Creek drains the south facing slopes of the San Rafael Mountains and flows 15 miles before entering Lake Cachuma. Much of the lower 5 miles of Santa Cruz Creek becomes intermittent by late summer although the upper reaches apparently retain water even in the driest of years. The East Fork supports better flow and habitat diversity than the West Fork. The West Fork flows from a upper moderate gradient mature Alder and Douglas Fir lined channel through a narrower boulder barrier sprinkled middle canyon and a 30 foot waterfall before the lower gradient pool rich but more open canopy lower section. Approximately 10% of the watershed burned in the 1993 Fire. Effects on the channels and biota were not substantial. Santa Cruz Creek is fished at low to moderate levels. Access is through private property by road in the lower sections and by trail into the upper watershed.

The lower reaches of Peachtree, a tributary to East Fork Santa Cruz Creek, often go dry and bedrock falls block upstream fish movement. Over 80% of the steep and unstable slopes of the Peachtree watershed burned with high intensity in the 1993 Marre Fire. Remnant sedimentation and channel scouring can still be seen today. Spawning, rearing, and summer holding habitat is good, but temperatures and flows may become prohibitive during drought years. The drainage is rugged and largely inaccessible to anglers.

Grapevine Creek, a tributary to East Fork Santa Cruz Creek retains water through most reaches and most years. Grapevine flows a total of two miles through an upper narrow but largely unshaded moderately steep valley and lower well shaded incised channel. Trout are found throughout in relatively high densities but small sizes. Grapevine may function well as a spawning and rearing area for Santa Cruz resident fish.

A number of smaller drainages also are tributaries to Cachuma Reservoir and the section of the Santa Ynez River between Cachuma and Gibraltar reservoirs.

Paradise and Oso Creeks are generally too small and quick to dry to support a significant number of spawning or rearing steelhead.

Between Cachuma and Gibraltar Reservoirs, the mainstem Santa Ynez flows over 8 miles through seepage maintained deep canyon bedrock pools in the upper section, through intermittent wide and open small boulder runs with occasional pools, and through a lower section of seasonally flowing sand and cobble riffles and glides. The lower section is on private lands and of unknown habitat quality and capability. The middle section is heavily stocked, fished, and used for recreation. Streambanks are disturbed, and no pool goes without fairly constant human disturbance in the summer. Riparian canopy is low and water temperatures are warm. All but the uppermost section usually goes intermittent by May or June. Wild trout are known to inhabit the upper more perennial reaches. Exotic Largemouth Bass, Smallmouth Bass, Greensunfish, and Mosquitofish are abundant. Carp, goldfish, and channel catfish are also present. Arroyo Chubs and Threespine Stickleback also inhabit this section.

Devil's Canyon flows off of north facing slopes approximately 3 miles before entering the Santa Ynez River almost immediately downstream of Gibraltar Dam. Devil's Canyon is densely shaded and well confined within steep Canyon walls. Gradients are more moderate than other North facing drainages. A small municipal water diversion 350 feet upstream as well as a concrete apron at a nearby bridge partially block fish movements at lower flows. All fish passage is blocked at a falls a mile upstream from the diversion.

Gibraltar Reservoir has supported a large trout and exotic warmwater fishery in the past. When the reservoir was drawn down and dredge in the late 1970's fish populations were reduced. No comprehensive surveys have been conducted to assess the present situation. It can be assumed, however, that Gibraltar like other Santa Ynez Reservoirs has a large component of exotic Greensunfish, Largemouth Bass, and Bullfrogs. Gidney Creek is the only tributary draining directly into the reservoir with opportunities for supporting spawning and rearing trout. Gidney flows a total of 3 miles through an extremely steep shaded upper section, past several partial barriers, through a moderate gradient narrow valley and through a lower steep rugged canyon reach with several boulder and plunge pool barriers. Trout are only found within the lower reach.

Camuesa Creek flows southeasterly through six fairly open moderate gradient miles. Camuesa only has seasonal and isolated pockets of intermittent flow, not enough to support a year-round fishery and limited access and qualities for spawning habitat.

Indian Creek flows south a total of 12 miles through a steep narrow well shaded upper reach, through a short section of bedrock canyon, a more open warm water cobble reach, back through a steep boulder and bedrock canyon including a number of bedrock barrier falls, reopens into a lower gradient gravel section, meets with Buckhorn Creek, and meanders through a low gradient sand and gravel intermittant stretch with many isolated pools, and finally through a low gradient wide open arroyo type channel before merging with Mono Creek within the floodzone of the Mono Debris Dam. Trout abundance is moderate to moderately high particularly within the canyon reaches. Fish are found above all but the upper most barriers. Angling use is moderate within the lower middle sections and heavy at the spilling pool created at the Mono Debris Dam.

Buckhorn Creek, tributary to Indian Creek, flows almost five miles through upper narrow intermittant boulder and cobble reaches, through middle sections of more open gravel pool and riffle reaches, through a lower gradient open cobble run and corner pool section. Buckhorn supports rate to high densities of trout and medium angling use.

Mono Creek holds a good but lesser number of trout than Indian Creek. Mono Creek flows over 16 southwesterly miles through a moderate gradient open canopied cobble glide section, through a narrower shadier moderate gradient bedrock lined canyon ("the Narrows"), and lower open low gradient arroyo section before merging with Indian Creek at the Mono Debris dam. Most of the reaches are intermittent but retain fish within year-round isolated pools. Mono Creek receives moderately heavy dispersed angling use along the easy to reach segments.

Agua Caliente supports good year round flows and has suitable habitat within the upper reaches but water temperatures are too warm from the hot springs to support trout. Chubs are found in some sections.

Blue Canyon flows almost four miles in a westerly direction parallel and not far from the mainstem Santa Ynez. Escondido, the main tributary and contributor of water, flows northward 3 miles through an upper high gradient and fishless reach, past a large waterfall, through a moderate gradient boulder and bedrock step pool section, and through the lower moderate gradient riffle run habitat which merges with another tributary and turns sharply to become Blue Canyon. Blue Canyon is mostly a moderate to low gradient seasonal flow gravel dominated run and glide reach. Only the upper most section, and parts of the Escondido tributary support year-round flows, pools of any significance, and adult trout. Phenomenal numbers of fry are observed in the mid to lower reaches, however, and large size spawning trout have been seen utilizing the area. Unfortunately, no genetic samples have been taken from the Blue Canyon spawners. We can only assume that these fish represent a spawning migration out from Gibraltar Reservoir, perhaps of largely un-introgressed land-locked native steelhead.

Fox Creek flows in a northerly direction through a total of nearly 2 miles of mostly steep boulder bedrock step-pool type habitat. Flow is perennial and could support a low number of year-round trout, although adults seem to only be observed in and around the spawning season. A Diversion dam prevents fish movement about a half a mile upstream. A large waterfall is situated a short distance beyond the diversion.

Alder Creek flows a total of nearly three miles first in a northerly direction through an upper steep boulder bedrock lined densely shaded canyon, through a moderate gradient step-pool canyon walled reach with waterfall and man-made diversion structures, turns sharply to flow in a westerly direction parallel to what would be the Santa Ynez River (but is the flooded Jameson Reservoir) through a moderately low gradient more open gravel and cobble run and riffle reach. A 20 foot waterfall blocks upstream fish passage a quarter mile upstream from the man-made diversion barrier. Until recently (1995) a pipeline supporting gabion structure blocked all fish passage into the lower end of Alder Creek from the mainstem Santa Ynez River. Until that time, the lower reach was thought to be largely fishless. Within the last several years a

number of fry have been observed within the lower reach. A short section below and immediately above the remaining man-made barrier supports year-round adult trout.

The 8 miles of mainstem Santa Ynez between Gibraltar and Jameson Reservoirs dries up in summer of most years leaving only a few stagnant pools and the plunge pools below Juncal Dam. Spawning habitat might be available but flows are likely not stable long enough to allow for successful development of eggs and fry movement into tributaries or down into Gibraltar Reservoir in order to survive. There have been numerous reports of stranded trout within this section. Arroyo Chubs are also common until flows subside.

Jameson Reservoir retains a good population of resident trout. Exotic bass and sunfish are likely not present in numbers comparable to those of Gibraltar and Cachuma. Spawning runs of good sized fish are observed into the tributaries. The North Fork Juncal flows over 2 miles in a southerly direction through steep upper bedrock and boulder cascades through moderate gradient boulder cobble step runs and through a short lower section of low gradient gravel glides and riffles. The upper Santa Ynez (Main Fork Juncal) flows in a westerly direction through almost two miles of steep boulder cascades followed by moderate gradient boulder/cobble step runs and riffles. Spawning trout and fry have been observed moving up this drainage.

HISTORICAL CONDITIONS

Historically, steelhead (Oncorhynchus mykiss) were a common inhabitant of California coastal streams as far south as Baja. An estimated 10,000-20,000 steelhead once ran over 50 miles up the mainstem Santa Ynez and additional distances into most of the major tributaries to spawn (Shapovalov 1944). Although the exact figures for steelhead production are arguable, there are many historical accounts of how the Santa Ynez River Basin produced larger runs and sized fish (20 lbs) than many other southcoast rivers. It is odd, however, that there are not the numerous historical accounts praising the Santa Ynez for it's rich resident trout angling like there are for other southcoast drainages. This may be just a matter of the accessibility and nearby human populations, or it may be a reflection that the Santa Ynez was a ideal producer for anadromous fish but could not support high numbers of fish into adulthood.

The best historical spawning habitat was concentrated in the mid to upper third of the Santa Ynez basin. The best quality mainstem spawning habitat was noted as from around present day Solvang up to Oso Creek in 1946 field observations (post Gibraltar Dam) (Shapovalov 1946). Cachuma and Santa Cruz were noted as significant spawning tributaries. Other upstream tributaries and mainstem areas also likely supported spawning steelhead but by the time steelhead began to decline and people took notice (ie the 1940's) reservoirs had already blocked access further upstream.

Historically, a substantial run of steelhead extended up into the lower part of Cachuma Creek. Natural bedrock falls provided at least partial blockage of fish passage into the upper basin. A "land-locked" run of steelhead continued to run up out of Cachuma Reservoir and utilizing lower reaches of Cachuma Creek to spawn but there were concerns with poaching and predators and a fish barrier

(gabion??) was constructed at the outlet and several miles inland as a protective measure against poaching of spawners!

From what few accounts are available, steelhead appeared to begin their most precipitous decline in the late 1940's. The construction of Gibraltar Dam in the 1920's, Juncal Dam in 1930, and Bradbury Dam in 1953, blocked steelhead from accessing the upper Santa Ynez River and began to greatly affect habitat quality. Debris basins and water diversions further fragmented the habitat. During 1940-1950's steelhead were "rescued" from stranding in drying reaches and moved up and over many natural and artificial barriers. Over 175,000 steelhead were rescued from prematurely drying reaches and stocked into Peachtree Creek in the late 1940's.

Within the last 50 years, stocking of non-native rainbow trout has resulted in dilution of native genes although most of the stocking has occurred in the lower portion of the Santa Ynez River below Gibraltar Reservoir. Stocking or inadvertant introductions of other exotic species has likely also had effects on steelhead. The reservoirs contributed to expansion and continued presence of exotics, as even in floods and droughts the reservoirs serve as a refuge. Largemouth Bass, Smallmouth Bass, Greensunfish, and bullfrogs, are of particular concern. Tamarisk continues to be a problem that will need ongoing efforts at control.

Dams also cut-off much of the supply of sand and gravels and began a process which has drastically altered the downstream channels and floodplains. Road building, maintenance, and use, has also had an effect on steelhead and stream corridors, although probably less so than many other watersheds. Most of the present day access roads were built around the turn of the century. The retention of much of the upper River basin as semi-primitive and more recently designated wilderness, has protected it from some human disturbances.

Fire and post-fire floods and debris slides have been a significant disturbance processes in the upper Santa Ynez River basin. Chaparral fires occur every 30-60 years (Davis et al., 1988) and seem to burn hot over large areas of the landscape. In normal water or wet years the incidence of fire is low, it burns only at low intensities, and rarely burns through the moister riparian zones. The riparian network thus is protected from fire and may contain fires within smaller patches of the watershed. Such is also the case if nearby hillslopes have recently burned and lack the fuels to carry the fire. Many recent fires have originated in or near streams in areas of greatest concentration of fire causing human activity (campfires, vehicles, etc.).

People have also directly disturbed the Ventura River watershed and the riparian corridors. Downstream from Bradbury Dam, historical channelization and bank revetment work has straightened and constricted mainstem channels to the detriment of fish and other aquatic life. Channel clearing continues within the lower River basin but has not been substantial within the Forest. Woody debris has been cleared from channels after fire. Known locations of past channel clearing projects include Cachuma and Santa Cruz drainages.

CURRENT CONDITIONS

Steelhead and Rainbow Trout

The Santa Ynez River steelhead population continues to be severely depressed. While it is likely that steelhead pass upstream without detection it is certain that their numbers are low (<100?; Entrix 1994), below the 200 fish threshold associated with a high risk of extinction (Franklin 1980). There have been no confirmed reports of anadromous adult steelhead in the Ventura River since 1993 and only a few scattered reports since the 1960's.

Southern steelhead and rainbow trout are of the same species and potentially intermixing populations. As has been observed in other steelhead populations (Shapovalov and Taft, 1954) resident populations may coexist and geographically overlap with the anadromous form. Steelhead and rainbow trout eggs, fry, and juveniles can not easily be differentiated. They can conclusively be identified as "steelhead" when they go through the smoltification process which prepares their system for salt water and gives them the characteristic silvery appearance. Smoltification probably occurs when fish achieve a length of 15 cm within the first or second year (Moore, 1980). Smolts move downstream with receeding storm flows in April-June (Shapovalov and Taft, 1954).

Southern steelhead have adapted to the unpredictable climate by retaining the flexibility to remain landlocked through many years or even generations before returning to the ocean when conditions allow (Titus et al., 1994). Such traits and behaviors appear to be inherited and there could very well be differences in the extent of anadromy between different river basins and even within a single drainage (Waples, 1991). Research into the movements of inland trout has also shown that different populations have vastly differing degrees of mobility ranging from a few feet to 50 miles within a year (Schmal and Young, 1994). Both anadromous and resident trout have likely adapted to move upstream to counter effects of periodic flood extremes and droughts. Success of restoration may be dependant on retaining the appropriate genetics for physiology and behaviors adaptive to local situations.

Stocking of non-native rainbow trout may be detrimental to native trout and hamper the restoration of anadromous steelhead. Filmore Hatchery rainbow trout are stocked in Cachuma Creek and the mainstem Santa Ynez below Gibraltar Dam. Many tributaries have been stocked in the past but have not been stocked for over 10-20 years.

It is not clear to what extent overstocking with non-native rainbow trout may have caused introgression in the Santa Ynez steelhead. Genetic analysis of rainbow trout from Alder, Juncal, Fox, and Indian Creeks has suggested that these populations retain much of the genetic make-up of their southern steelhead ancestry (Nielsen et al. 1997). More recent genetic analysis has revealed that Devil's Canyon also may harbor a large component of fish with native steelhead genes (4 out of 5 fish sampled) (USFS data files 1997). Jameson Reservoir seems to maintain a mixture of the southern California and non-native stocks. It is not known if the progeny of resident trout with steelhead ancestry will ever be able to smolt and regain the anadromous life-style.

Until recently, the regular five fish limit without gear restrictions was applied throughout the Ventura River basin. Since 1993, only catch and release fishing with barbless artificial flies is allowed from May through December below Cachuma Reservoir in order to protect anadromous steelhead trout. The

five fish limit continues in upstream reaches. Most angling activity is concentrated in Cachuma and the mainstem Santa Ynez below Gibraltar Dam and mostly takes place in spring extending into the early summer. The extent that angling has impacted wild trout populations is not clear. Steelhead populations have been shown to be highly susceptible to angling in the northwest (Pollard and Bjornn, 1973). Even catch and release angling can impact populations, especially later in summer when fish are already stressed by high water temperatures and reduced flows (Wright, 1992).

Angling as well as other recreational activity may be affect trout and their habitat. Recreationists concentrate their activity along fragile streambanks and wading in the prime shallow water spawning areas. Research has indicated that a single wading across salmonid spawning redds can kill 40% of the eggs. Mortality increases to over 90% with multiple wadings (Roberts and White, 1992). Recreationists build flimsy and yet channel altering small boulder and cobble dams for ponding water for summer soaking. At lower flows these small dams act as barriers to fish movements and create additional pool habitats that may favor exotic species such as bass, mosquitofish, sunfish, and bullfrogs to the detriment of native species and trout. Recreationists potentially have the greatest impacts on stream fish and biota from May through August with the highest potential impacts on steelhead and resident trout during April and May when the eggs and fry are sensitive to damage or habitat loss.

Resident rainbow trout are well dispersed throughout the upper Santa Ynez River basin, inhabiting all sections of the mainstem and tributaries where there is good perennial water and stream gradients are not too steep (generally less than 10%). In drought years their distribution shrinks and in high water years their distribution expands where falls, boulder cascades, or man-made barriers do not block their upstream migration. The highest densities of juvenile trout are found within seasonal intermittent reaches such as Blue Canyon and Alder Creek.

Santa Ynez River basin supports low to moderate ("good" according to Smith 1982) overall trout densities (0.3-2.0 fish per m^2), comparing favorably to more northerly coastal streams (Burns 1971; Shapovalov and Taft 1954) and of similar densities to other south coast streams (USFS data files). Adult population densities are estimated at 300-1000/mi which is lower than densities encountered in other southern California coastal streams. Juvenile densities ranged from 0.1-5.0 per m^2 with the average around 1.2, higher than documented in many other southcoast streams, including the lower Santa Ynez River (0.18/m^2; Entrix 1994). These differences in productivity may be related to morphological, geological, and hydrological differences between watersheds but could also indicate that human influences have taken a toll. The discrepancy between high juvenile but low adult populations may indicate that the Santa Ynez River basin has the capability to produce large numbers of steelhead smolts that go to sea to complete their growth but is not ideal for supporting year-round high resident trout production.

Among the tributaries, Blue Canyon holds the greatest potential to produce a large number of fry. There seems to be something particularly productive about the lower gradient east-westerly reaches of Blue Canyon and Alder Creeks. Access of fry to continued late summer rearing habitat may be a problem, however. Other areas of high observed fry densities include Juncal Creek above

Jameson Reservoir, Fox above Gibraltar Reservoir, and sections of Santa Cruz Creek and it's tributaries above Cachuma Reservoir.

Projecting fry densities across the potential fish producing reaches within the Santa Ynez River basin, Forest lands would yield roughly 92,000 juvenile trout on the whole or equivalent smolts to support an adult steelhead run of approximately 1,800 (Table 1). A similar but higher estimate of potential steelhead production (4,000 adult spawners) can be derived from the quantity and quality of spawning habitat which could be made accessible to spawning steelhead within the Forest Service System lands. These estimates are within the realm of the historical projections of over 10,000 steelhead historically utilizing the Santa Ynez River basin (Shapovalov 1944) but rather low. The discrepancy may be due to present-day habitat alterations and differences in productive capabilities of anadromous steelhead and the current resident trout.

Projected spawning capacities reinforces the premise that Blue Canyon, Santa Cruz and Alder Creeks are the prime potential steelhead smolt producers. Because of extensive and/or high quality available habitat, Mono/Indian Creeks, Devil's Canyon, and the lower mainstem Santa Ynez emerge as additional contenders as major production areas (Figure 1).

Other Aquatic Species:

Pacific lamprey (Lampetra tridentata) share many of the same habitat requirements as steelhead and may spawn and rear within similar areas and within the same season. Lamprey larvae are not easily detected, however, and although they were not observed in Forest Service surveys they may be there. Lamprey are also hampered in their upstream migrations by natural and artificial barriers, but possibly to a lesser extent than steelhead.

Arroyo chub (Gila orcutti) are found in abundance (10-20 fish per 100 feet) throughout much of the mainstem Santa Ynez and many of the lower gradient reaches of tributaries. Chubs appear to be associated with low gradient riffles and runs (USFS, 1995). Three spine stickleback (Gasterosteus aculleatus aculleatus) are not as abundant but are common in the middle Santa Ynez above Gibraltar Reservoir. Stickleback habitat includes small pools with constant flow and low water velocities (Baskin and Bell, 1975). Both species are known to coexist with steelhead and resident trout and may serve as a food source for migrating adult steelhead.

Several species of sculpin (staghorn sculpin Leptocottus armatus, prickly sculpin Cottus asper) and tidewater goby (Eucyclogobius newberryi) co-existed with steelhead and were native to the Santa Ynez lagoon and estuary. Sculpin may also have inhabited the mainstem but were not likely to have extended far into the upper basin and tributaries. Sculpins have been observed in Cachuma Reservoir and may extend into Cachuma and Santa Cruz Creek. Neither of these species interacted with steelhead to any great degree except possibly as a food source for migrating adults.

Exotic species that are abundant in the upper Santa Ynez River basin include Largemouth Bass (Micropterus salmoides), Smallmouth Bass (Micropterus dolomieui), Greensunfish, (Lepomis cyanellus), Bluegill (Lepomis macrochirus),

and Pacific Crayfish (Procambarus clarki). Less abundant exotics include Fathead Minnows (Pimephales promelas), and Mosquitofish (Gambusia affinis). Highest densities of the exotics are found in the reservoirs, mainstem, and lower gradient sections of some of the tributaries. Crayfish are scavengers that readily feed upon eggs and fry in gravel spawning beds (Hobbs et al. 1989; Page 1985). Periodic floods likely limit upstream expansion of these species. Droughts may limit populations but can also increase the impacts of exotics on native species as there is increased competition for shrinking habitat.

Native species which may impact trout and steelhead include western pond turtles (Plemmys marmorata pallida) and two striped garter snakes (Thamnophis hammondii). Turtles prey upon fish but only if the fish are stranded, dead, or sluggish. Two-striped garter snakes are highly effective predators, taking juvenile salmonids of up to five inches in length. Their impacts on local fish populations can be substantial during dry summers when fish are concentrated in limited habitat.

Other native aquatic species that appear not to negatively impact trout or steelhead included Red-legged Frogs (Rana aurora), California Treefrog (Hyla cadaverina), Pacific Treefrog (H. regila), Western Toads (Bufo boreas), Arroyo toads (Bufo microscaphus), and California Newt (Taricha torosa). All of these species except California newts overlap with trout in the use of stream channel types, reaches, and to some extent instream habitat. California newts generally inhabit perennial stream reaches where trout densities are low to non-existant. Newts are not common in the Santa Ynez River basin. Arroyo toads requires shallow open pools, with little to no flowing current, and open banks, usually the low gradient reaches with only seasonal water flow. Red-legged Frogs typically utilizes dense shrubby riparian vegetation associated with deep pool habitats (>1 meter deep) in still or slow moving perennial water (Christopher 1994, Stebbins 1954, Hayes and Jennings 1988).

Habitat Quality -- Migrations

Southern California steelhead/rainbow trout move upstream to spawn during the tail-end of winter storm events between January and March (Shapovalov and Taft 1954). Usually, several successive winter storms would allow for multiple spawning migrations and assist with the movements of steelhead smolts downstream to the ocean.

Landlocked resident rainbow trout may also move great distances as a mechanism to survive the typical flood and drought cycle (Schmal and Young 1994). If upstream movements are blocked, trout survival and reproduction may be drastically reduced. Entire year classes may be lost as the lower and mainstem channels go dry; Adult spawners may not be able to reach suitable spawning habitat and return safely to good summer holding water. Trout strandings are common. Natural falls and concrete dams with a drop of over four feet are generally complete barriers to upstream fish movements.

Migrating steelhead can generally navigate upstream against flows up to 6 feet per second and leap over 4-6 foot heights (Evans and Johnston, 1972). Deep water (>half of the vertical jump) is necessary to gain the leaping momentum. Resting pools (>6") are necessary in long sections of high velocity flows. Swimming and jumping abilities are size dependant (Evans and Johnston 1972), so

that fewer but larger individuals may be able to reach the upper reach spawning beds. The spawners that do make the effort would be compensated with less competition for available habitats, larger and more numerous fry, and healthier progeny.

Complete high flow barriers are found within almost every major tributary to the Santa Ynez. Many of these barriers are formed by water plunges through boulders jammed against bedrock streambanks and canyon walls. Some of the barriers are waterfalls over bedrock ledges. Boulder barriers may shift to form or open so as to allow fish passage during extreme flood flows or earthquake activity. There is also opportunity for human intervention to blast open a channel for fish passage. The rather immutable waterfalls, however, are often situated at the lower end of reaches with boulder barriers, and thus the potential for opening up additional access for steelhead is limited at best.

During low flows, boulder cascades, bedrock slides, and low gradient riffles may become barriers to upstream fish movement. Steelhead may become stranded on their upstream migration if flows rapidly decline. The presence of good deep resting pools is essential during this period as fish may wait out the period between storms. An average of one out five years is well below normal precipitation (less than 15 inches over the year) potentially severely limiting steelhead spawning migrations and trapping downstream moving smolts.

Low flow barriers are likely found throughout many of the reaches of the upper Santa Ynez River basin. Low to moderate flow fish passage is thought to occur when depth is greater than 0.6 feet over more than 25% of the wetted channel and with velocities of more than 8 feet per second (Thompson 1972). Surveys were not of sufficient detail to describe all low flow barrier locations.

Artificial barriers to steelhead migrations include Bradbury, Gibraltar, and Juncal Dams as well as water diversion structures on Devil's Canyon, Fox, and Alder Creeks. Road crossings may be low flow barriers within the mainstem Santa Ynez below Gibraltar and above Jameson Reservoir. Sediment catchment basins also block upstream fish movements on Indian, Mono, and East Fork Juncal Creeks.

Habitat Quality -- Spawning

Spawning trout seek out riffles or pool tails where gravels are plentiful and within a usable size range (1/4-3/4") and silts are minimal (<15-30% of volume) (Phillips et al. 1975). Stream flow must be adequate to maintain oxygen levels of at least 5 ppm (Bjornn and Reiser 1991) and temperatures between 3 and 20 °C (Bell 1986). North facing tributaries seem to have the best stream flows and cooler water temperatures extending later into the egg incubation and fry rearing periods.

As previously discussed, steelhead, and likely wild rainbow trout, will move into seasonally flowing reaches to spawn. They are not limited to only perennial waters and may infact utilize intermittent reaches to avoid crowding and potential predators (Carroll, 1985; Everest, 1973). Riffles provide the predominant spawning habitat although small gravel pockets associated with pool tails may also be utilized by steelhead rainbow trout. Juncal, Alder, Fox, Blue Canyon, and Devil's Canyon Creeks have the highest proportions of riffle habitat.

Not all riffle habitat is good spawning habitat, however. Good spawning habitat should have a high percentage of gravels (>20%), no more than 15% fine sediments, and channel morphology (width/depth ± 15) offering the good oxygen and silt carrying velocities. Given these parameters, the most suitable spawning areas would be predicted to be in Blue Canyon and Alder Creeks. And indeed, these areas support some of the highest densities of trout fry.

The majority of mainstem spawning habitat downstream of Bradbury Dam occurs upstream of Refugio Road (ie. approximately 8 miles). Projections from redd densities would indicate that the area could produce about 1.2 million fry but that rearing habitat would further limit numbers produced to about 180,000 (Entrix 1994). In dry years losses might have been greater with most of the available rearing habitat areas going dry in summer.

Rearing Habitat

Two or three weeks after fertilization the eggs hatch and emerge as fry. Fry emergence is a time period when trout are highly sensitive to silt, water temperature, and fluctuations in flow (Phillips et al. 1975; Sigler et al. 1984). The prime spawning habitat is located in low gradient alluvial channels which naturally may go dry in summer or earlier in drought years. Local trout have adapted to local hydrology so as to ensure the timing of emergence almost always proceeds extreme reductions. Once hatched fry remain in shallow margins of riffles and runs close to the spawning beds until they have grown enough in a month or so to actively migrate to more suitable stable summer habitat (Bisson et al., 1981).

Low gradient riffles, runs, and glides provide the primary rearing habitat into the early summer. The quality of rearing habitat is largely determined by the continuation of water flow of moderate temperatures and the availability of cobble and small woody debris for use as cover from predators and protection from high water velocities.

The best rearing areas do not completely overlap with the localities of the best spawning reaches. Juncal, Alder, and Fox Creeks appear to have sufficient rearing habitat to support the fry that are produced in spawning beds. Blue Canyon and Devil's Canyon may not have sufficient rearing areas to meet the demands of fry produced from spawning beds. Other areas that may provide good rearing habitat but do not necessarily have prime spawning areas include sections of the Santa Cruz, Mono, and Indian drainages.

Food Producing Habitats

Adult steelhead/rainbow trout feed on aquatic and terrestrial insects such as caddisflies, mayflies, and stoneflies in addition to snails and other fish (Shapovalov and Taft, 1954). Temperature extremes, siltation, and loss of riparian vegetation can lead to a reduction in the aquatic food base and overall health and survival. Obviously, a premature loss of flow during the peak period of spring productivity can also affect insects, thus affecting fish.

Good spawning riffles and pool tails are usually also good food production zones. Highest productivities would be expected where substrate size is dominated by cobble, however. Woody debris contributes nutrients and substrate for primary and secondary production. Less than 15% fines and moderate sunlight but ample streamside vegetation (canopy 40-60%) would be ideal for aquatic insect production. Based upon limited aquatic invertebrate sampling, food availability is good throughout most of the upper Santa Ynez River basin mad may not be the key factor limiting trout recruitment.

Late Summer Habitat

As fish grow in late summer and fall they move into swifter and deeper water, inhabiting runs and pools (Chapman and Bjornn, 1969). Runs are quite common and not limiting. Pools and coolwater refugia from the summer heat are likely the most restrictive bottleneck that reduces population size and limits growth and recruitment. During dry years, summer conditions of high temperatures and low dissolved oxygen are particularly severe reducing fish growth, survival, and health. By August particularly in drought years, only isolated deep pools retain fish, and complete or partial fish die-offs can occur. If there are barriers to upstream movements it is possible that a tributary may become fishless after extreme drought.

Loss of riparian canopy or widening of a stream channel can greatly increase water temperatures and reduce trout survival. Steelhead/rainbow trout are thought to prefer temperatures between 10-13 ^{o}C (Bell 1986) and may die if exposed to temperatures above 25^{o}C (Charlon et al. 1970). Long term exposure to sub-lethal temperatures (14-25^{o}C) weaken trout and leave them more susceptible to disease and predation. High but sublethal water temperatures can also affect growth (Barnhardt, 1986), smoltification, immunity to other stresses, and behavior (Reeves et al. 1987).

Southern California steelhead/rainbow trout appear to survive under higher water temperatures and lower dissolved oxygen levels than other trout. It is unclear however whether they can better withstand heat or if they have developed ways to simply avoid it through microhabitat selection (Matthews and Berg 1994). If subsurface flows are reduced and riparian vegetation declines overall water temperature will increase and seep fed pool refuges will also be reduced. This effect may be particularly damaging during late spring when entire year classes may be lost.

Reaches with denser canopy cover are likely to maintain the coolest water temperatures into late summer. Likewise, cool water springs and seeps may be important. Much of the mainstem Santa Ynez experiences high temperatures (>75^{o}F) that likely limit trout survival and production. Hot springs in Caliente and Little Caliente further increase temperatures. The best end of summer and drought refugia are to be found in reaches of Juncal, upper Alder, Escondido (tributary to Blue Canyon), Fox, Indian, Devil's Canyon, and Santa Cruz. Only limited areas of the mainfork Santa Ynez above Jameson and below Gibraltar Reservoirs have any appreciable shading.

Pool densities may also be related to trout abundance. Deep pools have been shown to retain cooler water near the bottom, offering thermal refugia to fish in late summer (Matthews and Berg 1996). Salmonids, and particularly steelhead require deep pools as resting areas and refuges from high flows and water

temperatures (Dunn, 1981). As juvenile steelhead grow they gradually shift from shallow to deeper water habitat, including pools (Bisson et al., 1981). Adult fish with a higher metabolism and larger body mass, require deep holding pools in order to survive winter floods and summer droughts.

Generally, the best and most abundant pool habitat is situated within the mid to upper reaches of side drainages. The mainstem is pool poor which when coupled with higher solar influx with a less dense shade canopy and lack of coolwater springs and lesser late summer flows means inhospitable summer habitat. The side tributaries are presently the most significant resident trout habitat and linkages must be maintained or restored to mainstem reaches in order to restore viable anadromous steelhead runs.

Water Quality

Detailed water quality sampling has not been conducted within the upper Santa Ynez River basin. Low dissolved oxygen can be a problem in mainstem reaches where flows are stagnant, algae growth vigorous, and temperatures are warm. Water quality is likely to be adequate for trout and steelhead throughout most reaches of the side tributaries. PH, mineralization, and alkalinity may be high, especially within reaches with a large influx of groundwater springs and seeps. White crusty sodium chloride and sulfide deposits are common where evaporation is high near spring influxes. In some reaches (as noted in Cachuma Creek) calcium carbonates will precipitate out forming a layer of cement across the stream bottom. Such cementing could lessen the quality of spawning beds although winter high flows appear to dissolve the minerals and break up much of the cement prior to the spawning period. Scattered small iron rich seeps may contribute to local precipitation of iron floculants which can be damaging to fish eggs and gills (McKee and Wolf, 1970).

The water chemistry suggests a moderately productive aquatic community, although nutrient levels have not been measured. Aquatic productivity may be limited at total dissolved solids over 400 ppm (Bell 1973) as may be encountered immediately downstream from high mineral hot springs.

Economics

Based upon the recreational and tourism money ($106/fish) that can be associated with steelhead trout (RPA, 1990), the Ventura watershed is potentially worth at least a million dollars, probably more. Additional economic value can be derived from non-consumptive use of steelhead resources. Other values associated with the presence of a healthy steelhead run can not be assigned a monetary figure.

SUMMARY AND CONCLUSIONS

Steelhead are currently blocked from accessing approximately 60% of their present and historical spawning and rearing habitat. Modification of the dams with fish ladders or trap and truck operations would open up an additional 23, 40, and 5 miles above Cachuma, Gibraltar, and Jameson Reservoirs, respectively. Providing access to Cachuma and Santa Cruz Creeks could produce 540 potential steelhead. Access to the lower Santa Ynez mainstem upstream from Cachuma Reservoir could produce 240 steelhead adults. Just getting fish into

the upper most part of this mainstem section and Devil's Canyon would produce 280 steelhead.

Restoration of fish passage above Gibraltar Dam and into Indian and Mono Creeks would support an estimated 1,200 steelhead. Without access up Mono and Indian Creeks around the Mono Debris Dam only about half of the potential steelhead would be produced. Restoration of access to above Juncal Dam would represent potential production of a 100 or so steelhead. If all of the above measures are taken, an additional 68 total miles of spawning and rearing habitat could be utilized to produce an estimated 1,800 to 4,000 steelhead adults. These estimates may be conservative.

Santa Ynez River steelhead can not afford any loss of numbers due to natural or unnatural causes. If the steelhead population was strong and well distributed it could withstand a poor reproductive year due to floods, fires, drought, or temporary barriers to fish passage. At the currently suspected low population size (<200 spawning adults) even minor disturbances could be devastating. The watershed should be managed for a diversity of steelhead habitat areas so as to minimize the risks of simultaneous catastrophic disturbance. Overall steelhead population viability can best be maintained by restoring multiple (ideally at least three) spawning subpopulations within the Santa Ynez watershed and managing these populations without encouraging intermixing.

Based upon the estimates of steelhead smolt production and habitat capabilities, restoring fish passage up through the middle section of the Santa Ynez above Gibraltar Reservoir is the most likely to be biologically effective alternative. The opportunities for long term and unimpeded recovery and restoration of steelhead may be greater in the less heavily used but readily accessed middle section of the upper Santa Ynez. This section also has the advantages of multiple perennial and seasonal side tributaries which could support spawning and rearing steelhead and distribute the population into additional subpopulations which may be able to better withstand disturbances such as floods, drought, and fire. The potential difficulties with exotics in Gibraltar Reservoir should be examined.

Restoration in the lower Santa Ynez entails numerous challenges such as the predominance of exotic species, constant and extensive human disturbance, conflicts with a popular put-and-take fishery, and a lack of adequate flows and appropriate spawning substrates. It may be worth considering getting fish into the upper section below Gibraltar Dam with access into Devil's Canyon.

Re-establishment of a link between Jameson Lake and an anadromous run would be worthwhile as the upper watershed tributaries are productive and isolated from human disturbance. However, the quantity of available habitat and potential for production is less than the other areas and there may be value in maintaining the land-locked native genetic pool separate from the ocean run fish.

Second priority alternatives would be to restore fish passage into Mono and Indian Creeks so as to provide continuity between several tributaries and the mainstem and to encourage linked but separate and diverse spawning subpopulations. If feasible, restoration of steelhead passage into Santa Cruz would also be worth evaluation. Ideally three separate subpopulations should

be restored to viable levels to provide insurance against catastrophic loss from fire, flood, drought, or disease.

RECOMMENDATIONS

From a strictly fisheries perspective, the most important actions that need to be taken are those that will allow steelhead to access their prime spawning grounds in the upper Santa Ynez River basin. The Forest Service can contribute to this effort by providing the best available information on the consequences of various alternatives and by addressing opportunities to restore steelhead to Forest lands. As discussed above, restoration of steelhead access to the mainstem Santa Ynez above Gibraltar Reservoir may be biologically the most effective alternative. Of course, the ideal situation would be restoration of steelhead to their entire historic range, from ocean to upper Juncal Creek.

If any of the alternatives prove worth further study, the Forest Service will need to also analyze the consequences of reintroducting steelhead on other Forest activities, particularly recreation. Fish passage issues at Forest Service road crossings and permitted water diversions are already under analysis since fish passage is also a concern for resident trout. Prospects of reintroducing steelhead would step up the analysis and possibly aid in securing funds and earlier implementation.

Protective measures to decrease migratory mortality would also require multi-agency involvement. Any alternatives that would reintroduce steelhead to the lower Santa Ynez below Gibraltar Reservoir would require a great deal of planning, public education, possibly modifications in facilities, and stepped-up law enforcement. Methods of controlling potentially harmful exotic species would need further development and major coordination among the regulatory and management agencies.

The water management and regulatory agencies may need to consider modifications of water release, diversion, and storage schedules. If steelhead restoration to the above Gibraltar Reservoir is possible, it may be worth considering augmentation of flow releases from Juncal Dam during the critical periods when fry need to disperse between the high production spawning reaches downstream to other more perennial areas for late summer rearing.

Measures to reduce streambank instability and control run-off of silts may be indicated. A more detailed analysis of overall watershed conditions would be necessary to identify, prioritize, and plan projects. Although there are some localized areas which could be treated to reduce erosion, efforts to return the watershed to a more natural or desirable fire cycle may be the most significant Forest Service contribution to restoration of steelhead habitat. Not only would siltation be lessened, but watershed hydrology could be improved to lessen the effects of drought and scouring floods and thus enhance habitat. The District has been implementing prescribed burns for a number of years with good success. An update to the fire management plan may be warranted to address steelhead issues and opportunities.

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Table 1. Habitat capability and estimates of potential steelhead production in the upper Santa Ynez River basin (based upon U.S.Forest Service stream surveys 1982-present).

DRAINAGE	Reach	Chan Type	(1) Flow Type	Miles	average Width (m)	%Rifl	%Gravl	%Fine	Barrier Type	(2) Spawning Habitat (m^2)	YOY Trout Densities (#/100m)	(3) Total #YOY from Habitat	(4) #YOY from Densities
ABOVE CACHUMA RESERVOIR:													
S.Ynez	1	C3	S	2.0	6.0	10	30	20	flow	40	30	400	1,940
	2	C2	SI	3.0	10.0	30	5	20	flow	724	30	7,240	2,896
	3	C2	PI	3.0	10.0	20	5	20		483	70	4,830	6,760
Cachuma	1	B3?	PI	4.0	1.5	10?	10?	10?		193	25	1,930	320
	2	B3?	PI	4.0	1.5	10?	10?	10?	bldr	193	25		
S.CruzEF	1	B3?	P	3.0	1.5	10	5	0		36	30	720	2,880
	2	B1	P	3.5	2.0	20	10	0	falls	225	45	4,500	5,320
	3	B2	P	3.0	1.0	20	15	5	bldrs	90	130	3,600	12,540
Grapevin	1	C2?	P	0.7	2.0	40	10	10		90	130	1,800	2,300
	2	B3?	P	1.3	1.5	40	10	5		318	50	12,720	2,100
S.CruzNF	1	B2?	P	2.5	1.5	20	10	10		121	30	2,420	2,400
Cocha	1	B3?	P	1.3	1.5	20	20	5		126	25	5,040	1,040
	2	B3?	P	1.0	1.5	20	20	5		242	65	4,840	2,100
Black	1	B2?	S	2.0	1.5	20?	10	10	flow	97	0	-	-
Peachtre	1	B3	SI	1.0	1.5	30?	5	30	falls	24	60	240	1,920
Oso	1	B3	S	1.0	1.5				flow		0		
	2	B2	S	1.0	1.0				flow		0		
Devil's	1	D3	S	0.1	4.0	60	10	10	flow		0		
	2	B3a	SI	0.1	3.5	60	20	0	flow-x	68	20	2,720	60
	3	B2a	P	1.5	2.0	30	20	5		290	20	11,600	60
	4	B2a	P	1.0	2.0	30?	20	5?	falls	193	0	-	-
Total above Cachuma:				32								66,532	117,016
Total Steelhead potential:				23								66,261	25,456

Table 1. Continued: Habitat capability and estimates of potential steelhead production in the upper Santa Ynez River basin (based upon U.S.Forest Service stream surveys 1982-present).

DRAINAGE	Reach	Chan Type	(1) Flow Type	Miles	average Width (m)	%Rifl	%Gravl	%Fine	Barrier Type	(2) Spawning Habitat (m^2)	YOY Trout Densities (#/100m)	(3) Total #YOY from Habitat	(4) #YOY from Densities
ABOVE JAMESON RESERVOIR:													
S.Ynez	5	B2a	S	0.9	2.0	25	25	0		188	40	7,520	1,160
	6	A2a+	P	0.9	1.5	30	20	5	xings	143	20	5,720	580
JuncalNF	1	C3b	S	1.0	2.5	40	5	30		80	7	1,600	
	2	B2a	P	0.6	1.6	40	10	10		48	110	960	1,760
	3	A2	P	0.8	2.0	10	5	20	steep	13	20	130	500
	4	B2a	P	1.0	2.0	10	15	15	flow	48	0	960	
Total above Jameson:				2.6								15,890	4,000
Total Steelhead pocential:				3								15,800	3,500
TOTAL:				101								217,142	118,716
TOTAL STEELHEAD POTENTIAL:				69								202,271	92,096

(1) P=perennial, S=seasonal, I= intermittent

(2) Spawning Habitat available = reach lengthxwidth x %riffles x %gravels

(3) Estimated potential YOY or smolt production derived from available gravel spawning habitat, multiplied by 0.20 redds/m^2 (Reiser and White 1981), 2000 eggs/redd (Hulkley 1967), and 0.50 survival of eggs to fry (Bley and Moring 1988). Estimage further reduced by 0.50 if fine sediments 10-20% and 0.25 if fines >20%.

(4) Estimated current YOY production derived from observed salmonid fry densities projected over total reach length and multiplied by 0.20 for mortality to smolting.

Table 1. Continued: Habitat capability and estimates of potential steelhead production in the upper Santa Ynez River basin (based upon U.S.Forest Service stream surveys 1982-present).

DRAINAGE	Reach	Chan Type	(1) Flow Type	Miles	average Width (m)	%Rifl	%Gravl	%Fine	Barrier TYPE	(2) Spawning Habitat (m^2)	YOY Trout Densities (#/100m)	(3) Total #YOY from Habitat	(4) #YOY from Densities
ABOVE GIBRALTAR:													
S.Ynez	4	C2	S	8.0	5.0	20	15	10	flow	1545	30	30,900	7,720
Gidney	1	B2?	S	0.6	1.0	20	10	5		193	80	7,720	1,540
	2	B2	P	1.4	1.5				bldrs				
	3	A2	P	1.0	1.0				falls				
Camuesa	1	B3	I	5.0							0	-	-
Indian	1	B2	S	1.0	3.5	20	15	20		169	30	1,690	960
	2	B3a	SI	1.5	3.0	20	10	30		145	10	1,450	480
	3	B3?	P	2.0	2.0	20	10	5		129	10	5,160	640
	4	B2?	P	3.0	2.0	20?	10	5		193	60	7,720	5,800
	5	B3?	FI	5.0	2.0	20?	15	5	falls	483	30	19,320	4,820
Buckhorn	1	B3?	FI	2.0	2.0	20	15	5		193	65	7,720	4,180
	2	A2	FI	2.5	1.5	40	10	15		241	130	4,820	10,460
Mono	1	C1	S	1.0	3.0	30	5	20	warm	72	0	-	-
	2	C2?	SI	2.5	2.0	20	20	20	warm	322	15	3,220	1,200
	3	B2?	SI	6.0	1.5	20	10	10		290	45	5,800	8,680
	4	B3?	FI	6.5	1.0	10	15	10		157	15	3,140	3,120
A.Calleo	1	D1	S	1.0	3.0						0	-	-
	2	B1	FI	3.5	1.5	50	20	10	hot	845	0	-	-
Blue C.	1	B4c	SI	1.2	3.0	50	50	15	flow	1448	450	28,960	1,720
	2	B4	SI	1.6	2.0	40	35	20		901	?	7,200	?
	3	B3	SI	0.8	1.5	30	45	20		435	?	2,300	?
Escondido	1	B3a	P	0.2	4.0	35	30	15		135	100	2,700	640
	2	A2	P	0.6	2.0	7	5	20	steep	29	?	290	
	3	A2a+	P	0.7	1.2	7	30	10	bldr	20	0		
Fox	1	B3a	P	0.5	2.5	40	10	20		86	110	1,600	1,760
	2	A2	P	1.0	1.5	30	10	5	div	72	0	2,880	
Alder	1	B3	SI	1.6	3.0	40	30	15		927	280	9,270	12,880
	2	A2a	FI	0.8	2.0	40	20	15		206	100	2,060	2,560
	3	A2	P	0.2	1.5	10	5	30	div	2	?		
	4	A2a	P	0.2	1.0	20	5	15	falls	3	0		
Total above Gibraltar:				64								133,720	69,160
Total Steelhead potential:				40								130,210	63,140

Table 1. Habitat capability and estimates of potential steelhead production in the upper Santa Ynez River basin (based upon U.S.Forest Service stream surveys 1982-present).

DRAINAGE	Reach	Chan Type	(1) Flow Type	Miles	average Width (m)	%Rif	%Gravl	%Fine	Barrier Type	(2) Spawning Habitat (m²)	YOY Trout Densities (#/100m)	(3) Total #YOY from Habitat	(4) #YOY from Densities
ABOVE CACHUMA RESERVOIR:													
S.Ynez	1	C3	S	2.0	6.0	10	20	20	flow	40	30	400	1,940
	2	C2	SI	3.0	10.0	30	5	20	flow	724	30	7,240	2,896
	3	C2	PI	3.0	10.0	20	5	20		483	70	4,830	6,760
Cachuma	1	B3?	PI	4.0	1.5	10?	10?	10?		193	25	1,930	320
	2	B3?	PI	4.0	1.5	10?	10?	10?	bldr	193	25		
S.CruzEF	1	B3?	P	3.0	1.5	10	5	0		36	30	720	2,880
	2	B1	P	3.5	2.0	20	10	0	falls	225	45	4,500	5,320
	3	B2	P	3.0	1.0	20	15	5	bldrs	90	130	3,600	12,540
Grapevin	1	C2?	P	0.7	2.0	40	10	10		90	130	1,800	2,900
	2	B3?	P	1.3	1.5	40	10	5		318	50	12,720	2,100
S.CruzWF	1	B2?	P	2.5	1.5	20	10	10		121	30	2,420	3,400
Cocha	1	B3?	P	1.3	1.5	20	20	5		126	25	5,040	1,040
	2	B3?	P	1.0	1.5	20	20	5		242	65	4,840	2,100
Black	1	B2?	S	2.0	1.5	20?	10	10	flow	97	0	-	-
Peachtre	1	B3	SI	1.0	1.5	20?	5	30	falls	24	60	240	1,920
Oso	1	B3	S	1.0	1.5				flow		0		
	2	B3	S	1.0	1.0				flow		0		
Devil's	1	D3	S	0.1	4.0	60	10	10	flow		0		
	2	B3a	SI	0.1	3.5	60	20	0	flow-x	68	20	2,720	60
	3	B2a	P	1.5	2.0	30	20	5		290	20	11,600	60
	4	B2a	P	1.0	2.0	30?	20	57	falls	193	0	-	-
Total above Cachuma:				32								66,532	117,016
Total Steelhead potential:				23								56,261	25,456

Table 1. Habitat capability and estimates of potential steelhead production in the upper Santa Ynez River basin (based upon U.S.Forest Service stream surveys 1982-present).

DRAINAGE	Reach	(1) Chan Type	Flow Type	Miles	Average Width (m)	%Rifl	%Gravl	%Fine	Barrier Type	(2) Spawning Habitat (m²)	YOY Trout Densities (#/100m)	(3) Total #YOY from Habitat	(4) #YOY from Densities
ABOVE CACHUMA RESERVOIR:													
S.Ynez	1	C3	S	2.0	6.0	10	20	20	flow	40	30	400	1,940
	2	C2	SI	3.0	10.0	30	5	20	flow	724	30	7,240	2,896
	3	C2	PI	3.0	10.0	20	5	20		483	70	4,830	6,760
Cachuma	1	B3?	PI	4.0	1.5	10?	10?	10?		193	25	1,930	320
	2	B3?	PI	4.0	1.5	10?	10?	10?	bldr	193	25		
S.CruzEF	1	B3?	P	3.0	1.5	10	5	0		36	20	720	2,880
	2	B1	P	3.5	2.0	20	10	0	falls	225	45	4,500	5,320
	3	B2	P	1.0	1.0	20	15	5	bldrs	90	130	3,600	12,640
Grapevin	1	C2?	P	0.7	2.0	40	10	10		90	120	1,800	2,900
	2	B3?	P	1.3	1.5	40	10	5		318	50	12,720	2,100
S.CruzWF	1	B2?	P	2.5	1.5	20	10	10		121	30	2,420	2,400
Cocha	1	B3?	P	1.3	1.5	20	20	5		126	26	5,040	1,040
	2	B3?	P	1.0	1.5	20	20	5		242	65	4,840	2,100
Black	1	B2?	S	2.0	1.5	20?	10	10	flow	97	0	-	-
Peashtre	1	B2	SI	1.0	1.5	20?	5	30	falls	24	60	240	1,920
Oso	1	B3	S	1.0	1.5				flow		0		
	2	B2	S	1.0	1.0				flow		0		
Devil's	1	D3	S	0.1	4.0	60	10	10	flow		0		
	2	B3a	SI	0.1	3.5	60	30	0	flow-x	68	20	2,720	60
	3	B2a	P	1.5	2.0	30	20	5		290	20	11,600	60
	4	B2a	P	1.0	2.0	30?	20	57	falls	193	0	-	-
Total above Cachuma:				32								66,532	117,016
Total Steelhead potential:				23								56,261	25,456

Study Year Watershed Inventory Data
Last Updated May 24, 1997 by Hanlon, Ryanne

Legend

Vegetation Key:

Methods Key:

Note 1: Width/Depth was calculated by dividing the mean bankfull width by mean bankfull depth.
2: Pebble count data surveys where D50 was calculated by dividing mean wetted channel width by mean wetted channel depth.

Stream channel attributes associated with the stated mapping layer at the Basin Year watershed analysis

Subbasin				Length	Flow	Pebble Count Data					Pebble	Avg Pool	%	%	%	% Pool	%	%	%	%	% Pool	Dry Year				
Date	Name	Method	Reach#	(mi)	(CFS)	Type	(D50)	(cm)	(cm)	+/-	Count	Depth (m)	pool	run	rif	Class	Area	Frequency	Volume	Complexity	Shade	Class	Substrate	Width (m)	Depth (m)	Pebble (D50 cm)	Embedded (D50)	Sub-Adult (D50) (cm)	Adult (D50) (cm)	Flow (CFS)
07-27-94	Juncal (Forest)	FISH Trans	01	0.65	I	Rib	101	69	0.65	-	-	-	25	0	25	125	0	25	21	100	24	AD	264	24.5	48.250	39.8	34.5	22.6	0.262
07-27-94	Juncal (Forest)	FISH	02	0.37	I	Alle	101	42	0.28	-	97	97	0	25	-	-	24	12	6	100	22	AD	21	11	53.250	0	44	33	0.164
08-21-94	MF Juncal	Transect	0001	0.56	F	C3b	31.8	3	0.45	-	-	-	-	-	-	31.7	31	5	14	-	-	AD	21	32.5	-	-	-	-	-	0.900
08-21-94	MF Juncal	Tributary	0002	0.83	F	B3a	90	2.77	0.67	-	-	-	-	-	-	-	25	15	20	100	-	AD	24	22.5	-	-	-	-	-	0.883
08-21-94	MF Juncal	FISH/SURVEY	0002	0.83	F	B3a	8.49	2.85	0.5	0	0.39	32	24	36	-	-	14	53	8	21	32	AD	24	11.1	27.250	11.2	42.3	34.5	0.833
08-28-94	MF Juncal	Transect	0003	0.76	F	A2	58.3	2.52	0.47	-	-	-	-	-	0	41.3	15	5	15	29	-	W	AD	23.1	-	-	-	-	-	0.165
08-28-94	MF Juncal	FISH	0003	0.76	F	A2	6.14	2.21	0.37	0	0.37	36	36	0	41.3	29	6	16	32	97	40	W	6	45.250	22.5	30.5	7.9	0.165	
08-31-94	MF Juncal	Transect	0004	1.02	F	B3c	7.9	2.2	0.68	-	-	-	-	-	-	-	15	15	13	100	-	AD	24	30.7	-	-	-	-	-	0.182
09-09-93	Alder	Reach *	01	0.12	I	B4	13	0.86	0.7	0	0.11	2	21	0	-	-	19	24	16	75.5	39.9	-	-	-	150.300	0	21.2	20.2	-	
09-10-93	Alder	Reach *	02	0.65	I	A2b	8.7	1.83	0.16	0	0.09	35	37	63	-	-	36	5	22.5	74.5	39.6	-	-	-	90.240	0	21.5	20.9	-	
09-10-93	Alder	Reach *	03	0.23	P	A2	5.1	1.71	0.43	27	0.26	30	38	12	-	-	39	69	18.2	74.8	41	-	-	-	180.360	0	24.7	19.5	-	
09-10-93	Alder	Reach *	04	0.53	P	A2b	9.1	1.93	0.3	25	0.29	72	7	21	-	-	13.5	6	7.5	31.1	46.5	-	-	-	-	-	-	-	-	
09-21-93	Alder	Reach *	05	0.47	P	A2	19.7	1.35	0.12	0	0.8	20	13	7	-	-	0	30	20.3	38.5	31.2	-	-	-	-	-	-	-	-	
04-16-93	Alder	Reach *	01	0.35	-	A2	7.6	4.57	0.61	0	0.35	30	13	7	-	-	10	10	25	-	-	-	-	-	30.150	21	29	13	1.48	
04-20-93	Alder	Reach *	02	0.65	-	A2	6.8	5.18	0.65	12	0.8	15	7	47	-	-	45	35	32	-	-	-	-	-	30.150	25	28	5.7	4.88	
04-28-94	Alder	Fish/Survey	0001	1.6	-	B3	16.1	6.4	0.4	-	-	-	6	35	0	59	28	31	28	-	-	W	30.5	17.4	30.150	-	-	-	0.16	
04-28-94	Alder	Fish/Survey	0002	0.6	-	A2b	11.8	6.7	0.57	-	-	-	6	32	53	-	28	16	14	36	-	0	AD	24	44.150	-	-	-	-	0.25
08-28-94	Alder	Fish/Survey	0001	1.5	-	B3	14.7	1.15	0.12	0	0.35	30	6	35	-	-	29	31	28	36	43.1	AD	0	13.5	30.150	6.7	20.7	0	0.16	
07-28-94	Alder	Fish/Survey	0002	0.9	-	A2b	13.8	1.76	0.13	13	0.88	60	6	36	-	-	19	18	14	36	39	AD	44	7.2	44.150	19.1	30.5	3	-	
07-30-94	Alder	Fish	0001	1.6	-	B3	3.9	0.94	-	-	-	-	-	-	-	-	15	20.3	49	58.3	34.4	AD	24	22.5	-	-	2.3	2.3	0.82	
08-07-94	Alder	Fish	0002	-	-	-	17.5	6.65	0.38	-	-	-	-	-	-	-	35	32	35	100	-	0	AD	30.3	-	-	-	-	-	2.05	
4-15-95	Alder	Reach	01	1.6	I	B3	11.2	3.39	0.3	0.6	0.4	16	36	0	-	-	7	1	3	14	36	W	W	16.6	-	0	2.6	2.4	0.24	
09-15-95	Alder	BCI	01	1.7	I	B4	20.5	-	-	0	0.51	-	-	-	-	-	6	49	-	31.7	-	-	-	-	-	-	-	-	-	-	
08-04-94	Alder	Reach	01	0.28	P	A2	5.65	2.08	0.37	61.1	0.8	11	36	33	-	-	0	9	32	57.5	37.5	AD	0	16.6	-	-	-	-	-	
08-10-94	Alder	Reach *	02	1.6	I	B3	8.8	1.37	0.15	0	0.31	16	24	37	-	-	19	31.6	28	34.6	16.2	-	-	-	-	29.1	16	6.7	-	
07-10-94	Alder	Reach *	03	0.36	P	A2	7.2	1.78	0.24	3	0.48	6	46	0	-	-	9	31	22	65.5	11.2	-	-	-	-	30.2	0	11	-	
08-21-93	Fox	Reach	01	0.11	P	A2	14.3	3.78	0.53	0	0.58	20	16	37	-	-	9	14	11	65.6	36.4	-	-	-	-	-	-	-	-	
08-21-93	Fox	Reach	01	0.28	P	A2	14.8	6.1	0.37	-	-	7	25	69	-	-	35	6	15	60	15	AD	-	-	57.250	49.6	31.5	13.4	2.8	
08-24-94	Fox	Fish/Survey	0003	0.48	P	B3c	12.1	3.4	0.28	47	0.6	24	11	25	39.5	20	13	16	100	31	AD	W	21.7	32.250	10.2	26.3	9.6	-	
09-27-94	Fox	Fish/Survey	0002	1	P	Alle	9.8	5.4	0.55	-	0.69	10	23	24	33.5	0	0	0	20	100	22	AD	0	21.6	-	0	0	0	0.09	
09-10-95	Fox	Transect	0004	0.49	P	B3c	10.5	3.2	0.3	-	-	-	-	-	-	-	3	0	26	100	-	AD	26.1	26.9	-	-	-	-	-	1.9	
09-10-95	Fox	Transect	0005	1	P	A2	8.8	4.7	0.45	-	-	-	-	-	-	-	0	31	-	97	-	M	0	17.5	-	-	-	-	-	3.48	
08-10-95	Fox	Reach	1	0.45	P	A2	20.4	3.01	0.15	0.7	0.41	15	20	65	-	-	11	11.3	10	72.3	29.3	AD	0	22.1	-	-	-	-	-	0.29
04-27-93	Agua Caliente	Reach	1	0.555	P	B1	11.2	2.84	0.25	0	1.53	1	30	69	-	-	12	20	20	-	-	-	-	-	-	-	-	-	-	
04-21-93	Agua Caliente	Reach	2	0.97	P	B1	10.5	1.43	0.13	-	0.6	2	6	94	-	-	10	10	20	-	-	-	-	-	-	-	-	-	-	0.57
04-27-93	Agua Caliente	Reach	3	0.55	M	C1	13.0	6.51	0.54	-	-	3	12	88	-	-	0	13	20	-	-	-	-	-	-	-	-	-	-	0.52
04-21-93	Agua Caliente	Reach	4	1.12	P	B1	13.2	10.1	0.78	36	0.88	4	18	36	-	-	6	17	32	-	-	-	-	-	-	0	0	0	0.47	
04-21-93	Agua Caliente	Reach	5	0.87	P	-	14.8	9.26	0.62	11.5	1.17	15	40	36	-	-	10	20	20	-	-	-	-	-	-	0	0	0	0.47	
09-21-94	Agua Caliente	Reach	3	-	-	-	12.8	12.3	0.97	-	-	-	-	-	36.1	16.3	6.7	49	36.1	-	-	W	W	36.5	-	-	-	-	3.66	
09-09-94	Agua Caliente	Reach	4	-	-	-	11.8	10.3	0.88	-	-	-	-	-	36.9	16	0	0	20	-	-	W	W	34.6	-	-	-	-	-	
09-08-94	Agua Caliente	Reach	[illegible]	-	-	-	9.91	3.11	0.31	-	-	37	30	33	-	-	8	0	20	-	-	-	-	-	-	0	0	0	0.80	
08-02-94	Dutch	Transect	001	-	-	-	19.8	8.75	0.45	-	-	-	-	-	23.5	30.1	0	0	20	36.6	-	-	W	36.5	-	-	-	-	-	
08-27-94	Main	Reach	1	0.85	I	C1	37.4	16.3	0.43	-	-	1	47	36	-	-	0	0	20	-	-	-	-	-	80.627	-	-	-	-	
08-02-94	Indian	Reach/Trans	0001 (01)	0.97	P	B3	16.8	13.8	0.78	0	0.31	30	25	17	34.6	20	10	10.6	87.5	54.7	70	W	44.3	53.250	33.4	23.2	11.9	-	
08-04-94	Indian	Reach/Trans	0002 (02)	1.6	E	B3c	10.5	7.28	0.69	0	0.44	30	30	20	37.5	20	0	0	24	89.2	56.9	LT	W	22.5	80.250	43.6	30.2	17.1	-	
08-18-94	Blue Canyon	Reach/Trans	0001	1.2	I	B4c	21.7	11.7	0.54	-	-	50	0	50	38	10	21	21	4	10	-	N	M	16.5	44.36	43.6	0	0	0.2	
08-18-94	Blue Canyon	Reach/Trans	0002	1.6	I	B4c	17.2	9	0.47	-	-	-	-	-	16.7	26	20	20	32	-	-	N	AD	13.2	-	-	-	-	0.3	
08-18-94	Blue Canyon	Reach/Trans	0003	0.65	I	B4	12.3	5.6	0.46	-	-	-	-	-	35.6	10	10	10	4	-	-	N	M	15	-	-	-	-	-	
08-28-94	Blue Canyon	Transect	02	1.6	I	B4c	10.1	5.6	0.55	-	-	-	-	-	-	5	27.5	35	68	-	-	AD	W	14.5	-	-	-	-	0.97	
08-28-94	Blue Canyon	Transect	03	0.65	I	B4	13.8	6.1	0.37	-	-	-	-	-	-	23	43.5	35	68	-	-	W	W	20.5	-	-	-	-	3.32	
08-02-94	Sawmill	Transect	0004 (03)	0.6	P	A2	13	4	0.45	-	-	-	-	-	-	33	1	5	10	-	-	0	0	24	-	-	-	-	0.1	
08-05-94	Sawmill	Transect	0005 (03)	0.7	P	A2c	14.18	5.4	0.38	-	-	-	-	-	0.7	7	22	32	89.7	-	-	0	AD	18.3	-	-	-	-	0.1	
08-10-94	Sawmill	Reach/Trans	0003 (01)	0.5	P	B3c	8.88	5.1	0.78	0	0.4	16	36	47	33.1	16	20	26	80.5	39.6	AD	0	21.3	27.250	18.2	0	10.2	0.1	
08-21-94	Sawmill	Transect	0003 (01)	0.5	P	B3c	13.89	5.4	0.4	-	-	-	-	-	-	10	41	20	83.6	39	0	0	AD	20.2	-	-	-	-	0.18	
08-08-93	SVR	Reach	01	0.15	E	C3	10.8	10.3	0.96	-	-	4	36	12	-	-	21	33	20	-	-	-	-	-	-	-	-	-	-	
08-08-93	SVR	Reach	02	0.35	E	C3	7.32	6.71	0.91	-	-	7	37	36	-	-	22	0	20	-	-	-	-	-	101.302	0	0.52	3.6	-	
08-17-94	SVR	SVR/Trans	0001	-	-	34	10.3	3.6	0.71	-	-	-	-	-	48	11	24	35	20	10	0.4	W	W	16	48.62	0	0	0	1.2	
07-21-94	SVR	SVR/Survey	01	-	-	-	20.3	10.3	0.53	-	-	-	-	-	-	4	23	20	20	32	0	W	0.4	20.5	0	0	0	0	1.3	
08-10-93	SVR	Walk Survey	-	0.11	E	-	8.82	12.1	1.32	-	-	30	20	50	-	-	26	45	30	20	-	W	-	-	-	-	-	-	-	
08-10-93	SVR	Walk Survey	-	-	E	-	12.5	16	1.3	-	-	30	20	36	-	-	30	45	30	-	-	W	-	-	-	-	-	-	-	
10-20-95	SVR	BCI	010173	0.16	-	C3	24.9	20.6	0.8	-	-	-	-	-	-	10	14	30	24	0	0	-	-	-	-	-	-	-	-	
10-17-95	SVR	BCI	010172	0.14	-	C3	20.9	15.8	0.75	-	-	-	-	-	-	1	16	20	24	-	-	-	-	-	-	-	-	-	-	
10-17-95	SVR	BCI	010173	0.16	-	C3	14.5	11.2	0.66	-	-	-	-	-	-	3	7	20	24	0	0	-	-	-	-	-	-	-	-	
10-11-95	SVR	BCI	010174	1	-	C3	20.3	20.2	0.99	-	-	-	-	-	-	3	16	47	-	-	-	-	-	-	-	-	-	-	-	
08-18-94	Oso	Reach	-	-	-	-	-	-	-	-	0.66	-	-	-	-	-	-	-	-	-	-	0	20	-	-	0	0	0	0.00	
08-30-95	Pendleton	010171	-	-	-	-	5.8	3.8	0.6	-	-	-	-	-	-	-	20	0	10	80	20	-	-	-	60.150	0	10.8	9.4	-	

Table 1. Continued: Habitat capability and estimates of potential steelhead production in the upper Santa Ynez River basin (based upon U.S.Forest Service stream surveys 1982-present).

DRAINAGE	Reach	Chan Type	(1) Flow Type	Miles	average Width (m)	%Rifl	%Gravl	%Fine	Barrier Type	(2) Spawning Habitat (m^2)	YOY Trout Densities (#/100m)	(3) Total #YOY from Habitat	(4) #YOY from Densities
ABOVE JAMESON RESERVOIR:													
S.Ynez	5	B2a	SI	0.8	2.0	25	25	0		188	40	7,520	1,160
	6	A2a+	P	0.5	1.5	30	20	5	xings	143	20	5,720	580
JuncalMF	1	C1b	SI	1.0	2.5	40	5	30		80	7	1,600	
	2	B2a	P	0.5	1.5	40	10	10		48	110	960	1,760
	3	A2	P	0.8	2.0	10	5	20	steep	13	20	130	500
	4	B2a	P	1.0	2.0	10	15	15	flow	48	0	960	
Total above Jameson:				2 5								16,890	4,000
Total Steelhead pocential:				3								15,800	3,500
TOTAL:				101								217,141	118,716
TOTAL STEELHEAD POTENTIAL:				69								202,271	92,096

(1) P=perennial, S=seasonal, I= intermittent

(2) Spawning Habitat available = reach lengthxwidth x %riffles x %gravels

(3) Estimated potential YOY or smolt production derived from available gravel spawning habitat, multiplied by 0.20 redds/m^2 (Reiser and White 1981), 2000 eggs/redd (Bulkley 1967), and 0.50 survival of eggs to fry (Bley and Moring 1988). Estimage further reduced by 0.50 if fine sediments 10-20% and 0.25 if fines >20%.

(4) Estimated current YOY production derived from observed salmonid fry densities projected over total reach length and multiplied by 0.20 for mortality to smolting.

Attachment

4

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

F/SWR:MC

SEP 19 2001

Harry M. Schueller, Chief
Division of Water Rights
State Water Resources Control Board
1001 I Street 14th Floor
Sacramento, California 95814

Dear Mr. Schueller:

Re: Hearing to Review the U.S. Bureau of Reclamation Water Rights Permits 11308 and 11310 (Applications 11331 and 11332) for the Cachuma Project on the Santa Ynez River in Santa Barbara County.

The purpose of this letter is to provide the State Water Resources Control Board (Board) with the National Marine Fisheries Service's (NMFS) preliminary comments on the Cachuma Project water rights hearing. This hearing is being conducted to determine whether any modifications to the U.S. Bureau of Reclamation's (Reclamation) water right permit terms and conditions are necessary to protect Public Trust values, including the endangered Evolutionarily Significant Unit (ESU) of Southern California steelhead (*Oncorhynchus mykiss*), and downstream water rights on the Santa Ynez River below Bradbury Dam. These comments focus specifically on the relationship between NMFS' recovery planning process for the Southern California steelhead ESU, the biological opinion that NMFS issued for Reclamation's Cachuma Project in September 2000, and the Cachuma Project water rights hearing. NMFS will provide additional technical comments to the Board in a separate letter on the draft Environmental Impact Report (EIR) for the Cachuma Project when it is released for public comment.

Background

Bradbury Dam is located approximately 48 miles upstream from the Pacific Ocean on the Santa Ynez River. Steelhead populations that are part of the endangered Southern California steelhead ESU occur in the Santa Ynez River mainstem and tributaries downstream of Bradbury Dam. Freshwater habitat and the associated riparian habitat in the mainstem and tributaries downstream of Bradbury Dam are also part of the designated critical habitat for this steelhead ESU. Prior to construction of the Cachuma Project in 1958, which included Bradbury Dam, the Santa Ynez River system supported one of the largest runs of steelhead in southern California, estimated by the California Department of Fish and Game to be approximately 20,000 adult fish per year. A majority of these fish are believed to have spawned and reared in the up-stream tributaries to the

Santa Ynez River, above the current site of the Bradbury Dam within the Los Padres National Forest. The current run of adult steelhead in the Santa Ynez River system is believed to be less than 100 adult fish per year, and is limited to the mainstem and tributaries of the Santa Ynez River below Bradbury Dam.

On August 11, 1997, NMFS listed the Southern California steelhead ESU, which includes steelhead populations in the Santa Ynez River system, as an endangered species under the Federal Endangered Species Act (ESA). The Southern California steelhead ESU was listed as an endangered species because of the destruction and loss of habitat throughout its range that has caused the annual run size in the ESU to decline from historic estimates of 55,000 fish to less than 500 fish, a decline of more than 90%. As noted above, the current steelhead population in the Santa Ynez River system has also been severely depressed, largely as a result of the construction and operation of the Cachuma Project which includes Bradbury Dam.

NMFS' Recovery Planning

Under the Federal ESA, NMFS is required to prepare a recovery plan for species that it lists as threatened or endangered. For the purposes of the ESA, each salmon or steelhead ESU is considered a species for which a recovery plan must be prepared. The basic elements of each recovery plan are quantitative population recovery goals for the species or ESU, specific recovery measures which must be implemented to achieve these recovery goals, a monitoring program to assess the status of the species or ESU and its progress towards recovery, and an estimate of the cost and time required to carry out the identified recovery measures.

NMFS is just beginning this recovery planning process for the Southern California steelhead ESU. The first step in this process will be the establishment of a Technical Recovery Team (TRT) which will develop the quantitative population recovery goals for this ESU, as well as address other recovery planning issues such as the identification of factors responsible for the decline of the ESU as well as factors limiting recovery of the ESU, the development of research, monitoring, and evaluation needs, and the identification and evaluation of early recovery measures. At present, our plan is to appoint this TRT by late 2001 or early 2002. This process will include formal solicitation of nominations from interested parties, the review and screening of nominations, and finally the selection of the TRT. The population recovery goals developed for this ESU will be based on the guidelines established by NMFS in its Technical Memorandum entitled: "Viable Salmonid Populations and the Recovery of Evolutionary Significant Units". Following the establishment of these biologically derived recovery goals, the TRT will, in conjunction with a wide range of stake-holders, including public and private interests, identify and evaluate specific recovery measures which must be implemented to achieve the quantitative population recovery goals.

It is important to emphasize that NMFS is just now in the process of beginning this recovery planning process, and therefore, has not developed specific population recovery goals for the Southern California steelhead ESU which includes those populations that utilize the Santa Ynez

River system. Because recovery goals for this ESU do not yet exist, it is not possible at present to assess the adequacy of any mitigation or conservation measures in terms of the ultimate recovery objectives that will emerge from this process.

NMFS' Biological Opinion for the Cachuma Project

On September 8, 2000, NMFS issued a biological opinion to Reclamation, pursuant to section 7 of the ESA, which addressed the effects of Reclamation's proposed operation and maintenance of the Cachuma Project on the Southern California steelhead ESU. NMFS' biological opinion concludes that Reclamation's proposed action, as described in the biological opinion, is not likely to jeopardize the continued existence of the endangered Southern California steelhead ESU or destroy or adversely modify the species' critical habitat. It is important to emphasize, however, that Reclamation's proposed action upon which the non-jeopardy biological opinion was based incorporated of a number of specific elements that NMFS believed were necessary to avoid jeopardizing the species. Because Reclamation's proposed action was the foundation for our non-jeopardy conclusion in the biological opinion, NMFS believes any water rights permits issued by the Board should ensure that those elements of Reclamation's proposed action that are within the jurisdiction of the Board be implemented without delay so that operation of the Project does not jeopardize the continued existence of the Southern California steelhead ESU.

Because Reclamation's proposed action for the Cachuma Project was expected to result in the incidental take of listed steelhead, NMFS also issued an incidental take statement with its opinion that includes a wide range of mandatory terms and conditions that Reclamation must comply with to minimize and monitor the incidental take of steelhead, as well as authorize the incidental take of listed steelhead. These mandatory terms and conditions include, for example, designing and implementing a strategy to further refine supplemental flow releases for steelhead migration in the Santa Ynez River. In order to ensure that the incidental take of steelhead is minimized and monitored as required by the incidental take statement, NMFS believes any water rights permits issued by the Board should also ensure that any terms and conditions that are within the jurisdiction of the Board be implemented without delay.

In addition to the biological opinion and incidental take statement, NMFS also provided Reclamation with a specific list of conservation recommendations designed to further minimize or avoid impacts on listed steelhead, and also assist with recovery planning and the implementation of recovery measures. Although Reclamation is not required to implement these conservation recommendations, section 7(a)(1) of the ESA directs Federal agencies such as Reclamation to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. NMFS provided these recommendations to Reclamation in light of this broader Federal agency obligation under the ESA. Although it is not mandatory for Reclamation to implement these conservation recommendations under section 7 of the ESA, NMFS believes implementation of these recommendations are important because they will either help to minimize the adverse effects of the Cachuma Project on listed steelhead, provide information necessary for the development of a

recovery plan, or assist in the eventual implementation of a recovery plan for this ESU. These additional conservation measures, which are discretionary on the part of Reclamation, include: (1) examination of alternative means of delivering water to downstream users of the Cachuma Project, (2) examination and evaluation of the means of providing passage for steelhead to and from the historic steelhead spawning and rearing habitat above Bradbury Dam, and (3) examination and evaluation of the ecological effects of reducing natural flood flows in the lower Santa Ynez River as a result of the operation of the Cachuma Project.

Finally, we would like to emphasize that NMFS' biological opinion for the Cachuma Project focused on the issue of whether or not Reclamation's proposed action, which included operation and maintenance of the Cachuma Project, would jeopardize the continued existence of the Southern California steelhead ESU. The biological opinion did not address and identify those specific conservation and management measures that would be necessary for recovery of the Southern California steelhead ESU, including those populations that occur in the Santa Ynez River system, because the section 7 consultation process under the ESA focuses soles on the issue of jeopardy rather than the broader issue of what is needed for recovery. Although NMFS's recovery planning efforts for this ESU are only now beginning, we feel strongly that the conservation recommendations that were included in our opinion need to be implemented as part of this broader recovery effort. Timely implementation of these conservation recommendations, as described above, will facilitate developing potential operation and maintenance alternatives for the Cachuma Project that further protect Public Trust values and contribute towards the recovery of the endangered Southern California steelhead ESU. For this reason, we urge the Board to ensure these recommendations are implemented as part of any water rights permit it issues.

Water Rights Hearing Issues

The Notice of the Water Rights Hearing for the Cachuma Project indicates that the basic purpose of the hearing is to review Reclamation's Water Rights Permits 11308 and 11310 to determine whether any modifications in permit terms and conditions are necessary to protect the Public Trust values and downstream water rights on the Santa Ynez River below Bradbury Dam. A review of the original water rights permits for the Cachuma Project indicates that no specific measures were included in the terms and conditions to: (1) provide for fish passage over, around or through the Bradbury Dam, (2) provide for fish transportation flows between Bradbury Dam and the Pacific Ocean, or (3) maintain the riverine or estuarine habitat in the lower Santa Ynez River to support Public Trust values such as, but not limited to, steelhead populations. While the current water rights permits (under Water Rights Order 94-5 amending Water Rights Permits 11308 and 11310) provide for 2,000 acre feet of water from the Cachuma Reservoir which could potentially be used for maintenance of fish in the lower Santa Ynez River, the permits do not specifically provide for the provision of habitat conditions that would restore steelhead runs in the Santa Ynez River or the recovery of the Southern California steelhead ESU.

As noted previously, the Santa Ynez River historically supported one of the most productive steelhead runs in southern California and still contains substantial amounts of high quality spawning and rearing habitat within the watershed, with a majority of the spawning and rearing habitat located above Bradbury Dam. For these reasons, NMFS believes that the restoration of the Santa Ynez River steelhead populations to the point where they are viable and self-sustaining will be an important element of the recovery strategy for the larger Southern California steelhead ESU. Resolution of the Public Trust issues raised by the Cachuma Project water rights hearing is critical to steelhead recovery in the San Ynez River, and therefore, cannot be separated from the recovery planning process for the Southern California steelhead ESU. Consequently, NMFS believes that any order issued by the Board for the Cachuma Project should be framed so as not to prejudice the NMFS' recovery planning process for the Southern California ESU, or preclude the effective implementation of recovery conservation measures that are identified in the future.

Because the range of alternatives addressed and evaluated as part of the EIR for the Cachuma Project is relevant to the questions of jeopardy and recovery of steelhead, as well as the Public Trust values in the Santa Ynez River, the scope of alternatives is an important element of the Cachuma Project water rights hearing. In a letter dated December 11, 2000 to Reclamation, you indicated that the Board staff had determined that the range of alternatives for the EIR should be revised to reflect the biological opinion issued by NMFS for the Cachuma Project. However, all of the alternatives in the attachment to the December 11th letter ("Summary of SWRCB Alternatives for the Cachuma Water Rights EIR") deal primarily with a limited number of flow management options in the lower Santa Ynez River below Bradbury Dam. None of the proposed alternatives specifically address the fundamental issue of what river conditions (either above or below Bradbury Dam) must be restored, or maintained, to achieve restoration of the steelhead runs of the Santa Ynez River, or recovery of the Southern California ESU. Because these alternatives are based on Reclamation's proposed action which NMFS analyzed in its biological opinion, they address only the more limited issue of ensuring the continued existence of the Southern California steelhead ESU, rather than the larger issue of recovery of the ESU.

As discussed previously, NMFS believes that the restoration of the steelhead runs in the Santa Ynez River will be crucial to the recovery of the Southern California steelhead ESU, and this specific Public Trust value should be explicitly reflected in the alternatives analysis in the EIR for the Cachuma Project. Further, NMFS believes that a comprehensive EIR which addresses all the potential alternative measures for restoring steelhead in the Santa Ynez River as part of a larger recovery program for the Southern California steelhead ESU is essential to fully inform public and private stakeholders, as well as the decision makers, involved in the Cachuma Project water rights hearing.

Summary

The Board's water rights hearing on the Cachuma Project raises issues central not only to the general Public Trust interest in the water resources of the Santa Ynez River system, but also to the recovery of the endangered Southern California steelhead ESU. Any decision on the

disposition of the water rights and Public Trust values in the Santa Ynez River should, therefore, be made in a manner which does not prejudice the recovery planning process that NMFS is just beginning to initiate, or the effective implementation of recovery measures necessary to restore viable and self-sustaining steelhead populations in the Santa Ynez River and recovery of the larger Southern California steelhead ESU.

Because the Board's consideration and possible decision on this matter is likely to precede the completion of NMFS's Recovery Plan for the Southern California steelhead ESU, NMFS recommends that any water rights decision made prior to the completion and adoption of this plan be interim in nature so that recovery actions that are needed for steelhead can be implemented in the future once they are identified through our recovery planning process. Any interim decision by the Board should ensure timely implementation of: (1) Reclamation's proposed action for the Cachuma Project, as analyzed by NMFS in its biological opinion, and (2) the terms and conditions included in the incidental take statement NMFS issued to Reclamation with its biological opinion. These measures should be implemented in an expeditious manner without delay. Lastly, any interim decision by the Board should also include specific requirements that provide for continuing evaluation of the effects of the Cachuma Project on the recovery of the Southern California ESU, including implementation of the conservation recommendations set forth in NMFS' biological opinion for the Cachuma Project.

NMFS understands the additional complexity which has been added to this hearing as a result of the Federal listing of Southern California steelhead ESU since the initiation of these water rights proceedings. However, we hope that these comments clarify the status of the recovery planning process, and in particular the relationship of the NMFS' biological opinion for the Cachuma Project to the recovery planning process and to the Cachuma Project water rights hearing. As noted previously, NMFS intends to also supply more specific comments on the draft EIR being prepared for the Cachuma Project water rights hearing as soon as the draft EIR becomes available.

Thank you for the opportunity to provide these preliminary comments on the Cachuma Project water rights hearing. Should you or your staff have any questions regarding these comments or wish to discuss these issues further, please feel free to contact Jim Lecky at (562) 980-4015.

Sincerely,

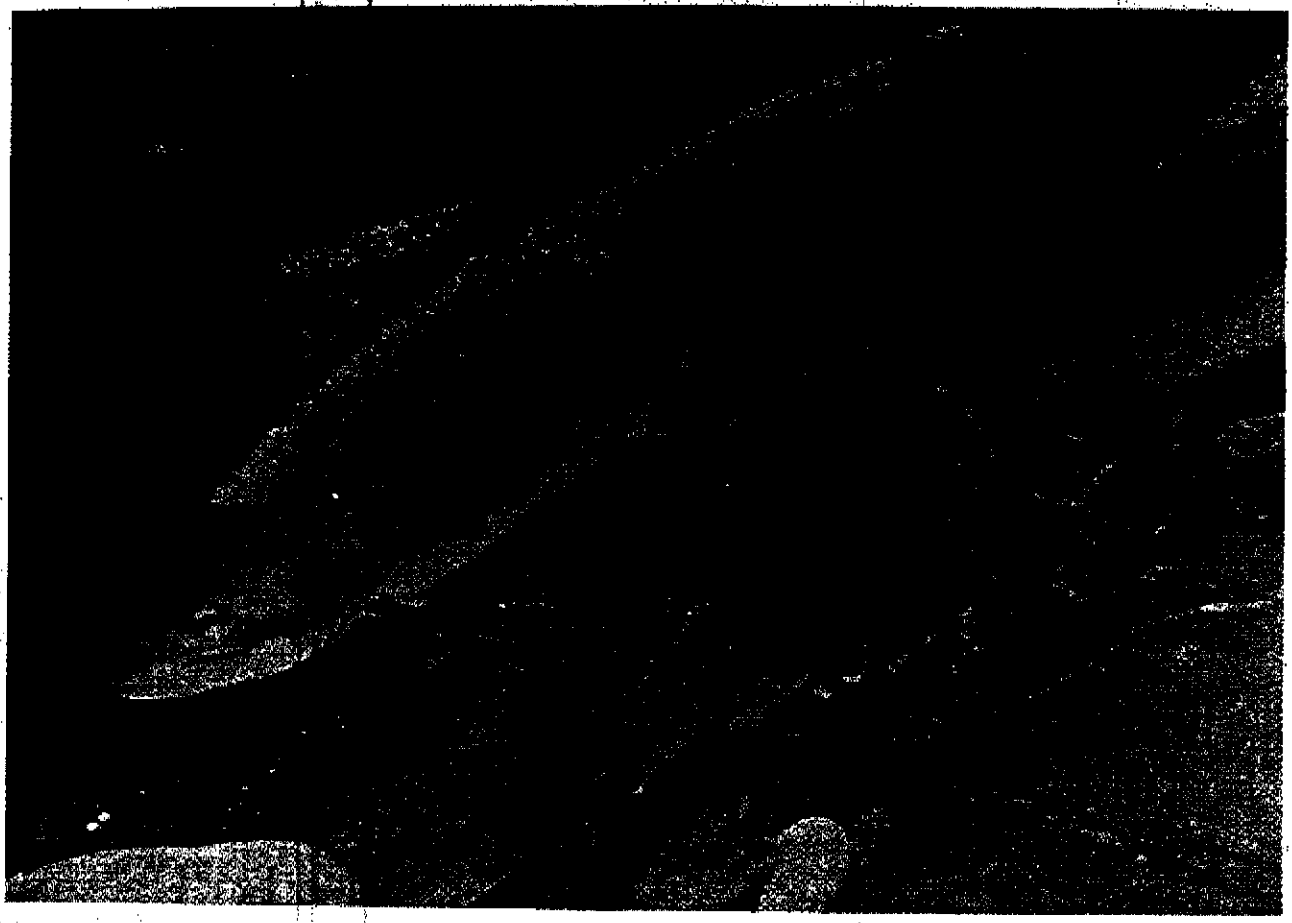
Rebecca Lent, Ph.D.
Regional Administrator

cc:
Kirk Rogers, Acting Regional Director, Bureau of Reclamation
Janine Derby, Forest Supervisor, Los Padres National Forest
Arthur Baggette, State Water Resources Control Board

Attachment

5

STEELHEAD RESTORATION AND MANAGEMENT PLAN FOR CALIFORNIA



DEPARTMENT OF FISH AND GAME

February, 1996

State of California
The Resources Agency
Department of Fish and Game

STEELHEAD RESTORATION AND MANAGEMENT PLAN FOR CALIFORNIA

by

Dennis McEwan
Associate Fishery Biologist
Inland Fisheries Division, Sacramento

and

Terry A. Jackson
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Inland Fisheries Division, Sacramento

Under the Supervision of

Forrest Reynolds
Assistant Chief
Inland Fisheries Division

and

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Senior Fishery Biologist
Inland Fisheries Division

Santa Rosa Creek. Until the early 1980s, steelhead were abundant in the Santa Rosa Creek drainage. Steelhead, along with several other aquatic vertebrates, have declined substantially since this time, mainly due to the loss of instream habitat due to increased diversion and underflow pumping (Rathbun et al. 1991). Lack of sufficient flows has also impacted the lagoon, which at one time served as an important rearing area for juvenile steelhead. Few juvenile steelhead have been observed in the lagoon for several years (Rathbun et al. 1991; Jennifer Nelson, DFG Fishery Biologist, pers. comm.). Urbanization of lower stream channels and cattle grazing have also affected the stream (CDFG 1992d).

Chorro Creek. Chorro Creek is a large system relative to other San Luis Obispo County streams. The anadromous reach of this stream terminates at an impassable dam which impounds Chorro Reservoir. The middle reach contains the majority of spawning habitat, unfortunately most of this section becomes dewatered during the summer due to numerous agricultural diversions and the impoundment at Chorro Reservoir (Snider 1974). Effluent from a sewage treatment plant provides the majority of the summer habitat in the drainage.

In addition to the problems caused by water diversion and storage, thirteen significant migration impediments on the mainstem and tributaries were identified by DFG in the early 1970s (Snider 1974), most of which still exist (Nelson n.d.). These barriers prevent adult steelhead from utilizing the upper reaches where perennial flows occur.

Recommendations

- **DFG should continue to seek necessary flows to restore steelhead populations in San Luis Obispo County streams that are degraded due to over appropriation of water.**
  DFG is involved with several interagency and community organizations to restore aquatic habitat and has filed protests with the SWRCB.

- **DFG should continue to protest water right applications on healthy streams unless sufficient bypass flows are established that will maintain habitat conditions in the streams, tributaries, and lagoons.**

SANTA YNEZ RIVER

Historically, the Santa Ynez River supported the largest steelhead run in southern California (Shapovalov 1945). Gibraltar Dam, completed in 1920, blocked access to much of the spawning habitat of the river system, including the upper mainstem and the Mono Creek system (Shapovalov 1945) (Fig. 22). The construction of the Cachuma Project (which

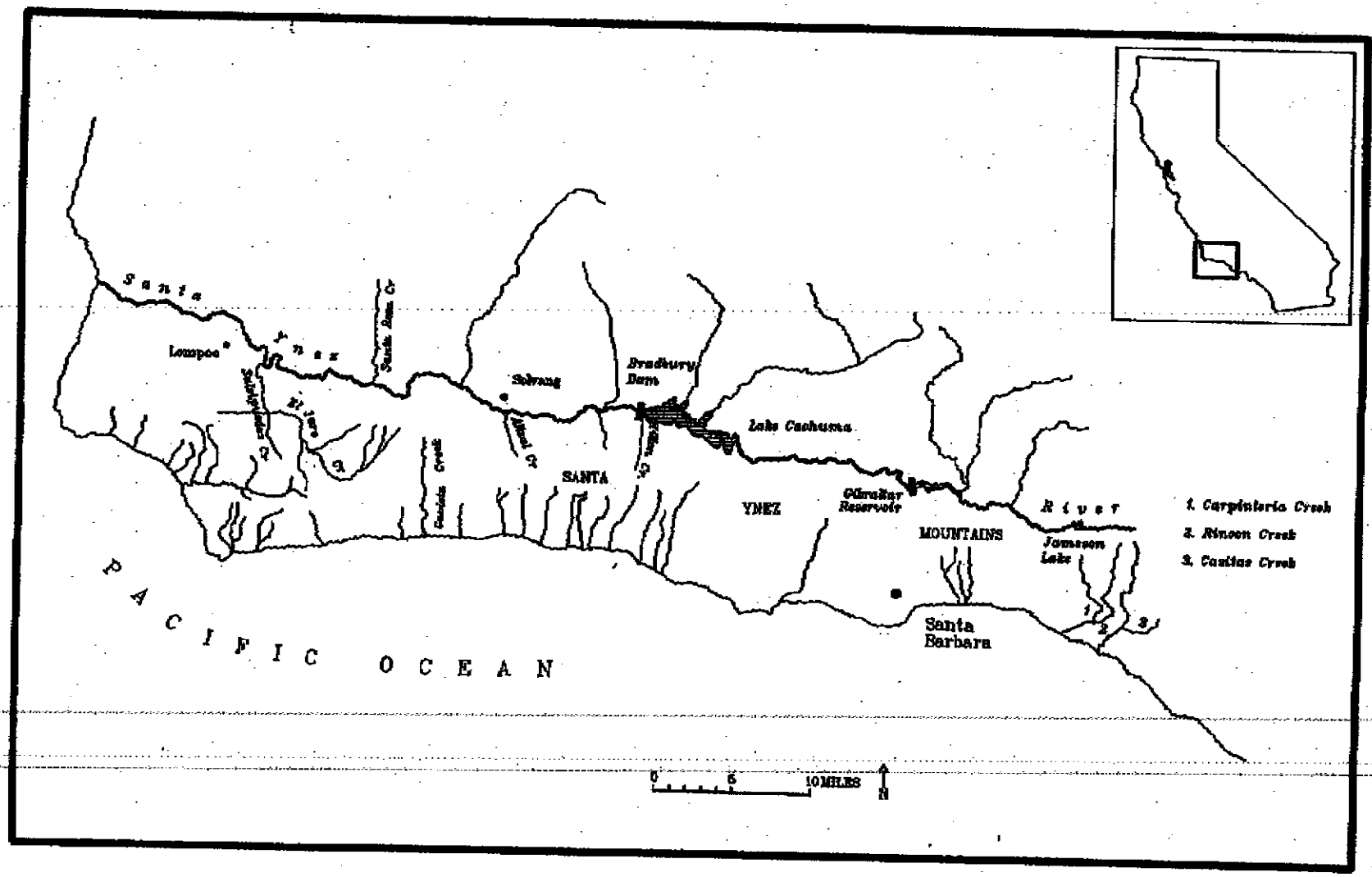

Figure 22. Santa Ynez River and coastal streams of Santa Barbara County.

includes Bradbury Dam) in the early 1950s eliminated access to nearly all historic spawning and rearing habitat. However, Shapovalov (1946) reported that excellent spawning habitat was present in the mainstem from Gibraltar Dam to the vicinity of Solvang, which is approximately 10 miles downstream of Bradbury Dam.

Bradbury Dam (Lake Cachuma) was authorized by Congress in 1948 as an emergency measure and was completed in 1953. After conducting pre-project fishery investigations, the U.S. Fish and Wildlife Service (USFWS) and DFG recommended that water be released from Bradbury Dam to provide migration, spawning, and nursery flows for steelhead. However, these releases for maintenance of the steelhead population were not authorized. Because of this, the steelhead run in the Santa Ynez River is nearly extirpated (CDFG 1975). Nehlsen et al. (1991) have categorized it as being at high risk of extinction.

Under conditions of the original water right permits issued to the U.S. Bureau of Reclamation (USBR) in 1958 for the Cachuma Project, USBR was to make releases that would maintain a "live stream" at prescribed downstream points to satisfy the needs of downstream water rights holders. In 1973, the SWRCB issued Order WR 73-37 which modified the original permits and allowed USBR to store all inflow to Lake Cachuma regardless of the persistence of the "live stream". This order was further modified in 1989 to provide greater releases to benefit downstream users and to extend the jurisdiction of the SWRCB to 1994. In 1994, the SWRCB issued Order WR 94-5 which reserved jurisdiction until 2000.

USBR is currently in the process of renewing its contract with the Santa Barbara County Water Agency to deliver water to the Cachuma Project Member Units for municipal, industrial, and agricultural purposes. Modification to project operations as a result of contract renewal may result in the need to revise USBR's water right permits, although the preferred alternative in the Final EIS/EIR for the contract renewal is to not change current project operations.

DFG has been a party to a Memorandum of Understanding (MOU) with USBR, USFWS, the Santa Barbara County Water Agency, the Member Units, and other interested groups to undertake cooperative fishery studies and to make recommendations for releases from Lake Cachuma to maintain fish and habitat. To provide water for this, a Fish Reserve Account consisting of up to 2,000 acre feet of water stored in Lake Cachuma has been established. Currently, the term of the MOU is for one year, after which it may be renegotiated or extended. The signatories to the MOU are proposing to extend the term to four years.

Above average rainfall in 1993 and 1994 created suitable migration flows and large rainbow trout/steelhead, were observed in the mainstem and tributaries. Several large rainbow trout/steelhead (16 to 18 inches) were captured and released in Hilton Creek in 1993 (CDFG 1993c). There were also anecdotal reports of anglers catching large rainbow trout in 1993. In 1994, a rainbow trout/steelhead estimated to be approximately 22 inches in length was captured in the mainstem (Trautwein 1994) and large rainbow trout were also observed in Hilton and Salsipuedes creeks (CDFG 1994a). Salsipuedes Creek tributaries and Hilton Creek still contain accessible spawning and rearing habitat. In 1995, several large rainbow trout that appeared to be steelhead were observed spawning in Hilton Creek. Several months later, swim-up fry where observed in the stream (Maurice Cardenas, DFG Fishery Biologist, pers. comm.).

There has been some question whether the rainbow trout observed in the lower Santa Ynez River are anadromous or have been introduced through catchable trout stocking in Lake Cachuma. There are examples of rainbow trout emigrating from reservoirs, establishing residence in downstream waters, and attempting to spawn in reservoir tailwaters and tributaries. However, rainbow trout used in catchable trout stocking programs typically have shorter life spans and do not grow as large as adult steelhead (Dennis P. Lee, DFG Senior Fishery Biologist, pers. comm.).

The Coastal Branch of the California Aqueduct (State Water Project) will bring approximately 45,000 acre feet of Central Valley water per year to Santa Barbara County. This project is currently under construction and is scheduled to be operational in 1996.

Portions of the river below Bradbury Dam suffer from habitat and channel degradation. Off-highway vehicles, pipeline construction, gravel mining, and riparian vegetation removal for flood control purposes has resulted in a broadening of the channel, subsurface flows, and loss of the riparian corridor.

- **DFG will seek a permanent flow regime from Bradbury Dam to restore the steelhead resource to a reasonable level and maintain it in good condition. This includes providing adequate streamflows for adult and juvenile migration, and mainstem spawning and rearing habitat.**
  USBR recontracting, SWRCB continued jurisdiction hearings, and additional water from the State Water Project may present good opportunities to rectify past actions which have resulted in the near extirpation of the Santa Ynez River steelhead and a diminishment of public trust resources. The question of whether rainbow trout present in the Santa Ynez River below Bradbury Dam are resident or anadromous is not pertinent to the need to mitigate for past water

development. DFG will negotiate mitigation on the basis that historic steelhead runs have been nearly eliminated by water development and actions to restore this public trust resource need to be implemented.

Recommendations

- **The feasibility of providing adult and juvenile passage around Bradbury Dam should be investigated and implemented accordingly.**
  Nearly all historic spawning and rearing habitat is located upstream of Bradbury Dam, therefor blocked access is probably the most significant limiting factor for steelhead. Because of the height of Bradbury Dam, trap-and-truck and smolt capture facilities are probably the only feasible means to restore access.

- **Short-term efforts to restore Santa Ynez River steelhead should focus on the following:**

  * **Restore and enhance spawning and rearing habitat conditions in Hilton, Alisal, and Salsipuedes creeks and other tributaries of the Santa Ynez River below Bradbury Dam.**

  * **Provide adequate interim releases from Lake Cachuma.**
    DFG should identify and seek flows needed for fisheries investigations and to maintain steelhead habitat until more permanent restoration measures are implemented. This will be done preferably through the MOU process.

  * **Investigate status and habitat needs.**

  * **Investigate the feasibility of modifying the release schedule of water released from Bradbury Dam to downstream users so that it provides benefits to fish and wildlife.**
    Currently, the water is released on an as-needed basis as called for by the Santa Ynez River Water Conservation District, which provides relatively little benefit to aquatic species and habitat.

SANTA BARBARA COUNTY COASTAL STREAMS

The southern slope of the Santa Ynez Mountains, a transverse range that abuts the southern end of the Coast Range, contains the watersheds of most of the coastal streams of

Attachment

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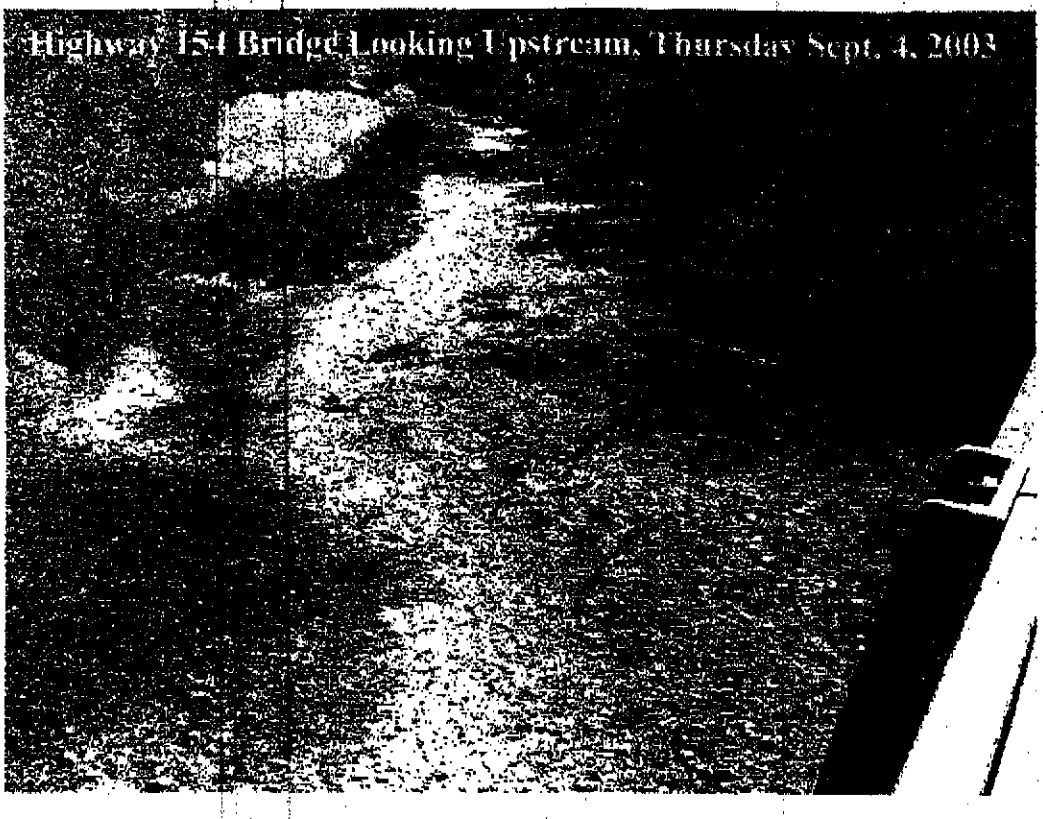
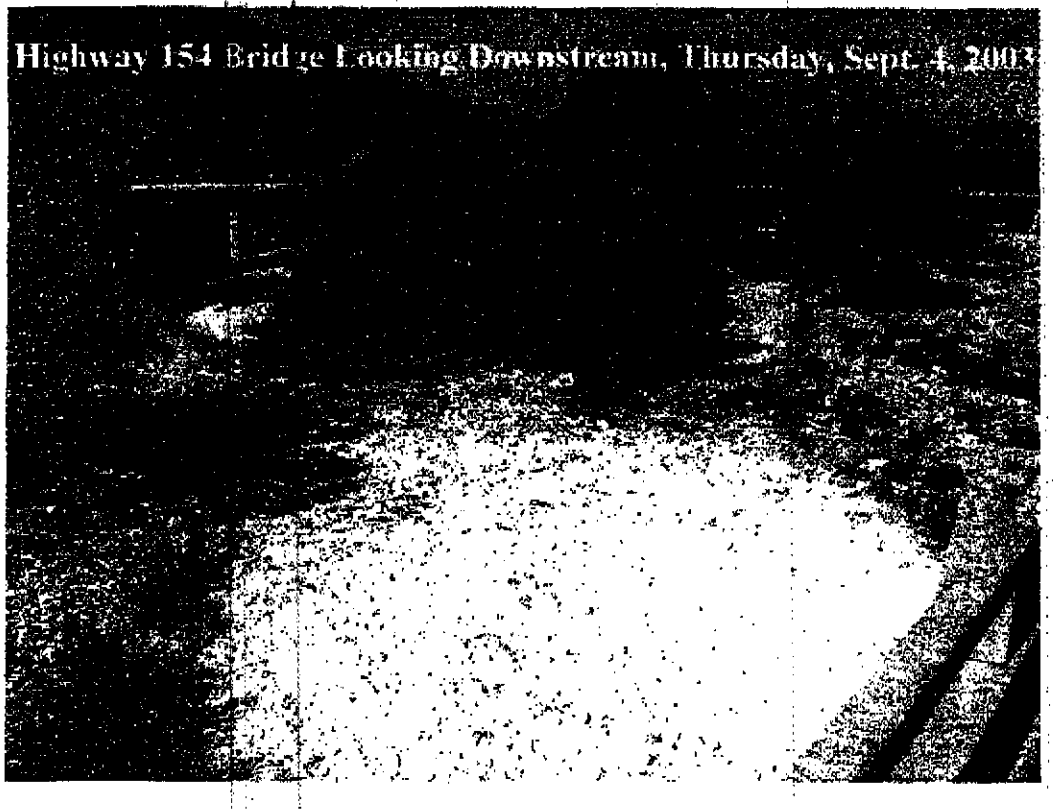


Highway 154 Bridge Looking Upstream, Thursday Sept. 4, 2003



Highway 154 Bridge Looking Downstream, Thursday, Sept. 4, 2003

Attachment

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1335

Oak Tree Protection Program

Draft Environmental Impact Report

00-EIR-07

December 2000

Prepared by

Santa Barbara County Planning and Development
Comprehensive Planning Division
Contact: Abe Leider

Prepared with the assistance of

Science Applications International Corporation

Table 4.2-4. Success of Oak Revegetation Projects

Page 1 of 3

Project	*Location*	*Date(s) of Onset*	*Program Size*	*Problems Encountered*	*Success/ Failure*	*Comments*
All American Pipeline	Los Padres NF (discontinued), Vandenberg AFB (discontinued), Gaviota SP and Rancho Los Potreros, Santa Barbara County	1987-1989	1,303 CLO 400 VO BO (discontinued) to replace: 1303 CLO 878 BO 82 VO	• Drought • Fire • Seed availability • Gopher predation • Cattle predation • Destruction by wild pigs	Results as of 1992: • BO at Los Padres (3-10.5% survival in 1 year) • CLO at VAFB: less than 1% survival after first year • CLO at Gaviota SP: 38% surviving after 5 years • VO at Rancho Los Potreros 22-88% after 5 years	Acorn plantings were more successful than seedling plantings at Gaviota SP. Plantings at Gaviota SP burned after AAPL was released of responsibility No watering except at Rancho Los Potreros Seedlings were more successful than acorns at Rancho Los Potreros AAPL agreed to fund oak research at Sedgewick Ranch instead of replanting
Exxon, Santa Ynez Unit	Las Flores Canyon, South Coastal Santa Barbara County	1993	319 CLO required for mitigation 491 seedling and acorn plantings	None noted	Results as of 1999: • 97% surviving, 64% over 6 feet tall • Survival numbers may misleading because spots were replanted when trees died. No data avail. To how many replants	Plants have been watered by drip irrigation and landscape maintenance company has conducted maintenance. Trees are now being taken off maintenance to determine long-term survival and growth.
Tosco, Point Pedernales	Harris Grade Road Area, Santa Barbara County	1987	78 mitigation trees (all CLO)	• Drought • Predation • Logistical difficulties • Fire	Poor, exact figures unavailable 51 surviving in 1996(?) Very low mortality between 1993/94 and 1996	Details on this project are scant, More oaks planted in 1997 and 1998 (one and 5 gallon trees). Success is at acceptable levels.

Table 4.2-4. Success of Oak Revegetation Projects
Page 2 of 3

Project	*Location*	*Date(s) of Onset*	*Program Size*	*Problems Encountered*	*Success/ Failure*	*Comments*
Torch, Point Pedernales	Vandenberg to foot of Harris Grade Road, Santa Barbara County	1987	477 mitigation trees (all CLO)	• Watering schedule • Predation	196 surviving in 1999? Very low mortality between 1993/94 and 1996	Originally planted acorns. New plantings 1997 from 5 gallon trees
Molino Gas Project	Cañada de Leon, Santa Barbara County	July 1997	21 plantings (all CLO)	None identified	20 surviving in 1999	Trees were 12 to 18 inches in height at last check and had not received supplemental water in several months.
Central Coast Water Authority (State Water Project)	Santa Barbara and San Luis Obispo Counties	Variable: 1995-1999, most by 1998	Approximately 18,000 trees planted; 10,829 needed for mitigation	• Gopher predation • Predation by cattle • Removal by property owners • Poor quality of transplant stock • Availability of supplemental watering	Survival for different planting areas and planting years ranges from approximately 40% to 70%	Plants were planted and protected with a variety of devices including: Acorn plantings Transplants, 1 gallon Transplants, plant band Tree tubes (a variety of types) Vexar cages Gopher baskets Chicken wire gopher protection
Central Coast Water Authority (State Water Project)	Lompoc Area, Santa Barbara County	Winter 1997/98	2000 trees planted	• Gopher Predation • Damage to tree tubes by wind	Almost 80% survival in first two years	Approach was experimental. Not all trees were protected the same way. Some had no protection and others had gopher baskets, tree tubes, and weed mats.

Table 4.2-4. Success of Oak Revegetation Projects
Page 3 of 3

Project	*Location*	*Date(s) of Onset*	*Program Size*	*Problems Encountered*	*Success/ Failure*	*Comments*
All American Pipeline 1601 Agreement Creeks	Gaviota Coast Area, Santa Barbara County	Fall 1994	37 trees planted	• Deer browse • Weeds	Almost 90% survival in first 3 years	Last checked in 1998. Plants from 1 gallon containers Watered with drip irrigation
Browns Farm	City of Santa Rosa, Sonoma County	1979	150+ VO	• Late planting • Root-bound container plants • Disking by farmer • Domestic herbivores	As of 1990: 86 trees surviving (that is close to 60%)	Average height in 1990 was 14 feet. This site is wetter than VO areas in Santa Barbara County (average rainfall is 30 to 40 inches)
Vandenberg AFB	San Antonio Terrace, Santa Barbara County	1991	300 CLO seedlings and planting spots	• Infestation with wooly aphids	57% survival after 4 years	Survival was almost 100% for seedlings

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Commissioner to require a permit pursuant to Article IX of Chapter 35 of the Santa Barbara County Code shall be considered to have arisen under this article and be a violation of this article.

Sec. 35-910. Oak Tree Removals Not to Count Toward Thresholds.

Where a public utility or other public entity has an easement over a portion of a lot, and if a public utility or other public entity removes protected oak trees within a utility or other public easement located over a portion of a lot, those protected oak tree removals shall not be counted toward the thresholds set out in Sec. 35-908 or in Sec. 35-909 for the remainder of the lot.

Sec. 35-911. Standards for Oak Tree Replacement.

Where deciduous oak tree removal requires a permit under this ordinance, the following standards shall be adhered to:

1. The preparation and implementation of an Oak Tree Management Plan for the lot on which the oak tree removal will take place and any lot used for off-site replacement shall be required. The Management Plan shall be prepared or endorsed by the Oak Tree Specialist. The plan shall:
   a. Demonstrate how the mix of deciduous oak tree savannas, woodlands, and forests on the lot will be preserved, created, enhanced, restored, and maintained, so that:
      (1) The removal of protected oak trees does not divide the remaining savanna, woodland, and forest habitats into small, isolated fragments.
      (2) Protection, maintenance, restoration, and enhancement of large blocks of savanna, woodland, and forests are given priority over maintenance, restoration, and enhancement of smaller, more isolated habitat patches.
      (3) Valley and blue oak trees that link on- or off-site oak tree savannas, woodlands, forests, or other existing, proximate habitats are retained to the maximum extent feasible.
      (4) On-site replacement is given priority over off-site replacement except where no suitable on-site locations exist, or reasonable use of the lot would be precluded as determined by Planning and Development along

with the Oak Tree Specialist. In such cases the replacement oak trees may be planted in an off-site location acceptable to the applicant, the landowner and the Oak Tree Specialist. For off-site replacement planting locations priority shall be given to nearby sites and to sites adjoining existing deciduous oak woodlands or providing links between deciduous oak woodlands.

(5) There is avoidance of removal of actively used granary trees, raptor roosting or nesting trees, and trees in riparian and other wildlife corridors.

b. Comply with the following requirement, when applicable.

(1) When required by the Oak Tree Specialist on a case-by-case basis, a buffer area protecting the critical root zone shall be maintained around identified valley and blue oak trees retained on the lot.

c. Identify valley and blue oak tree replanting, restoration, conservation and enhancement sites on a plan or aerial photograph to facilitate mitigation monitoring and tracking; and identify the species, location, and size of all oak trees that are planted or protected as mitigation or to fulfill a condition on the permit.

d. Provide the deciduous oak tree replanting schedule and nurturing regime.

2. Protected oak trees that are removed shall be compensated at a 15:1 ratio by replacement planting, or protection of naturally occurring oak trees between six (6) inches and six (6) feet tall on the lot.

3. Naturally occurring valley and blue oak seedlings/saplings, growing on the lot and between six (6) inches and six (6) feet in height that are protected and nurtured for five (5) years, may be counted as replacement (mitigation) trees under the Program.

4. Any combination of acorns, planted seedlings/saplings, or naturally occurring valley and blue oaks between six (6) inches and six (6) feet tall, if established according to the requirements herein, may be used to achieve the required number of replacement trees.

5. Replacement deciduous oak trees that are planted must come from nursery stock grown from locally-sourced acorns, or use acorns gathered locally, preferably from the same watershed in which they are planted. If planting is done using acorns, the ratio of acorns to protected oak trees removed shall be a minimum of forty-five (45) acorns for every

protected valley oak tree removed. Up to three (3) acorns may be planted in the same hole.

6. Replacement deciduous oak trees shall be established in a location suitable for their growth and survival as determined by the Oak Tree Specialist, no closer than twenty (20) feet from each other or from existing oak trees and no farther than 165-180 feet from each other or existing oak trees unless otherwise approved by the Oak Tree Specialist.
7. Valley oaks shall replace valley oaks removed and blue oaks shall replace blue oaks removed.
8. The replacement deciduous oak trees shall be nurtured for five (5) years, the last two without supplemental watering, using techniques consistent with the most current version of the University of California publication "How to Grow California Oaks." At the end of the five years, ten trees for every protected tree removed must be alive, in good health as determined by the Oak Tree Specialist, and capable of surviving without nurturing and protection.
9. Each replacement deciduous oak tree must be protected against damaging ground disturbance, soil compaction, or over-irrigation within the dripline. It must be fenced to protect it from grazing or browsing by animals both below and above ground until it has reached a minimum of eight (8) feet in height.
10. Where conditions warrant and where agreed to by the landowner and Oak Tree Specialist, tree planting designs and nurturing practices (e.g. protective structures, watering schedules) may be adjusted to improve the probability that replacement trees will be established successfully.
11. Valley oak tree removal encompassing an area of five (5) acres or greater shall require valley oak replanting of an area of comparable size in accordance with the requirements of this section, in an area of existing or historic valley oak habitat. This area shall be protected in the long-term where feasible.
12. For the purposes of this ordinance, all replacement trees are considered protected oak trees regardless of size.

Attachment

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County of Santa Barbara

Environmental Thresholds and Guidelines Manual

(Updated as of January 1995)

Planning and Development Department

total relative cover[7] [8].

b. Removal or severe disturbance to a patch or patches of native grasses less than one-quarter (1/4) acre, which is clearly isolated and is not a part of a significant native grassland or an integral component of a larger ecosystem, is usually considered insignificant.

4. **Oak Woodlands and Forests**

(1) **Description:** There are three primary types of oak woodlands in Santa Barbara County: Valley Oak, Coast Live Oak, and Blue Oak woodlands. The number, type, and density of oak trees, and the relationship between trees and understory are principal characteristics which define the various types of woodlands. Oak habitats support a diverse wildlife population, and offer abundant resources to wildlife including food sources, shade in summer, shelter in winter, perching, roosting, nesting, and food storage sites.

(2) **Impact Assessment Guidelines for Woodlands and Forest Habitat Areas:** Project-created impacts may be considered significant due to changes in habitat value and species composition such as the following:

a. Habitat fragmentation

b. Removal of understory

c. Alteration to drainage patterns

d. Disruption of the canopy

e. Removal of a significant number of trees that would cause a break in the canopy or disruption in animal movement in and through the woodland

5. **Impact Assessment for Individual Native Trees**

(1) **Description:** Native specimen trees, regardless of size, are potentially significant, and rare native trees, which are very low in number or isolated in distribution (such as Island Oak) may be particularly significant. This significance evaluation is done on a case-by-case basis and considers tree size, numbers, location, relationship to habitat, etc.

(2) **Definition:** Specimen trees are defined, for biological assessment purposes, as mature trees that are healthy and structurally sound and have grown into the natural stature particular to the species.

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[7] The California Department of Fish and Game, Natural Heritage Division uses the 10% relative cover figure in determining acreages of remaining native grasslands (Keeler-Wolf, Natural Diversity Data Base, personal communication May 1992). (Relative cover is the cover of a particular species as a percentage of total plant cover of a given area. [Barbour, Burk & Pitts 1980].)

[8] Native grasslands which are dominated by perennial bunch grasses such as purple needlegrass (*Stipa pulchra*) tend to be patchy (the individual plants and groups of plants tend to be distributed in patches). Therefore, for example, where a high density of small patches occur in an area of one acre, the whole acre should be delineated if native grassland species comprise 10 percent or more of the total relative cover, rather than merely delineating the patches that would sum to less than one acre.

(3) **Native Tree Impact Assessment:** In general, the loss of 10% or more of the trees of biological value on a project site is considered potentially significant.[9]

E. GENERAL MITIGATION GUIDELINES FOR BIOLOGICAL IMPACTS

1. Mitigation Hierarchy

The following general approaches to reducing biological impacts are presented in the order of their effectiveness.

a. Avoidance

Avoid direct or indirect impacts to significant biological resources through project design.

Focus on maintaining large, contiguous habitat areas and animal movement corridors. A project design which clusters development on a relatively limited portion of the project site may reduce the habitat area disturbed by the project.

b. Onsite Mitigation

Minimize or reduce impacts through on-site design and resource protection measures.

Measures may include vegetative spatial buffer between project and habitat areas; revegetation; habitat enhancement; erosion and water quality protection; on-site replacement/compensation; maintenance and management measures such as fencing, weed control, use of building envelopes, and dedication of areas through open space or conservation easements or grant deed of development rights; short-term measures to protect against construction impacts (e.g., fencing, timing of construction to avoid nesting season).

c. Off-Site Mitigation

Compensate for on-site impacts through off-site measures.

When avoidance or on-site mitigation is infeasible or inadequate to reduce impacts, measures such as those listed under on-site mitigation can be considered in off-site locations, or may be accomplished through in-lieu fees. Off-site approaches may be appropriate at times if a greater ecological value may be clearly gained than with on-site mitigation. (i.e., where on-site habitat is of low quality or highly fragmented).

[9] The number of trees present onsite from which the 10% is measured may be calculated either by counting individual trees or by measuring the area of tree canopy with a planimeter.

Attachment

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County of Santa Barbara

Environmental Thresholds and Guidelines Manual

(Updated as of January 1995)

Planning and Development Department

absence of sensitive species and the value of habitat on and surrounding the project site, and to identify potential project impacts and feasible measures which could be incorporated into the project design to avoid or minimize the potentially significant impacts. Guidelines for performance of biological studies and sensitive resource definitions are provided in a separate technical document.

The determination of impact is done on a case-by-case basis. Because of the complexity of biological resource issues, substantial variation can occur between cases. The following sections identify questions and factors used in assessing the value of biological resources, and the significance of project impacts.

2. Evaluation of Resources on the Project Site

(1) Resources Inventory

a. What biological communities are on the site? What size area?

b. Is the habitat type relatively common? Is it rare and occurring in only a few places in the region, or significantly declining in extent and/or quality? Is the habitat designated as an ESH area on County planning documents, or designated as "critical habitat" for listed species by Federal or State agencies?

c. Is the site in an urban, rural or outlying area? What are the uses surrounding the site? Is the habitat isolated or is it contiguous with adjacent habitat or close enough to provide a link between habitats?

d. Does the habitat support resident species or migratory species? Are there protected species (eg., endangered or threatened), or species of candidate, special, or local concern or healthy rare species?

(2) Condition and Quality

a. Is the habitat pristine or disturbed? How much or to what degree?

b. How biologically productive is it? Does it support an especially rich and diverse plant and/or wildlife population?

c. Is the habitat resource (including the surrounding area if it is related) large enough to be viable?

3. Evaluation of Project Impacts

Assessment of impacts must account for both short-term and long-term impacts. Thus the assessment must account for items such as immediate tree removal and longer-term, more subtle impacts such as interruption of the natural fire regime or interference with plant or animal propagation.

(1) **Types of Impacts to Biological Resources**

Disturbance to habitats or species may be significant, based on substantial evidence in the record (not public controversy or speculation), if they substantially impact significant resources in the following ways:

a. Substantially reduce or eliminate species diversity or abundance
b. Substantially reduce or eliminate quantity or quality of nesting areas
c. Substantially limit reproductive capacity through losses of individuals or habitat
d. Substantially fragment, eliminate, or otherwise disrupt foraging areas and/or access to food sources
e. Substantially limit or fragment range and movement (geographic distribution or animals and/or seed dispersal routes)
f. Substantially interfere with natural processes, such as fire or flooding, upon which the habitat depends.

(2) **Less Than Significant Impacts**

There are many areas in the County where there is little or no importance to a given habitat and it is presumed that disruption would not create a significant impact. Examples of areas where impacts to habitat are presumed to be insignificant include[4]:

a. Small acreages of non-native grassland if wildlife values are low.

b. Individuals or stands of non-native trees if not used by important animal species such as raptors or monarch butterflies.

c. Areas of historical disturbance such as intensive agriculture.

d. Small pockets of habitats already significantly fragmented or isolated, and degraded or disturbed.

e. Areas of primarily rudural species resulting from pre-existing man-made disturbance.

(3) **Impact Assessment Factors**

In addition to the criteria listed in (1) "Types of Impacts to Biological Resources" above, the following questions and factors are used in assessing the significance of project impacts on biological resources.

[4]Pursuant to CEQA, a presumption based upon County thresholds that a project's impact is insignificant is rebutted if there is substantial evidence in light of the whole record before the lead agency that the project may have a significant impact on the environment (Pub. Res. Code §21082.2).

(a) Size

How much of the resource in question both on and off the project site would be impacted? (percentage of the whole area and square footage and/or acreage are both useful to know)

How does the area or species that would be impacted relate to the remaining populations off the project site? (% of total area or species population, either quantitatively or qualitatively.)

(b) Type of Impact

Would it adversely indirectly affect wildlife (light, noise, barriers to movement, etc.)?

Would it remove the resource or cause an animal to abandon the area or a critical activity (e.g., nesting) in that area?

Would it fragment the area's resource?

(c) Timing

Would the impact occur at a critical time in the life cycle of an important plant or animal (e.g., breeding, nesting, or flowering periods)?

Is the impact temporary or permanent? If it is temporary, how long would the resource take to recover?

Would the impact be periodic, of short duration, but recur again and again?

D. HABITAT-SPECIFIC IMPACT ASSESSMENT GUIDELINES

The following section provides additional impact assessment guidelines specific to several biological communities. These guidelines are to be used in conjunction with the general impact assessment guidelines described in Section III. (Note: Not all habitat types found in Santa Barbara County are addressed by these habitat-specific guidelines. Habitat types not addressed here are assessed with the general impact assessment guidelines in Section III.)

1. Wetlands

(1) **Description:** Wetlands are among the most biologically productive of habitats, and the County's wetlands have been diminished both in areal extent and quality from the historic condition. As a result, naturally-occurring wetlands are an important resource, and projects with potential impacts to wetlands must be carefully evaluated. Examples of wetlands include coastal salt and brackish marshes, fresh water marshes, and vernal pools. Special cases include seasonal wetlands, vegetated flats, interdunal swale wetlands, and vegetated river bars and flats (riparian areas).

(2) **Definition:** For the purposes of determining potentially significant effect, Santa Barbara

Attachment

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CACHUMA CONSERVATION RELEASE BOARD
MEMORANDUM

February 19, 2002

TO: BOARD OF DIRECTORS

FROM: Chuck Evans, Consultant Manager

RE: Cachuma Recreational Area

RECOMMENDATION:

Recommend to the COMB Board of Directors that it send the attached letter to the Bureau of Reclamation recommending a contractual provision for any extension of the Bureau of Reclamation-Santa Barbara County Cachuma Recreation Area contract.

DISCUSSION:

As we have discussed before, it is important to the Cachuma Member Units that the issue of who pays for the relocation costs of Cachuma Park facilities needs to be addressed between the Bureau of Reclamation and Santa Barbara County. Otherwise, if the issue is only addressed during the State Water Board EIR or FMP/BO EIR/EIS process, it is possible that some will look to the Member Units to possibly fund Park facilities relocation costs. That would be inappropriate.

It is now suggested that, as Reclamation and the County are embarking on Cachuma Recreation Area Resource Management Plan and EIS preparation, it would be appropriate to address this issue in any interim contract extension for the Park.

Respectfully submitted,

Chuck Evans

Chuck Evans, Consultant Manager

Attachments

Item # 9h
Page # 1

SUGGESTED CONTRACTUAL PROVISION

BUREAU OF RECLAMATION - COUNTY OF SANTA BARBARA

CACHUMA RECREATION AREA

County acknowledges that the Bureau is presently obligated under a Biological Opinion issued September 11, 2000 pursuant to the Federal Endangered Species Act,16 U.S.C. §§ 1531-44, to make certain operational changes to Cachuma Reservoir, including, but not limited to, provision for a periodic surcharge increasing the elevation of the Reservoir by three feet (3'). County agrees that it shall relocate any of its facilities presently constructed, or constructed in the future so as to not be impacted by the surcharge. The relocation shall be at the sole cost of the County.

County acknowledges that the Bureau or the Bureau's agents or assigns may from time to time be obligated by law to change the operation of the Reservoir in ways that impact or cause inconvenience to the operation of County's recreation facilities. County agrees to save and hold harmless the Bureau or the Bureau's agents or assigns from any and all claims that it, its tenants or invitees may have as the result of the operation of the Reservoir or Bradbury Dam.

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CACHUMA OPERATION AND MAINTENANCE BOARD
3301 LAUREL CANYON ROAD
SANTA BARBARA, CALIFORNIA 95105-2017
TELEPHONE (805) 687-4011
FACSIMILE (805) 569-5825

February 25, 2002

Michael P. Jackson, Deputy Area Manager
U.S. Department of the Interior, Bureau of Reclamation
South-Central California Area Office
1243 N Street
Fresno, CA 93721

Re: Contract 14-06-200-600 Agreement to Administer Recreational Area Cachuma Project, California

Dear Mr. Jackson:

As you know the term of the captioned contract between the United States and the County of Santa Barbara (County) expires on January 12, 2003. At the present time the Bureau of Reclamation (Bureau) is under an obligation to complete certain steelhead habitat enhancements under the Biological Opinion for Cachuma Project Operations issued under the Federal Endangered Species Act by the National Marine Fisheries Service (NMFS) dated September 11, 2000.

One of these enhancements is the provision for a three foot (3') surcharge of the Cachuma Reservoir which is to be completed in the near future. The County of Santa Barbara has constructed certain facilities and structures within the zone that will be inundated when the surcharge is completed.

Although it is our belief, and we assume the Bureau's as well, that the provisions of the current contract obligate the County to accommodate any changes in the operation of the reservoir that are mandated by law, the "1950s" language of the Agreement is less than clear and could be subject to other interpretations. Of course, this same zone and the County facilities and structures in it also have been, and may continue to be, inundated by normal reservoir operations by the Bureau creating up to a ten foot (10') surcharge during periodic Santa Ynez River watershed flood events.

Item # 9b
Page # 2

Michael P. Jackson, Deputy Area Manager
Contract 14-06-200-600
February 25, 2002

In view of the impending 2003 termination date of the Agreement, COMB respectfully suggests the following actions:

1. No extension of the existing agreement be granted without an express agreement by the County of Santa Barbara that it will be solely responsible for the cost of, and the relocation of any of its facilities that are within the three foot (3') surcharge zone, holding the United States and COMB harmless from any claim that should result from implementation of the surcharge or any other activity under the Biological Opinion that should impact any of the County's recreation facilities.

2. A new agreement be negotiated with the County of Santa Barbara for a term beginning on the expiration date of the existing Agreement that contains a clear provision incorporating the terms outlined in the above paragraph.

We are enclosing suggested contractual language which we believe accomplishes the above goal.

Sincerely,

Jan Abel
President of the Board

cc: Cachuma Project Member Units

st/wordperfect/contracts/recreationarea.ltr

Item # 7b
Page # 3

CACHUMA OPERATION AND MAINTENANCE BOARD
3301 LAUREL CANYON ROAD
SANTA BARBARA, CALIFORNIA 93105-2017
TELEPHONE (805) 687-4011 FAX (805)569-5825
www.ccrb-comb.org
contactus@cachuma-board.org

October 15, 2002

Ms. Terri Maus-Nisich
County Parks Director
610 Mission Canyon
Santa Barbara, CA 93105

Dear Ms. Maus-Nisich:

We have obtained a copy of a letter dated August 27, 2002 from County Counsel Shane Stark to Michael Jackson of the U. S. Bureau of Reclamation (Reclamation), regarding the County's obligation to relocate facilities at the Cachuma Park. We also received a copy of Mr. Michael Brown's letter to Congressman Gallegly requesting his assistance in shifting the costs for such relocation to unspecified "other sources". Based on the tone and content of those letters, we are concerned that the County seems to be acting without a full understanding of the circumstances, and the County's obligations and responsibilities, related to the Cachuma Project. By acting without such understanding and broadcasting its position to Reclamation and elected Federal representatives, we are concerned that **the County may jeopardize the legitimate interests of a broad segment of its constituency** and may also be breaching its fiduciary duties to the County Water Agency's Cachuma Member Units. We would like to discuss this with you in greater detail, and develop a cooperative strategy to address possible funding sources for the necessary County Park's improvements.

Background: Cachuma Lake is a Water Supply Facility

Bradbury Dam was constructed in 1953 to provide the principal agricultural and domestic water supply for the approximately 200,000 residents of the Cachuma Member Units - the City of Santa Barbara, the Goleta, Montecito and Carpinteria Valley Water Districts, and the Santa Ynez River Water Conservation District, Improvement District No. 1. The Cachuma Project was authorized by Congress as a water supply project. That Congressional authorization was for a reservoir designated to be surcharged to an elevation of 760.6 feet MSL, over ten feet above the normal maximum water elevation of 750 feet MSL. Naturally, it was understood that such a surcharge would cause inundation of land adjacent to the shores of the lake. The original water service contract for the Cachuma Project was with the Santa Barbara County Water Agency, which is governed by the Board of Supervisors. The Water Agency contract is for the express benefit of the Cachuma Member Units.

After entering into the Agreement to Administer the Recreational Area with Reclamation in January 1953, the County proceeded to develop a park on the shores of the new lake. It installed boat docks and other facilities along the shore within the surcharge inundation zone, and thus placed those facilities in jeopardy should the lake rise to levels authorized by Congress. From our review of the files related to the Recreation Contract and project and recreation area plans, it is

clear that the County should have originally placed those facilities at a higher elevation or with the ability to move with the lake level.

As the Cachuma Project was authorized as a water supply project, both recreation and flood control are considered as incidental uses to water supply purposes, and none of the costs of the Project have been paid by those County departments or activities. We certainly acknowledge that the Cachuma Park is a wonderful facility and should remain as a Park far into the future. However, the Cachuma Project's fundamental purpose as a water supply project must remain the first priority for all.

Since 1953, the County residents represented by the Cachuma Member Units have been repaying, in their monthly water bills, the full costs of the Cachuma Project, plus interest, to the Federal Government. Interestingly, the Cachuma Project was unusual for its time in that there was no Federal authorization for flood control or recreational purposes, and so the typical Federal allocation or subsidy for those purposes was not enjoyed by the Cachuma Project. While the County's subsequent recreation contract with Reclamation called for net revenues to be applied toward project debt repayment, the County has never charged a fee for uses that resulted in any net revenues. In a very real sense, therefore, the County's water users have been subsidizing the users of the County park for many years. Many of these park users are visitors from other counties, other states and other countries.

The County's Fiduciary Duty to the Water Consumers and the Water Agencies

In 1995, Cachuma Member Units sought to have the Cachuma contracts assigned by the County to the Cachuma Project Authority, a joint powers agency formed by the Member Units. At that time, the County refused such assignment and so retained its fiduciary position. We were, therefore, particularly surprised and concerned with the County's letters, since they appear to take a position which is adverse to the interests of the water customers and the water agencies that serve them.

The Fishery Restoration Project

Reclamation now needs to allocate 3.0 feet of the design surcharge at the Lake to meet the requirements of the U. S. National Marine Fisheries Service as part of a Cachuma Project Biological Opinion issued in September 2000 to protect the endangered steelhead fish in the Santa Ynez River and its tributaries downstream of Bradbury Dam. This surcharge is to allow for such protections while continuing to provide the essential water supply to the community that again is the authorized purpose of the Cachuma Project, consistent with the Water Service Contract with the County Water Agency and its Member Unit Contracts with the Cachuma Member Units.

The County needs to relocate certain of the Cachuma Park facilities, so that Reclamation may more fully utilize the reservoir, in accordance with the requirements of the Biological Opinion. These relocations are necessitated due to the County's original decision to place the facilities in a designated inundation zone. Several of these facilities, including the water treatment plant and sewer lift stations, are in fact already subject to impact or inundation due to current flood control/gate holding operations as requested by the County. This represents a potential current health risk.

Relocation of these facilities is now necessary because they were **originally placed by the County Parks Department at a lower elevation than was appropriate.**

Park Facility Relocations Should be Paid by Park Users, Not Water Users

If Reclamation were required to fund the costs of relocating the County park facilities, these costs would likely be directly passed on to the Member Units, and so to their customers, who are all County constituents. We believe that if local funds are required for such relocation, they should come from those who use the park facilities, rather than from water users who already subsidize the park.

Other Sources of Funding Should be Explored

As I am sure you are aware, the County's current recreation contract with Reclamation expires in January 2003, and a Resource Management Plan is being prepared. Both COMB's attorneys and Reclamation's attorneys have reviewed the existing contract and are of the opinion that, as a matter of contract law, the County is responsible for the relocation of any of its facilities that interfere with the operation of the Cachuma reservoir facilities that may be required by law, which the Biological Opinion issued under the Endangered Species Act is. Notwithstanding this belief, we have still been attempting since July 2000 to assist the County Parks Department in obtaining grant funding for the Park's facilities relocation costs. We also initially took leadership in obtaining funds for these costs from the Proposition 50 Water Bond on the November 2002 election ballot. The possibilities are promising for funds to be provided for the Park's facilities relocation costs from this source, if Proposition 50 passes. However, the County needs to accept its responsibility for the necessary relocation of its facilities, and work to obtain such funding.

In any case, the County needs to at least immediately clarify for the Federal officials that have been contacted that the request is for them to assist the County in obtaining Federal, non-reimbursable funds for the necessary improvements at Lake Cachuma, rather than pursuing action that would either jeopardize local water supplies or impose additional costs on the Cachuma Member Units and their customers.

We would like to meet with you to discuss this matter further. The Cachuma Conservation Release Board manager, Chuck Evans, will be calling you to schedule a meeting.

Yours truly,

Robert E. Wignot
General Manager

cc: Michael Jackson, USBR Deputy Area Manager
Cachuma Member Units

C:\MyDocuments\CCRBCorresp\Letters\LtrtoMikeBrownreCountyLtrtoReclamation100202revChip.doc

Item # CCRB
Page # 3

SANTA BARBARA COUNTY BOARD AGENDA LETTER

Clerk of the Board of Supervisors
105 E. Anapamu Street, Suite 407
Santa Barbara, CA 93101
(805) 568-2240

Agenda Number:	
Prepared on:	10/15/02
Department Name:	County Administrator
Department No.:	012
Agenda Date:	10/22/02
Placement:	Administrative
Estimate Time:	
Continued Item:	NO
If Yes, date from:	

TO: Board of Supervisors

FROM: Michael F. Brown, County Administrator
Terri Maus, Director of Parks

STAFF CONTACT: Jim Laponis, Deputy County Administrator
568-3400

SUBJECT: Lake Cachuma - Federal Legislation and Potential Action re: Privatization and Lake Surcharge

Recommendations:

That the Board of Supervisors:

A. Receive this report on the potential impacts to Lake Cachuma of (1) Federal Legislation (HR 5460 Calvert, copy attached) which could result in privatization of the lake as well as of other Federal land and recreation areas; and, (2) The impacts of the potential surcharge of Lake Cachuma by the Bureau of Reclamation which would raise the water level by three feet.

B. Confirm staff's direction to the County's Federal Legislative Advocate (Waterman & Associates) to advocate the insertion of language into HR 5460 limiting privatization of public lands to instances where no bonafide public body is interested in administering the land.

Alignment with Board Strategic Plan:

The recommendations are primarily aligned with Goal No. 1: An Efficient Government Able to Respond Effectively to the Needs of the Community.

Executive Summary and Discussion:

The County's lease with the Bureau of Reclamation to manage the Lake Cachuma Recreation Area expires in January 2003. However, staff recently became aware of HR 5460 (Calvert) legislation intended to reauthorize and amend the Federal Water Project Recreation Act. The legislation sets forth the ability for private entities rather than only public bodies to provide for management of public lands. This concept presents issues for the long term continued management and maintenance of Lake Cachuma and other like areas.

Item # CCB 11
Page # 1

In order to address the issue in a timely manner, staff authorized (at no dollar cost to the County) Waterman & Associates to determine the genesis and intent of the legislation. Based upon initial conversations with the author's (Congressman's Calvert) staff it was determined that the bill was intended to ensure that lands currently held by public agencies would not go into abandonment if such public agencies could no longer provide for their management. In such instances, a private entity would then have the ability to bid for and assume management and oversight. This intent, however, is not sufficiently reflected in the wording of the bill. Since HR 5460 was on a "fast track" to be passed before the end of this legislative session, Waterman & Associates requested an amendment to the bill which clarifies that private entities would be able to provide for management of public lands only if there is a lack of bonafide interest by public bodies. To date the House Resource Committee has accepted the language and it is now under consideration by the Senate Energy and Natural Resource Committee.

Failure to obtain the clarifying language compromises negotiations regarding the County's long-term lease with the Bureau for Lake Cachuma recreational facilities. Waterman & Associates has been in frequent contact with Congressman Gallegly's office as well as Congressman Calvert's and Senator Feinstein's offices on this matter as they serve respectively on the House and Senate Natural Resources Committees. The County Parks Department has been in contact with Congresswoman Capps' staff to ensure they are briefed on the overall Lake Cachuma issue and concerns about the potential impacts of HR 5460 at the local level.

While the proposed legislation is the most pressing issue related to Lake Cachuma at this time, staff is continuing to work with the Bureau of Reclamation on the renewal of the lease set to expire in January of 2003 as well as address the potential impacts of the Bureau's requirement to enhance the steelhead trout habitat.

In order to comply with the requirement to enhance trout habitat, the Bureau is likely to surcharge the lake raising its level three feet to provide additional flow for the steelhead. This potential surcharge places the County's recreational and support facilities at Lake Cachuma in jeopardy. Approximately $12 million in recreation and support facilities would need to be removed and replaced. These facilities include the existing boat launch, docks, storage area; water treatment plant and two lift stations. In addition, a variety of oak trees of various types would be inundated and require mitigation.

The Bureau of Reclamation has interpreted the existing lease agreement to require that the County be responsible for all costs associated with facility replacement. However, County Counsel has refuted their position indicating that there is no mention of how this type of issue is to be addressed within the existing lease agreement. Staff is proactively pursuing a variety of avenues to secure funding from grant resources as well as continuing to work with other agencies to appropriately share in the overall costs in the implementation of the potential surcharge.

Mandates and Service Levels:

There are no mandates requiring the County to influence Federal Legislation.

Attachment

11

BT

AL

ENVIRONMENTAL IMPACT STATEMENT/

ne I:
IN TEXT

Prepared by:

u of Reclamation
Project Authority
ty Water Agency

ber 1995

FINAL

ENVIRONMENTAL IMPACT STATEMENT
ENVIRONMENTAL IMPACT REPORT

Cachuma Project Contract Renewa

December 19

Volume I:
EIS/EIR MAIN TEXT

Prepared

Bureau of Reclamatic
Cachuma Project Author
Santa Barbara County Water Agenc

In essence, Alternatives 3A2 through 3A7 represent varying amounts of water that would be available for improving habitat conditions below the dam, particularly for steelhead/rainbow trout. In general, the more water that is available for downstream releases, the more often favorable passage and habitat conditions can be achieved along suitable portions of the river. When only a relatively small amount of water is available for release, the emphasis would be maintaining flows for fish passage rather than on creating mainstem habitat. With increasing amounts of Project water to maintain minimum flows, mainstem habitat for spawning and rearing can be improved along with fish passage conditions. Increasing the amount of Project water for fish will also increase the frequency of the suitable minimum flows during drier years.

All but Alternative 3A4 would utilize the flow scenario presented for Alternative 3A2, except in dry years. None of these alternatives call for specific flows to open the lagoon. An estimated 300 cfs would accomplish this depending on oceanographic conditions (see Appendix D, Section 1.2 or the Fisheries technical Report, Section 3.1.1). Once the lagoon was breached and the flood flows which caused the bread had subsided to below 25 cfs (the passage criteria), water would be released from the dam to bring the flows at the Solvang and Floradale Bridge gaging stations to 25 cfs. For purposes of allocating water within the model, the period from February 15 through April 15 was selected as the peak spawning period. This is based on analysis of historical exceedances (USGS Gaging Station 11128500) and the ability of steelhead to wait offshore until the mouth is breached (Beeman, 1946; SBNP, 1936, 1940 and 1950). The exceedance analysis indicates that steelhead have been able to enter the Santa Ynez River in January in only seven percent of years. Depending on the amount of water available for instream use in each alternative, upstream migration and spawning flows may be available for two weeks or for the full two month period. Alternative 3A4 provides a lower normal and wet year base flow than Alternative 3A2. In dry years when the mouth opened, Alternative 3A3 would not provide upstream migration and spawning flows.

According to the hydrologic modeling, natural flushing flows (500 cfs or more) occur on the river at an average interval of not more than every three years. Hence, it was determined that such flows were not specifically required in the release schedule for Alternatives 3A2 - 3A7.

Alternative 3A2 would require releases from Lake Cachuma to maintain the following minimum streamflows to enhance fish passage and steelhead spawning and rearing habitat along the mainstem of the river primarily between Bradbury Dam and Refugio Road:

- 48 cfs 15 February to 14 April for spawning, then
- 20 cfs to 1 June for incubation and rearing, then
- 25 cfs for one week for emigration, then
- gradually decrease releases to 10 cfs by 30 June, then
- hold at 10 cfs to 1 October for steelhead rearing and resident fish, then
- 5 cfs for the rest of the year for resident fish.

Based on the hydrologic modeling study described in Section 6.1, the above minimum streamflows would be maintained at both San Lucas and Alisal bridges in all years, including drought years. Passage flows would be maintained at Floradale Avenue Bridge. These streamflows would be created by both natural streamflows, as well as releases from the dam.

Under this alternative, the resultant average annual delivery to Member Units would be 14,235 acre-feet per year based on model simulations.

Alternative 3A3 involves the operation of Lake Cachuma to meet the minimum streamflows of Alternative 3A2 in as many years as possible, while allowing streamflows below the dam to drop to 5 cfs in all months of drier years to ensure that Member Unit yield is no less than 22,944 acre-feet per year. The 5 cfs streamflow would not be sufficient for steelhead passage, nor would it create suitable steelhead spawning or rearing habitat in the mainstem. Hence, during these dry years, the 5 cfs minimum streamflows would only benefit resident fish along the river.

Based on the hydrologic modeling results presented in Section 6.1, maintaining the lower streamflow would need to be implemented in 21 of 75 years of the simulation period, or about 28 percent of the time. The lower minimum streamflow would only be met at San Lucas Bridge.

Under this alternative, the resultant average annual delivery to Member Units would be 22,667 acre-feet per year based on model simulations.

Alternative 3A4 involves the operation of Lake Cachuma to meet a lower flow release schedule to create steelhead habitat, as follows:

- 35 cfs 1 March to 15 March for migration and spawning, then
- ramp releases to 10 cfs by 31 March, then
- hold releases at 10 cfs to 1 June for incubation and rearing, then
- 25 cfs for one week for emigration, then
- ramp releases to 10 cfs by 30 June, then
- 10 cfs from 1 July to 30 September for rearing, then
- 5 cfs for the rest of the year for rearing.

This alternative would provide passage flows for steelhead and a brief two-week period for mainstem spawning. The spring streamflows for rearing would be slightly lower than those produced under Alternative 3A2. This alternative would focus primarily on supply passage flows and a reduced opportunity for mainstem spawning.

The above minimum streamflows would be maintained at both San Lucas and Alisal bridges due to natural streamflow and release from the dam. The results of the hydrologic modeling described in Section 6.1 indicate that these minimum streamflows would be met in all years.

Under this alternative, the resultant average annual delivery to Member Units would be 17,097 acre-feet per year based on model simulations.

Alternative 3A5 involves the operation of Lake Cachuma to meet the minimum streamflows for Alternative 3A3. This alternative would provide the same minimum streamflows as Alternative 3A2 in wet years. However, during dry years, the minimum streamflows below the dam would be managed only to provide a limited period of passage flows for steelhead rather than maintaining very low flows (i.e., such as 5 cfs for Alternative 3A3) for resident fish for the year, as shown below:

Attachment

12

STATE OF CALIFORNIA—THE RESOURCES AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
SACRAMENTO, CALIFORNIA 95814

(916) 445-3531

June 23, 1987

Mr. Jim Edmondson
5537 N. Ryland Avenue
Temple City, CA 91780

Dear Mr. Edmondson:

I am writing in response to your letter of March 9, 1987, requesting clarification of the Department of Fish and Game's (Department) policy regarding use of the Instream Flow Incremental Methodology (IFIM).

Since November 17, 1983, it has been the policy of the Department to require the use of IFIM in the evaluation or development of proposed streamflow recommendations for projects which may adversely affect the state's aquatic resources (see enclosed memorandum dated November 17, 1983). The IFIM process provides a consistent approach to assessing instream flow needs and evaluating potential project impacts. It is reliable, when properly conducted, and has been successfully defended in litigation.

While the Department may not have explicitly followed this policy in the past, we are now making every effort to evaluate stream resource needs using IFIM.

Sincerely,

Pete

Pete Bontadelli
Acting Director

Enclosure

cc: Richard May

Jim
I hope the answers your real concern - If not let me know and we'll get it done.
Pete

Memorandum

To : Regional Managers, Region 1, 2, 3, 4, & 5 Date : November 17, 1983
Project Manager, Bay-Delta
Branch Chiefs, AFS, IFB, ESS, Planning

From : Department of Fish and Game

Subject: Use of the Federal Instream Flow Incremental Methodology to Evaluate Projects Affecting California's Streams and Rivers

In view of its benefits and defendability, the Instream Flow Incremental Methodology (IFIM) will be used in the evaluation of and to develop instream flow recommendations for projects which may affect the state's aquatic resources by project construction, operation, or by changing an existing flow regime.

The U.S. Fish and Wildlife Service's Cooperative Instream Flow Service Group has developed the IFIM for assessing the relationship between flows and available fish habitat. This physical habitat simulation model provides a wide range of information about changes in available aquatic habitat relative to incremental changes in streamflow. No other methodology has the predictive capabilities of the IFIM. This method is the state-of-the-art and several other states, including Oregon and Washington, are using this method as the standard for assessing instream flow needs and evaluating potential projects. The IFIM has also been successfully defended during litigation pertaining to major water projects.

Several criteria affect the level of reliability of the IFIM. If these criteria are not met, the models reliability and predictability are affected. Attached is a list of requirements regarding set up and use of the IFIM's IFG-4/HABTAT programs (i.e., physical habitat simulation programs for use on streams and rivers with gradients greater than 5%). Please provide your staffs with copies of these requirements.

Requirements and applicability of other methods for use on California streams and rivers (including IFIM's WSP/HABTAT programs) will be developed and provided to DFG personnel in the future. Questions regarding use of the IFIM or other methods should be directed to the Stream Evaluation Program (lease line 8-485-1383).

COPY Original Signed by N.B. Culpepper

Director

DFG REQUIREMENTS FOR AN IFG-4 INCREMENTAL INSTREAM FLOW STUDY

I. Field Setup

A. The affected stream segment must be divided into separate representative reaches of general macrohabitat types. All general habitat types comprising more than 10% of the stream being affected must be included in subsequent sampling and analysis. Critical reaches, regardless of size, and the affected life stages must be identified and sampled accordingly (e.g., spawning areas, migration riffles etc.). Methods which deviate from the representative reach concept are not acceptable.

B. Generally, sampling two pool-riffle sequences with five to seven transects per sequence is sufficient to sample a habitat. For consistency, and to insure adequate modeling of stream conditions, the Department requires a minimum of ten transects per representative stream reach and the length of the representative stream reach must be a minimum of seven times the average width of the reach. Transects must be placed to characterize all hydraulic and habitat conditions within the representative reach. The stage of zero-flow must be determined for each transect and recorded in the field notes. Stationing across each transect must be frequent enough to adequately model the streambed and hydraulics and to reduce potential errors. A minimum of 10 stations (cells) per transect is required at the lowest flow measured. Final transect location must have Department approval before flow measurements and habitat assessments are made.

C. A minimum of three flows must be measured for an acceptable study. The average annual streamflow should be within the range of the three flows measured unless for safety reasons this cannot be accomplished. Extrapolation of habitat/flow relationships to 250% and 40% of the measured high and low flows, respectively, is acceptable only if there is an order of magnitude between the highest and lowest flows measured. As the magnitude between highest and lowest flows measured decreases, the extrapolation range also decreases. (Note. Velocity Adjustment Factors and Velocity Prediction Errors must also be acceptable to allow maximum extrapolation - see Computer Analysis Section). If the IFG-4 study is used to evaluate a proposed minimum or maintenance flow, the proposed flow should be encompassed by the flows measured to insure useable results in the event extrapolation is not possible.

D. There must be a steady flow state during transect data collection. Water surface elevation and staff gage readings must be made for each transect as velocities and depths are measured. If the flow varies between transects as measurements are made, the change in water surface elevation must be recorded in relation to change in staff gage reading and appropriate adjustments made in data compilation. If stage varies more than

±0.02 ft. while measurements are made within a particular transect, measurements should be discontinued and repeated when the flow becomes steady.

E. The streambed must be rigid throughout the period that flows are measured. A change of ± 0.1 ft. based on bench mark datum can be accommodated.

F. Substrate and cover code data must be specific enough to allow DFG to compare field notes with the computer outputs and allow for infield varification.

G. Within the sample reach or within close proximity, a site must be selected where the best estimate of the flow being sampled may be accurately determined. The site must be stable enough to allow for future measurement and correlation with gaging facilities.

H. The requirements of A, B, C, F, & G above must be approved by DFG in writing before data collection begins.

II. Computer Data Compilation and Analysis

A. Hydraulic Simulation

IFG-4 Hydraulic Simulation Calibration Error Ranges and Classifications are included in the following tables:

Velocity Prediction Errors
(Tape 11 of the Hydraulic Simulation Program)

90%	<	0.10	good
90%	<	0.15	fair
90%	<	0.20	marginal
90%	<	0.25	poor
more than 10%	>	0.25	very poor

If, the velocity prediction errors (VPE) fall in the good to fair range, the hydraulic simulation may be extrapolated to 40% of the lowest and 250% of the high flows measured. VPE in the poor to very poor range indicate that the model is poorly calibrated and that the hydraulic simulation is poor. Consequently, the data should not be extrapolated, and collection of another data set should be considered.

Velocity Adjustment Factors
(Tape 12 of the Hydraulic Simulation Program)

0.9 - 1.1	good
0.85 - 0.9, 1.1 - 1.15	fair
0.80 - 0.85, 1.15 - 1.20	marginal
0.70 - 0.80, 1.20 - 1.30	poor
0.70, 1.30	very poor

If the velocity adjustment factors (VAF) fall in the good range, the hydraulic simulation may be extrapolated to 40% of the lowest and 250% of the highest flows measured. VAF in the fair and marginal ranges indicate the model calibration is poor and that the simulation is of reduced quality and data should be extrapolated only to a limited degree. VAF in the poor to very poor range indicate the model calibration and hydraulic simulation are poor, data should not be extrapolated, and collection of another data set should be considered.

Data from hydraulic simulation models with VPEs and/or VAFs in the poor to very poor ranges are not acceptable for use in determining and evaluating instream needs.

B. FISHFIL - Suitability of use or preference curves must be:

1. Those developed on site using the USFWS's Instream Flow Groups criteria and approved by DFG,

2. Those developed by DFG and approved for use, and/or

3. Those developed by others and approved by DFG for use.

III. Habitat Simulation Output

The following output data must be submitted in a timely manner to DFG for proper evaluation of an IFG-4 study. Printout refers to the actual computer printout, not a summary.

A. Printout of cross sectional profile (RIFG4 Program Out File).

B. Printout of substrate and cover data (Input data deck or RIFG-I Program Out File).

C. Printout of numerical FISHFIL data used, and plotted representation.

D. Printout of discharge vs. weighted usable area. Flow intervals must be large and small enough to identify peaks and lows in weighted usable area (Tape 8, HABTAT Program).

E. Identification and location of measurements for flows used for best estimate of discharge.

F. Printout of RIFG4 Program Tapes 11 and 12.

G. An explanation of all corrections, alterations, or manipulations of data due to problems associated with unsteady flow, changes in bed profile, velocity prediction errors, velocity adjustment factors, etc.

IV. Effective Habitat Time Series

information requirements for the determination of the appropriate habitat ratios in the effective habitat time series are significant. The effective habitat time series analysis will not be accepted unless the following data are acquired or determined for specific species, streams, and/or projects:

1. The weight-age relationship for the population(s);
2. The periodicity of the population;
3. The life span and age of maturity of adults;
4. Average fecundity per spawning female;
5. Maximum density of spawning pairs per unit spawning weighted usable area;
6. Survival of eggs to the fry stage;
7. Density of fry per unit weighted usable area for fry in kg/m^2 or lb/ft^2 (numerical density may be substituted); 1/
8. Survival of fry to juvenile stage;
9. Density of juveniles per unit weighted usable area for juveniles in kg/m^2 or lb/ft^2 (numerical density may be substituted); 1/
10. Survival of juveniles to adult stage; 1/
11. Density of adults per unit adult weight usable area, in kg/m^2 or lb/ft^2; and
12. Annual survival of adults.

Habitat ratio equations and procedures are outlined in Instream Flow Information Paper No. 12 (Bovee 1982).

1/ If juveniles reside in the stream for more than one year, it may be desirable to compute ratios for different age groups based on different densities and survival rates as the fish grow.

CALIFORNIA TROUT

KEEPER OF THE STREAMS

FAX/MEMO FROM

JIM EDMONDSON
CONSERVATION DIRECTOR

5436 Westview Court
Westlake Village, CA 91362
Phone (818) 865-2888 Fax (818) 707-2459
troutmd@earthlink.net

Total transmission including this cover page = (Seven[7] pages)

To: Karen Kraus
Fr: Jim Edmondson
Dt: September 18, 2003
Re: DFG Instream Flow Study Policy

Karen:

Following this fax cover page are six pages from the California Department of Fish and Game revealing their instream flow study policy supporting the IFIM method. As you will see in the Director's letter to me, this policy has not been explicitly followed, as was the case with the Santa Ynez, but nevertheless it does provide one basis for identifying instream flow recommendations -- - vastly superior to the method used by Entrix, i.e., the top width only approach.

Call if you have any questions and thank you in advance for your cooperation.

# # # # # #

Attachment

13

SANTA YNEZ RIVER AND TRIBUTARY MILES (PRELIM.*)

QUADRANGLE	River or Trib.	LENGTH (~miles)	Subtotals
	Mainstem above Juncal	3	
	Tribs above Juncal	6	**9**
(still need Old Man Mtn. Quad for N. of Juncal)			
Carpinteria	Mainstem below Juncal	5.5	
	Blue Cyn. & Escondido Cyn.	7	
	Forbush	1	**13.5**
Hildreth Peak	Mainstem below Juncal	5	
	Blue Cyn.	1	
	Aqua Caliente	7	
	Aqua Caliente Tribs	16	
	Little Caliente	4	
	Mono	14	
	Mono Tribs	17	**64**
Little Pine	Mainstem below Juncal	7	
	Mainstem above Juncal	1	
	Mono	3	
	Mono Tribs	1	
	Indian Creek	9.5	
	Indian Creek Tribs	18	
	Camuesa Creek	6.5	
	Camuesa Creek Tribs	13	
	Buckhorn and Tribs	20	
	Gibralter Tribs		
	Gidney	4	
	Devils	6	
	Other	2.5	
	Mainstem tribs below Gibralter (on Little Pine Quad)	23	**114.5**
Big Pine	Indian Creek	7.5	
	Indian Creek Tribs	22	**29.5**
(Below Gibralter Dam)	Santa Cruz E. Fork	7.5	
	Santa Cruz E. Fork Tribs	27	
	Grapevine Creek & Tribs	13	**47.5**
San Marcos Pass	Mainstem	9	
	Oso Creek & Tribs	11	
	Lewis Cyn	1	
	Unnamed E. of Lewis	2	
	Arroyo Burro	4.5	
	Paradise	4	

QUADRANGLE	River or Trib.	LENGTH (~miles)	Subtotals
San Marcos Pass	Kelly & Cold Spring	8	
	Red Rock & Seagull	16	
	Horse & Trib	10	
	Oil	2.5	68
(Below Dam)	Santa Cruz	1.5	
San Rafael	Santa Cruz	13	
	Santa Cruz W. Fork & Tribs	24	
	Peachtree & tribs	12	
	Mine & tribs	6	55
?? Need other quad. estimate 1/3 again for Cachuma Crk as Cruz	Cachuma Creek (est.)	21	21
TOTAL MI. OF RIVER & TRIB ABOVE BRADBURY DAM (EST.)			422

*methods: dividers "walked" along stream/tributary courses for each topo.
Does not differentiate between blue-line and intermittent blue-line stream miles.

Attachment

14

Successful Adaptive Management - The Essential Need For Pre-Determined Fisheries Performance Objectives

(Presented by Jim Edmondson, California Trout Conservation Director, at the Rock Creek-Cresta Collaborative Relicensing Meeting, February 3, 2000)

The fishery management process has five steps: (1) choice of goals, (2) selection of objectives, (3) identification of problems, (4) implementation of action, and (5) evaluation of actions. Goals provide long-term statements about what fisheries programs are to achieve. Objectives specify measurable expected outcomes that indicate achievement of goals, and state the date when achievement is expected. Objectives are the criteria by which agencies (and the public) can determine progress towards achieving goals over time. (Kohler and Hubert, 1993)

The Rock Creek-Cresta (FERC Project #1962) Federal Energy Regulatory Commission relicensing collaboration is considering the use of an adaptive management program.

Adaptive management is a relatively new management style when compared to more traditional fishery management approaches. Even so, the published literature is replete with guidelines stating that measurable objectives are an essential component of adaptive management.

1. "Successful implementation of adaptive management requires management to take risk-prone actions while providing institutional patience and stability. The experimental nature of adaptive management requires that managers and politicians redefine success so that learning from error becomes an acceptable part of the learning process. In addition, information must be collected and analyzed over time frames that often exceed the typical tenure of politicians. Adaptive management also needs to be predicated on clearly established goals and decision criteria that will allow for accountability and evaluation of how goals are being met. (*Emphasis added*) (Halbert, 1993)

2. "Adaptive management takes that uncertainty seriously, treating human interventions in natural systems as experimental probes. Its practitioners take special care with information. First, they are explicit about what they expect, so that they can design methods and apparatus to make measurements. Second, they collect and analyze information so that expectations can be compared with actuality. Finally, they transform comparison into learning- they correct errors, improve their imperfect understanding, and change action and plans". (*Emphasis added*) (Lee, 1993)

3. "As Robert Olson (1986) pointed out, 'The better we know where we are going the more likely we are to get there.' For some reason, this simple logic seems to elude many in environmental management, and they lapse into a reactive mode, under the guise of being 'adaptive.' Given the many surprise events nature throws

at us, management soon spirals into a never-ending series of ad hoc actions that keep its officers busy impressing their bosses.

The notion of aiming management at a desired end point may seem counter to adaptive management, but it need not be. Experiments can be conducted to determine the best path toward that end point. The value of having defined the end point is that the partners have a common goal. Without this, they either don't know, or they disagree on, the purpose of management: a recipe for a standoff and inaction." (*Emphasis added*) (Rogers, 1998)

4. Defining measurable management objectives and list potential management actions is the second step of adaptive management. (Ministry of Forests).

It is for these reasons California Trout insist any adaptive management approach contain measurable objectives with its management scheme.

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Walters, C. 1997. Challenges in adaptive management of riparian and coastal ecosystems. Conservation Ecology [on-line]1(2):1. Available from the Internet. URL: http://www.consecol.org/vol1/iss2/art1

Attachment

15

APPENDIX G
Environmental Checklist Form

1. **Project title**

2. **Lead agency name and address**

3. **Contact person and phone number**

4. **Project location**

5. **Project sponsor's name and address**

6. **General plan designation** 7. **Zoning**

8. **Description of Project.** (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)

9. **Surrounding land uses and setting:** Briefly describe the project's surroundings:

10. **Other public agencies whose approval is required** (e.g., permits, financing approval, or participation agreement).

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- ☐ Aesthetics
- ☐ Agriculture Resources
- ☐ Air Quality
- ☐ Biological Resources
- ☐ Cultural Resources
- ☐ Geology / Soils
- ☐ Hazards & Hazardous Materials
- ☐ Hydrology / Water Quality
- ☐ Land Use / Planning
- ☐ Mineral Resources
- ☐ Noise
- ☐ Population / Housing
- ☐ Public Services
- ☐ Recreation
- ☐ Transportation / Traffic
- ☐ Utilities / Service Systems
- ☐ Mandatory Findings of Significance

ISSUES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☐
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☐
IX. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☐
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☐
X. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☐
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☐
XI. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☐

Attachment

16

Santa Barbara County Public Works Department
Flood Control & Water Agency

September 3, 2003

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

Attn: Andrew Fecko

RE: Comments on the Draft EIR for Consideration of Modifications to the U.S. Bureau of Reclamation's Water Right Permits 11308 and 11310 (Applications 11331 and 11332)

Thank you for the opportunity to review the Draft EIR for "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)"

The comments below are focused on flooding issues brought up in the EIR and the corresponding mitigation measures.

While the EIR discusses the potential impacts on extending low flow releases, the discussions relating to involvement with the County Flood Control District are not adequate.

Of particular concern is the discussion in section 4.2.2.4 (page 4-25), which states;

The potential increase in flood hazard is considered a potentially adverse, but not significant impact, because the County FCD could take reasonable action to prevent damage to public infrastructure through its authority to conduct channel maintenance. The extent and magnitude of this potentially adverse impact is unknown, and may be offset by the reduction in uncontrolled spills, which can cause flooding.

Furthermore, on the next page, the EIR goes on to state;

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Public Works Director

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PH: 805 568-3440 FAX: 805 568-3434 www.countyofsb.org/pwd/water

Thomas D. Fayram
Deputy Public Works Director

4.2.3 MITIGATION MEASURES

The County FCD could mitigate for increased flood hazards due to increased riparian vegetation and the reduction in spill frequency under Alternatives 3A-C and 4A-B. No other mitigation is considered because no significant adverse hydrologic impacts would occur due to the project alternatives.

Several problems exist with the line of reasoning the EIR pursues. These statements lack any discussion related to issue of expanding a channel maintenance program in this area.

In fact the Flood Control District would not be able to expand channel maintenance in this region should vegetation growth result. The EIR fails to review the gamete of issues surrounding the proposed action of expanding channel maintenance below Bradbury Dam. The EIR apparently dismissed significant issues impacting the feasibility such as permitting, mitigation, land rights, and perhaps the most significant issue being cost.

Current funding in the Santa Ynez Flood Zone IS NOT adequate to address additional channel maintenance needs. The FCD has not conducted channel maintenance in this portion of the river. Given existing funding constraints, it is therefore not feasible to assume that the FCD can simply just add this work element to our program.

Several other feasibility issues were also missing from the discussion. For example, permitting such a project in itself would be cost prohibitive. Given the presence of endangered species, such as steelhead, makes it most difficult to deliver an effective program even if cost issues were not present. Also, as a side note, the voters turned down an assessment increase in the Santa Ynez Flood Zone in March of 1996. The proposed assessment increase DID NOT even include the costs for a channel maintenance program in the river.

Other issues that were missed include mitigation sites. Channel maintenance in the river would require significant land for mitigation. Such land is not readily available. In the Lompoc area, it was only through the cooperation of the City of Lompoc that land was made available for mitigation in this reach of the river. There is not a similar inventory of public land below Cachuma.

The Flood Control District is also familiar with the position many land owners retain relating to government access. As such, it is probable that any access would also require a significant right-of-way acquisition process.
In summary, the conclusions reached in the Draft EIR pertaining to the Flood Control District's ability to conduct channel maintenance are totally incorrect.

The proposed mitigation measure is not feasible and does not consider the long list of hurdles that would prevent such an action. The Flood Control District is not mandated to conduct such work and the District lacks the capacity to consider such a project. Other agencies could do the work however. The State, USBR, or other local agencies could take this responsibility.

Thank you again for the opportunity to comment, I would welcome the opportunity to discuss these issues in depth with your staff and or EIR consultant. I would urge such a meeting so that you can clearly understand the issues at hand.

In either event, the EIR should be corrected to remove any suggestion that the County Flood Control District would be a mitigation measure for a particular impact. That said, the District is not suggesting that there will be a problem, however, should there be a problem, the assumption that the District will mitigate it is not accurate.

Please contact me at 805-568-3436 or by email at tfayram@co.santa-barbara.ca.us to discuss further.

Thank you.

Sincerely,

Thomas D. Fayram
Deputy Public Works Director
Water Resources Division

ATTACHMENT 17

October 3, 2003

MEMORANDUM FOR: Brian Trautwein, Environmental Defense Center Environmental Analysis
Karen Kraus, Environmental Defense Center Staff Attorney

SUBJECT: E.T. Zapel Qualifications & Statement of Expert Opinion regarding fish passage above Bradbury, Gibraltar, and Juncal Dams on the Santa Ynez River

STATEMENT OF QUALIFICATIONS

Education and Training

Mr. Zapel holds a B.S. degree in Civil Engineering from Washington State University (1984), graduating with honors. He also holds a M.S. degree in Hydraulic Engineering from Washington State University (1987), graduating *cum laude*. He is also currently completing a Ph.D. program in Fisheries Science from the University of Washington (anticipated completion date 2005).

Publications

Mr. Zapel has authored or co-authored a number of publications relating to hydraulic design of fish passage facilities, including the following:

*Larson, L.W., Zapel, E.T., S. J. Schlenker, R.T. Lee, S.C. Milligan; "Predictive Numerical Computer Models of Adult Fishways and Application at US Army Corps of Engineers Dams." Proceedings of the Bioengineering Symposium at 132nd Annual American Fisheries Society Meeting. Baltimore, Maryland, August, 2002. (*under peer review at this time)

*Zapel, E.T., T.R. Molls, S.V. Johnston, P.A. Nealson, M.A. Timko, and M. G. LaRiviere; "Juvenile Salmonid Acoustic Tracking Correlation with CFD-Model Predicted Velocity Fields at the Mayfield Dam Louvered Intake." Proceedings of the Bioengineering Symposium at 132nd Annual American Fisheries Society Meeting. Baltimore, Maryland, August, 2002. (*under peer review at this time)

Ahmann, M.L., and E.T. Zapel, "Stepped Spillways, a dissolved gas abatement alternative." Proceedings of the International Workshop on Hydraulics of Stepped Spillways. Zurich, Switzerland, March, 2000.

Zapel, E.T. "F.A. Goetz, and P.J. Hilgert. "Development of a Downstream Fish Passage System for Anadromous Salmonids at a High-Head Dam." Proceedings of BioEngineering Symposium at 127th Annual American Fisheries Society Meeting. Monterey, California, August, 1997.

Zapel, E.T. "Howard A. Hanson Dam Juvenile Fish Bypass System." Fish Passage Workshop. Milwaukee, Wisconsin, May, 1997.

Skills, Knowledge, and Expertise

Mr. Zapel is a civil engineer with 19 years of experience in hydraulic, hydrologic, and fisheries engineering developed in a variety of engineering assignments throughout the western United States. These include fish passage facilities for low and high-head dams and reservoirs for both juvenile and adult salmonids, major flood control dam outlet works design, flood control pump station design. He has extensive experience with fish exclusion screen design for water intake structures and reservoir outlet works, sedimentation and erosion analysis and remediation, river engineering, watershed and basin hydrologic analysis, dam safety inspection and remediation, and levee system design, inspection, and repair. He also has significant experience in watershed restoration planning studies, and stream habitat analysis and restoration.

Specific Areas of Expertise: Relative to the Central and South Coast River Systems

Mr. Zapel has accumulated approximately 10 years of experience working on rivers and streams of the San Francisco Bay area, and the central and south coasts of California. Specifically, he has experience on the Sacramento River, American River, Mokelumne River, Petaluma River, Guadalupe River, Guadalupe Creek, Salinas River, Santa Ana River, Los Angeles River, Poway Creek, and several streams in the inland southwest. Various studies have included restoration of juvenile rearing and adult steelhead spawning habitat, fish ladders, fish passage barrier removal, incorporation of SRA into flood damage reduction channel designs, inspection and evaluation of channel flood capacity, fish collection and behavioral study weirs, and fish screening and water intake facility design. In addition to his 10 years of California hydraulic and fish passage engineering experience, Mr. Zapel has nearly 20 years of experience with the design of fish passage facilities for dams and barriers ranging in hydraulic height from 5 feet to 400 feet. These facilities have included the analysis and design of modifications to

complex adult fish attraction, collection, and ladder systems carrying up to 7,500 cfs on the mainstem Columbia River dams. In addition, Mr. Zapel has developed designs for fixed and floating juvenile and adult fish collection, bypass, and transport systems for more than half a dozen large flood control and water supply dams throughout the Pacific Northwest. Several of these dams are very similar to Bradbury and Gibraltar Dams, with seasonal forebay elevation variation of up to 125 feet, reservoirs up to 1.2 million acre feet in volume, and upstream watershed areas ranging from tens to hundreds of square miles. He has designed and evaluated the effective passage efficiency of juvenile collection and bypass systems for average smolt migrations ranging in size from 25,000 to 50 million fish. In addition, Mr. Zapel has designed and evaluated modifications to adult trapping and collection systems for hatcheries, truck haul, and broodstock collection systems. He has also designed and evaluated adult fish trapping systems ranging from simple floating picket weir assemblies deployed seasonally in small streams to large permanent barrier dam and fixed trap systems. Mr. Zapel has also designed numerous habitat enhancement and restoration projects throughout the Pacific Northwest and California. These have included channel reconfiguration projects, large woody debris installations, channel stabilization and riparian zone restoration, and spawning channel construction.

Membership in Professional Societies and Professional Registration

Mr. Zapel is a member of the American Society of Civil Engineers, and also the American Fisheries Society. He is presently serving on the BioEngineering Committeee of the American Fisheries Society.
Mr. Zapel is a registered Professional Engineer in the State of Washington.

STATEMENT OF EXPERT OPINION

I have reviewed the list of documents cited in the literature list below this section. Based on this review of available documents, studies, and proposed actions relating to the Santa Ynez River, I believe additional studies regarding the feasibility of restoring passage to upstream habitat above one or more of the three storage reservoirs for anadromous steelhead trout are justified and necessary. Specifically;

1) Adult fish passage around Bradbury Dam and Lake Cachuma, Gibraltar Dam and Gibraltar Reservoir, and Juncal Dam and Jameson Reservoir. There are at least several feasible methods of trapping and collecting upstream-migrating adult steelhead at or near the toe of Bradbury Dam and hauling upstream to tributary release points above the dam. These range from seasonal use of very simple floating picket weir designs that can be installed by hand or with limited machinery assistance with hand collection and transfer of fish into waiting light-duty tank trucks, to large barrier dams and fixed trap system capable of withstanding design flood flows. The estimated costs provided should be considered with an additional contingency of up to 100% to account for unanticipated expenditures.
    a) For example, a simple floating picket weir and temporary trap could be installed in Hilton Creek and perhaps across the mainstem below Bradbury Dam for a cost of about $100 per lineal foot of channel width. A light-duty 1-ton tank truck or other transport tank system with 300 to 500 gallon aerated and refrigerated tank would suffice for annual collection of up to about 1,000 adult spawners. Total installed cost of a simple system such as this would be in the range of $50,000 to $100,000, with an annual labor requirement of approximately 1.5 to 3 partial year FTE's (from $75,000 to $150,000). Annual repair and maintenance costs for this system are minimal.
    b) A moderate duty system designed for up to 2,000 annual adult spawners would likely include two light-duty tank trucks or other two-transport tank system, a semi permanent barrier weir and trap across both Hilton Creek and the mainstem, and water-to-water transfer of captured fish from trap to transport tank and from transport tank to tributary release point. Pump-back attraction flow might be desirable to enhance adult fish attraction efficiency. Total installed cost for such a system would be in the range of $300,000 to $600,000, with an annual labor requirement of approximately 2 to 4 partial year FTE's (from $100,000 to $200,000). Annual repair and maintenance costs for this system would likely be in the range of $30,000 to $50,000.
    c) A large, high service trap system designed for up to 10,000 or more annual adult spawners would likely consist of a permanent concrete barrier dam at Hilton Creek

and across the mainstem at the foot of Bradbury Dam, a permanent trap and holding tank system, hopper hoist system, brail crowder panels, handling equipment, etc., and at least three 1,000 to 2,000 gallon aerated and refrigerated tank transport systems. Pump-back attraction flow might be desirable to enhance adult fish attraction efficiency. The transport tanks would require 2.5 ton truck chassis, or other similar capacity air or land transport vehicles. Total installed cost for such a system would be in the range of $1.5 to $3 million, with an annual labor requirement of approximately 3 to 6 partial year FTE's (from $150,000 to $300,000). Annual repair and maintenance costs would be in the range of $40,000 to $70,000.

2) Juvenile Fish Collection and Bypass Systems for Bradbury Dam, Gibraltar Dam, and Juncal Dam. As above for adult fish collection systems, there are several feasible alternatives for collecting and bypassing juvenile steelhead outmigrants from each of these three dams and reservoirs. These range in complexity and cost from zero to several tens of millions of dollars, depending on the desired rate of survival from fry to smolt delivered to the lower river mainstem. Based on my review of the Santa Ynez River hydrology above the dams, instream collectors are not recommended. Woody debris, sediment, and high flows would make these designs unreliable. Instead, I recommend development and evaluation of floating collectors located either at the inlet of each tributary below adult release points into the respective reservoirs, or at each dam, depending on the efficacy of through-reservoir migration survival. These floating collectors would include attraction flows provided by low-head electric pumps supplied with power from either fixed grid service lines or portable power generation plants of 50 Kw to 400 Kw size range, depending on the desired attraction flow rate (from about 30 cfs to as much as 250 cfs). Each collector would include a barge with transfer boat and holding tanks, sorting and handling facilities, and water-to-water transfer of juvenile fish to downstream transport tank systems, or bypass pipe to shore based facilities.

   a) The simplest collector systems 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. Total installed cost of each collector with fish transfer to the top deck of the dams provided by a fixed or portable crane would range from about $2.5 to $5 million. The same tank transport system used for adult fish would be utilized for juvenile fish on the return trip. Average annual labor requirements would be accommodated by operators of the adult trap and haul facility. Annual repair and maintenance costs would range from about $50,000 to $100,000 for each collector.

   b) Should through-reservoir survival studies prove the at-dam collector undesirable or infeasible, individual collectors would have to be located in the reservoir at the inlet of each tributary into which adults had been released. Accompanying each collector would be a 100% exclusion barrier net deployed across the width of the inlet embayment and vertically from the surface to the bottom of the reservoir. The net and collector would be positioned far enough out in the reservoir to lower average net approach velocities to well below the structural capacity of the net material. Total installed cost of each collector and its accompanying net and barge transfer and holding system would range from approximately $5 million to $10 million. Annual labor requirements would necessitate the addition of from 1 to 2 partial year FTE's ($50,000 to $100,000) to that required for the adult trap and haul system, since the same crew would do both tasks.

3) Adult fish passage and juvenile fish passage around Alisal Dam. The scale and cost of a passage system around Alisal Dam would be proportionally less than the system designed for the larger storage dams on the Santa Ynez River. Since the reservoir is very small, and the forebay elevation does not generally vary significantly on a seasonal basis, a juvenile collection system may consist of nothing more than bypass outlets that are designed to meet bypass criteria for steelhead smolts (30 fps maximum velocity, smooth interior, gradual bends >3 diameters in radius, no exit plunge in excess of 25 fps, etc.). Since the reservoir elevation is largely fixed, a small fish ladder for adult passage might be feasible. If not, a simple floating picket weir or fixed braille weir would be used.

Total installed cost of providing passage around Alisal Dam would likely range from $500,000 to $2.5 million, depending on the height of the dam.

4) Average survival rates for adult trap and haul facilities range from as low as about 90% for fragile sockeye and pink salmon, to as high as nearly 100% for robust fish such as chinook and steelhead. Juvenile salmonid survival through a floating collector and screens ranges from perhaps 80% for coho to as high as 95% or higher for larger steelhead smolts. Collection efficiency may range widely, depending on whether 100% exclusion is provided by the barrier net and collector screen. Overall, a combination of upstream adult fish migrant trap and juvenile fish floating collector can achieve survival and passage efficiency rates ranging from 50% to as high as 95% to 98%. The desired minimum acceptable rate of survival must be determined by evaluating the stock's potential to re-inhabit previously inaccessible habitat and become self-sustaining over time through larger watershed historical survival studies.

5) With regard to the relative success of fully restoring steelhead runs on the Santa Ynez River with the above-discussed passage systems or only with downstream flow augmentation and enhancement, it would appear that a steelhead restoration plan that included passage to the upper basin would be the most successful. According to historical documents reviewed, the upper basin contains the majority of available historically spawning and rearing habitat, therefore one would expect that the overall success of the Santa Ynez River steelhead run would benefit the most from provision of upstream and downstream passage.

6) Overall, I believe an evaluation of adult and juvenile fish passage around the three storage dams and Alisal Dam is warranted and should be conducted to determine to most effective solution.. This evaluation should consider a range of feasible fish passage alternatives, including all of the above-mentioned juvenile collection systems and adult trap and haul systems. The geographic scope should include Bradbury Dam, Gibraltar Dam, and Juncal Dam, as well as Alisal Dam and Hilton Creek.

7) Should the Water board decide to move forward with development of fish passage solutions around the dams, a phased approach to implementation is recommended. Each phase would be accompanied with requisite survival and migration success studies to define acceptable and unacceptable performance levels, and to refine the system design to optimize the fish passage system. This approach would consist of the following steps:

   a) Temporary adult fish trap facility at Hilton Creek, with truck transport to mainstem above Bradbury Dam. Smolt sampling collection would be conducted in screw-type or other suitable temporary trap systems in the mainstem just above the inlet to Lake Cachuma to determine net proportion of smolt-ready juvenile fish to resident life history juvenile fish. Through-reservoir survival radio tag tracking studies should be conducted to assess potential predator losses and migration success.

   b) If sufficient numbers of smolt-ready juvenile fish are collected in mainstem sampling trap to justify additional effort at re-establishment of sea-run fish, then install semi-permanent adult trap at Hilton Creek. Captured adult fish would be truck transported to mainstem and other release points above Bradbury Dam and perhaps Gibraltar Dam. If in-reservoir survival or migration success is found to be unacceptable in step a) above, then install floating juvenile collector in Lake Cachuma near inlet of mainstem and, if necessary, in Gibraltar Reservoir near the inlet of mainstem. Barge or bypass pipe transfer smolts to constructed truck transport facility on shore near collectors. If in-reservoir survival or migration success is found to be acceptable in step a) above, install floating juvenile collectors in forebays of Bradbury and Gibraltar Dams.

   c) If success is found with semi-permanent adult trap and floating juvenile collector systems as described in parts a) and b) above, then install full juvenile collection and transport system as discussed above in parts 1c) and 2b) above, and improve adult trap to permanent standards.

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ATTACHMENT 18

PACIFIC INSTITUTE

Research for People and the Planet

Comments on the Draft EIR for the Cachuma Water Rights Hearing

Report to the Environmental Defense Center

Dana Haasz
Peter Gleick

Pacific Institute
Oakland, California

October 6, 2003

654 13th Street, Preservation Park, Oakland, California 94612, U.S.A.
510-251-1600 | fax: 510-251-2203 | email: pistaff@pacinst.org | www.pacinst.org

Comments on the Draft EIR for the Cachuma Water Rights Hearing

Report to the Environmental Defense Center

Dana Haasz
Peter Gleick

October 1, 2003

Introduction

In response to the State Water Resources Control Board (SWRCB) draft Environmental Impact Report (DEIR) released in August 2003 addressing modifications to the U.S. Bureau of Reclamation's Water Right Permits 11308 and 11310, the Pacific Institute was asked to assess the potential for improving water-use efficiency among the five major water districts (the Cachuma contractors) that play a role in the region: Carpinteria Valley Water District (CVWD), Goleta Water District (GWD), Montecito Water District (MWD), City of Santa Barbara (SB), and Santa Ynez River Water Conservation District, Improvement District #1 (SYRWCDID#1). The following analysis concludes that the contractors can reduce their take of water from the Santa Ynez River without a loss of service or quality of life. Substantial water can be freed up for environmental purposes and future expected growth simply by applying existing efficiency technologies and well-understood policies to conserve water, in a cost-effective manner. This potential has been ignored or underestimated by previous studies, including the DEIR, and should play a critical role in meeting future needs. The first section looks at the role of conservation through examination of end uses in individual water agencies. The second part questions some of the methodology and assumptions used in the EIR to project future supply and demand balances.

The recently released DEIR indicates that the proposed releases to protect steelhead and other public trust resources may cause a significant impact to the agencies' water supplies during critical drought years unless drought contingency water conservation measures are implemented. The DEIR states that the water-supply impact during critical drought years "might be mitigable to less than significant levels if the member units were to develop and implement a drought contingency plan to cover the [temporary] water supply shortage." However, the DEIR stops short of analyzing specific measures and alternatives that can mitigate this water-supply impact. Furthermore, it fails to describe how much water can be generated through conservation and/or alternatives or to assess whether the impact can be fully or only partially offset. This report is intended to provide the SWRCB with additional information and details regarding the feasibility of mitigating the water-supply impacts associated with the alternatives in the DEIR as well as other alternatives that may be proposed by the public, including California Trout.

More detailed analysis is necessary to determine the mix of conservation options most appropriate for the individual water agencies and the associated savings, but our initial work suggests that a wide range of alternatives are available that can reduce or eliminate the reasonable expected impacts.

These alternatives include increased water conservation, recycling and reuse, and developing new sources or enhancing use of existing sources of supply, such as increased extraction of water from existing sources, desalination, or the development of access to new sources. We identify and examine only the alternatives that are most cost-effective, and most feasible from an environmental, economic, and political perspective.[1] It should be noted that we do not discuss agricultural water use in this report, which accounts for about 20 percent of the member agencies' use. While an analysis of agricultural use was outside the scope of this

[1] We did not include in our analysis options that, under current conditions, would not be cost effective, devices that are new to the American market such as dual-flush toilets, or measures that are politically sensitive, such as rate structures.

report, a detailed assessment of the potential to improve efficiency of agricultural water use is strongly encouraged.

The following analysis is based on best available information collected from California Urban Water Conservation Council (CUWCC) Best Management Practices (BMP) reports, Department of Water Resources Urban Water Management Plans (UWMP), Water Conservation Plans required through U.S. Bureau of Reclamation (BoR) contract, and direct contact with the member agencies. The reports to the DWR and BoR are mandatory, (the CUWCC reports are mandatory if the agency is a signatory) but it is relevant to note that their accuracy, completeness, and quality vary widely as does the quality of data collected and available from the member agencies.[2]

Table 1 shows year 2000 water use for the five member agencies. There is considerable variation in per-capita water use among the agencies, with that of Montecito and Santa Ynez more than double that of the other agencies. During the drought in the early 1990s, the City of Santa Barbara (SB) and Goleta Water District (GWD) implemented aggressive water-conservation programs as a way of reducing demand. Although there has been some rebound in demand post-drought, many of the measures, such as toilet-replacement programs, had permanent effect on reducing demand. Prior to the drought, per-capita residential use in SB was 120 gallons per day (gpd). During the height of the drought it was reduced to 71 gpd, and currently it stands at 88 gpd.[3] In Goleta prior to the drought, water usage reached as high as 15,175 AFY, dropped to a low of 8,152 AFY in 1991 at the end of the drought, and has since rebounded to about 13,000 AFY.[4] If the most efficient currently available technologies were installed, average residential use could be as low as about 65 gallons per capita per day (gpcd), 35 of which is used indoors.[5]

Table 1: Water Use of Cachuma Contractors (year 2000)

	Population	Total Use (AFY)[6]	Residential Use (GPCD)
Carpinteria[7]	17,900	4,672	87
Goleta[8]	80,000	13,700	82
Montecito[9]	17,278	5,338	201
Santa Barbara[10]	96,628	14,881	85
Santa Ynez[11]	8,920	5,152	231
Total	**217,130**	**24,366**	

[2] As one example, Santa Ynez only provides information on single-family accounts in its reports to the CUWCC, while the other agencies include detail on multi-family, CII, agricultural, and some even have information on landscape accounts.
[3] City of Santa Barbara, Water Facts. 2002.
[4] Camp Dresser & McKee. August 2001. Goleta Water District Urban Water Management Plan.
[5] Gleick, P.H., D. Haasz, C. Henges-Jeck, V. Srinivasan, G. Wolff, K. Kao-Cushing, A. Mann. 2003. Waste Not Want Not: The Potential for Urban Water Conservation in California. Pacific Institute for Studies in Development, Environment, and Security, Oakland, California. In press. See also, Mayer, P.W., W.B. DeOreo, E.M. Opitz, J.C. Kiefer, W.Y. Davis, B. Dziegielewski, and J.O. Nelson. 1999. Residential End Uses of Water. Final Report. AWWA Research Foundation. Denver, Colorado.
[6] Total of all urban uses: residential, commercial, industrial, and institutional.
[7] Carpinteria Valley Water District. April 2001. Carpinteria Valley Water District Urban Water Management Plan and Water Shortage Contingency Plan.
[8] Camp Dresser & McKee. August 2001. Goleta Water District Urban Water Management Plan.
[9] Montecito Water District Urban Water Management Plan.
[10] City of Santa Barbara Public Works Department. December 2000. City of Santa Barbara Urban Water Management Plan.
[11] Santa Ynez River Water Conservation District, Improvement District #1 Urban Water Conservation Plan.

Conservation Potential

We quantify conservation potential from only a subset of end uses of water based on current use and estimates of saturation of cost-effective water-efficient technologies. Actual conservation potential is likely to be higher than these estimates. We identified three primary end uses that, based on statewide and regional studies and programs, offer the greatest conservation potential from both a cost- and water-savings perspective: residential and commercial toilets, washing machines, and landscape irrigation. Table 3 summarizes our findings for these end uses. Replacing older inefficient residential and CII toilets with models meeting the current legal standard has the potential reduce current toilet use by 1,500 acre-feet per year.[12] Replacing residential washing machines with more efficient models can save another 900 acre-feet per year. Even greater savings can be achieved by improving the efficiency of water use in landscapes – between 2,800 and 4,600 acre-feet savings can be achieved by better management of urban landscape irrigation. There are many ways in which an agency can promote such conservation, including incentives on conservation technology, education, regulation, rate setting, and information dissemination. We chose to examine ULF toilets, washing machines and landscape irrigation because these programs have already proven to save water, be cost-effective, and be acceptable to the customer. There are many other options, many current and emerging technologies, and various types of incentive programs that an agency can choose to invest in to reduce demand. As a result, these savings estimates should be considered the minimum achievable savings.

Table 2: Summary of Potential Savings by End Use (AF/Yr)

	Residential ULFT	Residential Washers	Landscape (a)	CII Toilets
Carpinteria	145	65	236-377	30
Goleta	449	309	852-1,363	122
Montecito	196	51	540-870	21
Santa Barbara		439	980-1,570	282
Santa Ynez	132	27	247-394	61
Total	**922**	**891**	**2,855-4,574**	**516**

(a) Including improvements in the management of water use in existing landscapes. No changes in turf area or area of water-efficient plants was included here, though these changes can greatly reduce overall water use in landscapes.

Residential Water Use

The residential sector is the largest urban water-use sector, and it offers the largest volume of potential savings compared with other urban sectors. This section describes specific indoor residential end uses and estimates the potential for improving efficiency of those uses with existing technologies.

Residential Toilets

Toilets use more water than any other indoor use, about 32 percent of current indoor residential water use.[13] Replacing old models with 1.6 gallon per flush (gpf) ultra low-flow toilets (ULFT) yields significant savings. While many old inefficient toilets have already been replaced through rebate programs, natural retrofits, and new construction, substantial numbers of inefficient toilets are still in place.

[12] Prior to the late 1970s, all toilets typically used six gallons per flush (gpf). Effective January 1, 1978, California state law required that toilets not exceed a flush volume of 3.5 gallons. In 1992, the National Energy Policy Act reduced the maximum flushing volume of residential toilets sold in the United States to 1.6 gallons per flush, effective January 1994. Commercial toilets are now covered as well.

[13] Gleick et al. 2003.

The assumptions we used to estimate potential savings come from two different sources. For SB and Goleta we used CUWCC information on savings per toilet because these were the only two agencies that had information on toilet stock and saturation of ULF models. The CUWCC assumption at 90% confidence is that replacing pre-1980 toilets with toilets that meet the current legal standard saves approximately 42.6 gallons per day. Replacing post-1980 toilets saves 34.1 gallons per day. For multi-family complexes, pre-1980 retrofits save 46.7 gallons/day and post-1980 toilets save 37.4 gallons/day. For the other three agencies we calculated use by population and calculated the distribution of toilets by flushing volume. Population was used as the standard measure, thus eliminating differences associated with toilet use in single-family and multi-family units. Three pieces of information were necessary to evaluate total savings:

- The proportion of the population living in new housing;
- The natural replacement rate for toilets; and
- The number of toilets actively retrofit by utility programs.

The proportion of the population living in new housing

Since all post-1980 housing requires lower flow toilets by law, the population living in new housing was assumed to be using the more efficient model toilets. Yearly housing estimates provided a figure for the number of new houses each year. All houses built after 1980 are assumed to have 3.5 gallon per flush (gpf) toilets and all homes built after January 1994 are assumed to have 1.6 gpf models. New housing construction estimates are multiplied by the average number of people per household, resulting in yearly estimates for the population living in new houses.

The natural replacement rate for toilets

The natural replacement rate refers to the replacement of equipment due to age and wear. The replacement rate used in our model was four percent per year as proposed by the ULFT subcommittee of the CUWCC (CUWCC 1992), equivalent to a 25-year life for toilets.

The number of toilets actively retrofit by utility programs

Carpinteria, Montecito, and Santa Ynez, unlike Goleta and Santa Barbara, have not had retrofit programs and therefore we assume that all retrofits in these districts have been due to natural replacement. The distribution of toilets was determined by calculating the number of 3.5 gpf and 1.6 gpf toilets that had been installed since 1980 accounting for all new homes and natural replacement. We estimated the total population using low-flow toilets in any given year (Plf) using the following equation:

Equation 1: Number of people using low-flow toilets

$$P_{lf} = \Sigma P_{nr} + \Sigma P_{nh}$$

Where
P is the population for a given year;
Pnr is the population using toilets that have already been retrofit as a result of the normal replacement cycle (see equation below);
Pnh is the population in new housing.

For a given year, the number of people using toilets that have been replaced as a result of the normal toilet replacement cycle is calculated by applying the replacement rate to the population that had not had their toilets replaced by either active or passive programs, nor were they living in a newer home built with efficient model toilets.

Equation 2: Number of people using low-flow toilets installed due to natural replacement

$$P_{nr\ (current\ year)} = (P - \Sigma P_{nr\ (previous\ years)} - \Sigma P_{nh}) * TR$$

where TR is the natural turnover rate.

These calculations were done annually, providing a population distribution by flush volume. Multiplying the population in each category by flush volume and frequency of use generates total water use by year for

residential toilets. For the separate estimate of maximum practical savings, 1.6 gpf was used as the flush volume for the entire population. The REUW study found that ULFTs were flushed at a slightly higher frequency than non-ULF toilets. The data show that ULFT toilets were flushed slightly more than five times per person per day, while residents of non-ULF homes flushed about 4.9 times per day.[14] Some recent data suggest that the latest ULFTs have the same flushing frequency as non-ULFTs, but we adopted the more conservative frequency estimates into the analysis. While newer, more efficient toilets are now coming on the market, such as dual-flush toilets that use a different volume of water for liquid and solid waste, or even no-water options, we have not calculated their potential for these agencies. We believe, however, that these new efficient toilets represent additional feasible water savings that could be captured if the need arises.

Our calculations assume that toilets have a life span of 25 years and therefore we conservatively estimate that only six gpf toilets are retrofit through agency programs and natural replacement. It does happen that some old toilets that would likely be replaced as part of the natural replacement cycle are replaced through agency programs. These are called free riders. This assumption has no effect on our estimates of potential savings from full implementation of ULFTs. It is, however, relevant to designing policies to capture cost-effective savings.

We estimate that if all the remaining inefficient residential toilets were replaced, current use in the five districts would be reduced by more than 900 acre-feet per year (AF/yr).

Results by agency

Goleta:

According to its 1997 report to the California Urban Water Conservation Council (CUWCC), the Goleta Water District has met the full requirements of BMP 14.[15] GWD had the most complete information on toilet stock and saturation of ULFTs of the 5 agencies. GWD began requiring 3.5 gpf toilets 4 years before it became a state mandate and in 1985 it began a ULFT rebate program that ran until 1989, replacing 11,190 toilets with 1.6 gpf models. Our calculations show that there are, at most, about 10,000 toilets in the district that are not 1.6 gpf, out of a total stock of 50,000. Because the district started requiring 3.5 gpf models in 1974, most of the "old" stock flushes at this volume. We estimate that the 6 gpf models have approximately all been retrofit, 26% of the stock flushes at 3.5 gpf, and the remainder are ULFTs. These estimates were made assuming that no 6.0 gpf toilets were purchased in the district after 1980 and no 3.5 gpf models were purchased after 1986, in both cases preceding state regulations. Retrofitting all remaining inefficient toilets to ULFT models can save the district up to 450 AFY.[16]

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[14] Mayer, P.W., W.B. DeOreo, E.M. Opitz, J.C. Kiefer, W.Y. Davis, B. Dziegielewski, and J.O. Nelson. 1999. Residential End Uses of Water. Final Report. AWWA Research Foundation. Denver, Colorado.

[15] The CUWCC was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private entities. The Council's goal is to integrate urban water conservation Best Management Practices (BMP) into the planning and management of California's water resources. A Memorandum of Understanding was signed by urban water agencies and environmental groups in December, 1991; those signing the MOU pledge to develop and implement fourteen comprehensive conservation BMPs. BMP 14 addresses ULFT replacement. The requirements for BMP 14 are that savings from residential ULFT replacement programs be equal or exceed water savings achievable through an ordinance requiring the replacement high-water-using toilets with ultra-low-flow toilets upon resale, and taking effect on the date implementation of this BMP was to commence and lasting ten years (http://www.cuwcc.org/m_bmp14.lasso). For more information on the CUWCC and the BMPs see www.cuwcc.org

16 Our calculations were based on CUWCC savings assumptions and Attachment 1-A of the 1997 CUWCC BMP report, which has information on the number of toilets in the service area. The mix of single-family and multi-family toilets was proportional to the mix of these housing units across the district.

Santa Barbara:
The City of Santa Barbara has also met the full requirements of BMP 14. The City of Santa Barbara had a ULFT replacement program that ran from 1988 to 1995. 18,842 residential toilets were replaced—50% of MF units and 34% of SF units —saving approximately 657 AFY.[17] According to our calculations, there is probably only a negligible amount to be saved through accelerating replacement, as most models are currently ULFTs.

Carpinteria, Montecito and Santa Ynez:
None of these three agencies have had any active toilet retrofit programs. As a result, the only ULFTs in place are the result of new construction after the state and national standards were put in place, plus toilets replaced due to natural replacement during remodeling and individual efforts. As a result, the saturation results are the same for each of the districts. The distribution of toilets by flush volume is estimated as follows: 10% at 6gpf, 74% at 3.5 gpf and 16% at 1.6 gpf. Based on these data, Carpinteria, Montecito, and Santa Ynez can save about 145, 196, and 132 AF/yr respectively by replacing inefficient toilets.

Washing Machines

High-efficiency (HE) washing machines can save a typical household about 7,000 gallons of water a year[18], cutting per-capita indoor use by 6 to 9 percent.[19] The vast majority of residential washing machines in the U.S. are top-loading machines that immerse the clothes in water and spin around a vertical axis. Horizontal-axis designs use a tumbling action where the washer tub is only partially filled with water, requiring far less water, energy, and detergent.[20] Horizontal-axis washing machines, long popular in Europe where they have captured over 90 percent of the market, have only recently been introduced to the United States. HE machines did not begin to appear in significant numbers in the United States until the late 1990s, but are now increasingly available and popular. For example, in 1999, an estimated 10,000 rebates were issued for high-efficiency washers in California (based on reporting data from the CUWCC); in 2002 more than 24,000 rebates were awarded, and a total of 64,000 rebates have been awarded in the four years since 1999.[21]

Rising pressure on water and energy resources nationwide has prompted detailed field and laboratory surveys evaluating savings from the use of more efficient washing machines[22]. The High Efficiency Laundry Metering and Marketing Analysis project (THELMA) consisted of both a lab and field analysis of machines currently available on the market. Separately, the Department of Energy and the Oak Ridge National Laboratory conducted a five-month field study in Bern, Kansas involving 103 machines and over

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17 CUWCC BMP Retail Water Agency Annual Report. 2000.
[18] U.S. Environmental Protection Agency (USEPA). 2002. Water Conservation Plan Guidelines: Water Use Efficiency Program. Appendix B: Benchmarks Used in Conservation Planning. http://www.epa.gov/owm/water-efficiency/wave0319/appendib.pdf
[19] Mayer et al. 1999
20 For typical usage, 80-90 percent of the energy use attributed to clothes is used to heat water. The partial filling of the tub means less total water is required, less hot water, and less water-heating energy (DOE 1990 in http://www.ci.seattle.wa.us/util/recons/papers/p_sh1.HTM).
[21] Dickenson, M.A. 2003. Executive Director, California Urban Water Conservation Council. Personal communication.
[22] Consortium for Energy Efficiency (CEE). 1995. Consortium for Energy Efficiency High Efficiency Clothes Washer Initiative Program Description. Consortium for Energy Efficiency. Boston, Massachusetts. U.S. Department of Energy (USDOE). 1996. Energy Conservation Program for Consumer Products: Test Procedure for Clothes Washers and Reporting Requirements for Clothes Washers, Clothes Dryers, and Dishwashers. 61 Federal Register 17589. Washington, DC.
THELMA. 1998. The High-Efficiency Laundry Metering and Marketing Analysis. A joint venture of the Electric Power Research Institute, U.S. Department of Energy, U.S. Bureau of Reclamation, and two dozen electric, gas, water, and wastewater utilities. EPRI final report, 1998. Palo Alto, California.

20,000 loads of laundry. Both studies yielded similar results: water savings of about 15.7 gallons per load.[23] Water savings from efficient machines are generally estimated to be between 40 and 50 percent.[24] This potential has encouraged many utilities nationwide to offer incentives for purchase of efficient washing machines as part of their conservation programs.

Information on the penetration of washing machines and frequency of use came from the 1995 American Housing Survey,[25] which found that 86 percent of households in the city of Santa Barbara have washing machines and we assumed this to be the same throughout the study area. We also assumed that 15 percent of new machines are HE and have a lifetime of 12 years, based on Energy Star estimates.[26]

Summary of Assumptions for Washing Machine Analysis:

- Water savings from retrofit to HE models are 15.7 gallons per machine.
- The penetration of efficient washing machines prior to 1998 is negligible.
- Machine lifetime is 12 years.
- Fifteen percent of new machines now sold in the study area are HE.
- Frequency of use is 0.96 loads/household/day.[27]
- The persistence of water savings from high-efficiency machines has not yet been analyzed. We assume the savings remain consistent through time.

Results for washing machines:

Using the assumptions above, we calculated the number of washing machines for each agency and the savings if all machines were to be replaced with average HE models. There have been no active retrofit programs in any of the agencies to date so we were calculated a standard saturation and turnover across the study area. Using these assumptions, we estimate that replacing inefficient residential washing machines can save nearly 900 AF/yr. We note that additional savings, not computed here, can be captured by replacing inefficient commercial washing machines as well (see discussion below).

Table 3: Water Savings from Retrofit of Residential Washing Machines

	Potential Savings (AF/yr)
Carpinteria	65
Goleta	309
Montecito	51
Santa Barbara	439
Santa Ynez	27

23 The two studies used a similar experimental design, the Bern study, however, examined only one efficient washing machine model while the THELMA study used three different H-axis models.

[24] Hill, S., Pope, T., and R. Winch. 1998. THELMA: Assessing the Market Transformation Potential for Efficient Clothes Washers in the Residential Sector. http://www.ci.seattle.wa.us/util/recons/papers/p_sh1.HTM. Pugh, C.A. and J.J. Tomlinson. 1999. "High efficiency washing machine demonstration, Bern, Kansas." CONSERV 99 Conference, Monterey, California.

[25] U.S. Census Bureau. 1995. American Housing Survey. AHS-N data Chart Table 2-4. http://www.census.gov/hhes/www/housing/ahs/95dtchrt/tab2-4.html

[26] http://www.energystar.gov/index.cfm?c=clotheswash.pr_clothes_washers

[27] We used an average of the following three studies:
Koomey, J.G., C. Dunham, and J.D. Lutz. 1995. "The effect of efficiency standards on water use and water heating energy use in the U.S.: A detailed end-use treatment." Energy-The International Journal. Vol. 20, no. 7. p. 627;
U.S. Environmental Protection Agency (USEPA). 2002. Water Conservation Plan Guidelines: Water Use Efficiency Program. Appendix B: Benchmarks Used in Conservation Planning http://www.epa.gov/owm/water-efficiency/wave0319/appendib.pdf; and
Mayer, P.W., W.B. DeOreo, E.M. Opitz, J.C. Kiefer, W.Y. Davis, B. Dziegielewski, and J.O. Nelson. 1999. Residential End Uses of Water. Final Report. AWWA Research Foundation. Denver, Colorado.

Total	**891**

Landscape

Landscape water use in Santa Barbara County is estimated to account for about 59% of total residential use.[28] SB County has a Mediterranean climate with generally warm, dry summers and cool, wet winters. Residential landscaped areas range from 2,000 square feet to three acres and over 50% of these lots have irrigation controllers.[29] Properties in SB and Goleta have large landscaped areas averaging about 0.5 acres and use 37,400 to 224,400 gallons per month (0.1 to 0.7 AF per month) during the summer.[30]

Outdoor residential water conservation and efficiency improvements have the potential to significantly reduce total water demand and improve supply reliability by reducing both average and peak demand. Savings will result from improved management practices, better application of available technology, and changes in landscape design away from water-intensive plants. In addition to the water-supply benefits, there are important water-quality benefits to proper landscape maintenance and irrigation. These include a reduction in energy and chemical use, mowings and other maintenance needs, and waste created.[31] In fact, part of the impetus for the landscape irrigation studies in southern California has been due to the runoff and pollution problems associated with overwatering residential landscapes. Overwatering leads to contamination of local waterways with fertilizers, pesticides, and herbicides.

In 2001, both the City of Santa Barbara and Goleta Water District applied to CALFED's water-use efficiency program for funding for a distribution and installation program for the Weather Trak ET controller. Savings estimates of 25% from the ET controllers were based on a pilot study conducted in Irvine, whose climate and landscape practices are comparable with those of the SB area. The Irvine study showed a 57 gpd savings based on a 3,000 sq. ft. landscaped area. The proposal calculates the cost-benefit ratio of the controller program as 1:1.4.

ET controllers programs are attractive for agencies because they circumvent the "behavioral"[32] issues associated with landscape maintenance, but there are a variety of other options for agency programs. A recent study (Gleick et al. 2003) estimated that landscape water-use reductions of 25 to 40 percent could be

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[28] Mayer, P.W., W.B. DeOreo, E.M. Opitz, J.C. Kiefer, W.Y. Davis, B. Dziegielewski, and J.O. Nelson. 1999. Residential End Uses of Water: Final Report. AWWA Research Foundation. Denver, Colorado.

[29] Almy, R. 2001. Santa Barbara County Distribution and Installation Program for the Weather TRAK ET Controller. CALFED Water Use Efficiency Proposal Solicitation Package.

30 Ibid.

[31] For more information on the co-benefits of proper landscape maintenance see: Moller, P., K. Johnston, and H. Cochrane. 1996. Irrigation Management in Turfgrass: A Case Study from Western Australia Demonstrating the Agronomic, Economic, and Environmental Benefits. Presented at the Irrigation Association of Australia, National Conference, Adelaide, Australia. May 14 to 16 1996. (Agrilink Water Management Services): http://members.iinet.net.au/~agrilink/turf.html);
Nelson, J.O. 1994. Water Saved by Single Family Xeriscapes. Paper presented at the American Water Works Association National Conference, June 22, 1994, New York, New York; and
Sovocool, K.A. and J.L. Rosales. 2001. A Five-Year Investigation into the Potential Water and Monetary Savings of Residential Xeriscape in the Mojave Desert. 2001 AWWA Annual Conference Proceedings, June. Southern Nevada Water Authority, Nevada, (working paper supported by the Southern Nevada Water Authority and the US Bureau of Land Management). Available at http://www.snwa.com/assets/pdf/xeri_study.pdf.

[32] Efficient irrigation involves two things: proper design and proper landscape maintenance. Proper landscape maintenance requires that the homeowner be informed and diligent — difficult things for an agency to predict, control, or monitor. When an agency decides whether to invest in a retrofit program, they can reliably calculate savings from switching their existing stock to ULFTs and from that determine the costs and benefits of such a program. A similar evaluation of landscape programs is more difficult and is constrained by lack of data and consistency in homeowner behavior.

made with improved management practices and available technology, economically and relatively quickly, even without changes in landscape design and plant type. Many options are available for reducing residential landscape water use, including new technologies, better management approaches, and appropriate garden designs.[33]

Three of the agencies — Santa Barbara, Goleta, and Montecito — had information on water sales by month, which allowed us to use the "minimum month" method of estimating outdoor water use. This method assumes that the lowest use month represents indoor use. Use above that value is categorized as outdoor. The underlying, and conservative, assumption is that there is a month in which there is no landscape irrigation. Using this method, we found the percentage of outdoor use to be lower than the estimate from the REUW analysis. We combined all urban uses together in this calculation (we did not do separate calculations for residential and CII accounts) and to this outdoor water use value we applied a potential reduction range of 25 to 40 percent based on experience from regional case studies, audits, and technology assessments.[34]

For the City of Santa Barbara we averaged data on metered water sales by month for 2001 through 2003, and subtracted agricultural uses to get urban use by month. Our results indicate that about 3,900 AF per year are used for landscape irrigation, accounting for almost 50% of urban use in the warmest month. Savings potential in Santa Barbara ranges from 980 to 1,570 AF per year. Goleta had monthly data from 1997-2002 and we estimate that about 3,400 AF is used annually for landscape irrigation, yielding a savings potential of 850 to 1,360 AF per year. Montecito had monthly data from 1968 to 2003 and the highest percentage of outdoor use of the three, reaching 68% during the warmest months. We estimate Montecito's landscapes use at about 2,160 AF/yr, which can potentially be reduced by 540 to 870 AF per year.

Carpinteria and Santa Ynez do not have accessible information on outdoor use, so estimates for these two districts were based on the information from the other three agencies. For Carpinteria we used the average urban water use for 1990, 1995 and 2000[35] (2,483 AFY) and applied to this the average outdoor use from Santa Barbara, Goleta, and Montecito (38%) to get an average annual outdoor water use of 944 AF. From this we estimate a potential savings of 236 of 377 AF per year from landscape improvements. We used the same procedure for Santa Ynez and found that outdoor uses account for just under 1000 AFY, yielding a potential savings of 247-394 AF per year.

Commercial, Industrial and Institutional (CII) Water Use

Conservation programs within the member agencies have targeted primarily residential water users and therefore the CII sector still offers considerable potential for water savings. As part of their ULFT rebate programs, the City of SB and Goleta Water Districts offered rebates for CII toilets between 1988 and 1994. Santa Barbara replaced 2,995 toilets (14% of pre-1993 stock and Goleta has replaced about 690 units. There remain a large number of CII customers with potential for significant water savings, which we estimate at about 516 AFY.

CII Toilets

The CUWCC has 1992 data on number of toilets by zip code broken down by sub sector, which we used to estimate the amount of water that could be saved from replacing CII toilets. To these 1992 numbers we calculated a 4% turnover rate per year to capture toilets naturally retrofit. For Santa Barbara and Goleta, the only agencies that have had active retrofit programs, we estimated the number of toilets retrofit by sector

[33] For more information on the various landscape conservation options and estimates of costs and savings, see Gleick et al. 2003.
[34] See Gleick et al. 2003
[35] Carpinteria Valley Water District Urban Water Management Plan and Water Shortage Contingency Plan. 2001.

based on the assumption that the retrofits occurred proportionately. For example, 9 percent of Goleta's CII toilets are in hotels and therefore we assumed that 9% of the 690 units replaced were also in hotels. For the actual savings estimates we used values from the county's (with the City of Santa Barbara participating) CALFED funding application for CII rebate programs for ULFTs, waterless and ULF urinals, and high-efficiency commercial clothes washers. These estimates, found in Table 5, are based on information from MWD programs. Tables 6 and 7 show the results across the five agencies by CII subsector and by agency.

Table 4: Savings per ULFT Installation by Market Segment

Market Segment	Savings per installed ULFT (gpd)
Category 1	
Wholesale	57
Food store	48
Restaurant	47
Category II	
Retail	37
Automotive	36
Multiple Use	29
Religious	28
Category III	
Manufacturing	23
Health care	21
Office	20
Miscellaneous	17
Hotel/motel	16
School	18

Source: Urban Water Conservation Grant Application, CII ULFT Savings Study, CUWCC 2001

We used the following equation to estimate water savings from CII retrofits:

Equation 3:

[Ts-(Tnr+Tar)]*Ss, where

Ts is the number of toilets by subsector;
Tnr is the number of toilets naturally retrofit (4% per year);
Tar is the number of toilets actively retrofit, and
Ss is the savings per toilet by subsector in gallons per day.

Table 5: Member Agencies' CII Toilet Numbers and Potential Water Savings by Subsector

CII Subsector	Total Number of toilets (1992)	Number of toilets naturally retrofit (through 2002)	Number of toilets actively retrofit (through 2002)	Number of toilets remaining to be retrofit (2002)	Potential Savings (AF/Yr)
Hotels	7,357	2,943	726	3,688	65
Eating Establishments	1,105	442	118	545	28
Health Sector	3,413	1,365	414	1,634	38
Offices	9,341	3,736	1,077	4,528	100
Retail/ Wholesale	8,987	3,595	932	4,460	195
Other	2,504	1,002	229	1,274	24
Industrial	2,457	983	256	1,219	31
Churches	666	266	71	329	10
Government	944	378	100	466	13
Schools: K to 12	995	398	97	500	11
Total	**37,770**	**15,108**	**4,019**	**18,643**	**516**

Table 6: CII ULFT Savings Potential by Agency and Subsector (AF/yr)

CII Subsector	Goleta	Carpinteria	Santa Barbara	Montecito	Santa Ynez
Hotels	7	2	38	2	16
Eating	6	2	16	1	3
Health	9	1	26	1	2
Offices	26	6	60	3	5
Retail/ Wholesale	40	11	108	10	26
Other	6	2	11	3	4
Industrial	18	4	8	0	1
Churches	2	1	6	0	1
Government	3	1	7	0	2
Schools: K to 12	4	1	4	0	1
Total	**122**	**30**	**282**	**21**	**61**

Commercial Washers

None of the five agencies have information available on the penetration rate of commercial washers so we could not estimate the potential of replacing existing models with high-efficiency machines. Santa Barbara County requested a CALFED grant, effective 2003, to fund a CII washing machine rebate program. They plan to rebate about 176 washers and estimate an annual water savings of 156 AF at a cost of $215/AF and benefit: cost ratio of 1:1.47.

Cost-Effectiveness of Water Conservation

The previous sections identify the range of conservation and efficiency improvements that are achievable in the member agencies' urban sector using proven, publicly acceptable technologies and options. This section presents our assessment of the cost of those technologies and options.[36] Since each water conservation measure is an alternative to a different source, or a new or expanded physical water supply, conservation measures are considered cost effective when their cost -- which we call "the cost of conserved water" -- is comparable the cost of other water-supply options. There are a variety of ways of computing this cost. Readers should look at Gleick et al. (2003) for detailed discussion.

Table 7 shows member agencies' avoided cost of water[37] from the different supply sources, which range from about $200 to $400 per acre-foot. The variable cost is the amount paid by the agencies for each acre-foot purchased. The difference between unit cost and variable cost is called "fixed costs," which is the amount paid by the agency regardless of whether they receive the water or not. For example, about three-quarters of the unit cost of water from the State Water Project are fixed and used to recover, among other things, the $600 million it cost to build the pipelines, pumping, and treatment plants importing SWP water to the county.[38] Regardless of whether agencies take their entitlement, they are liable for these costs. Therefore, unless agencies are looking at major supply shortages in the future that require new projects to be built or expanded (which the Cachuma contractors are not), the avoided cost of water is the variable cost and the cost of conservation alternatives should be compared to this.

Table 7: Avoided Cost of Water ($/AF)

	Groundwater	Cachuma Purchased	Cachuma (Spill)	State Water (exchanged)	State Water (purchased)	Desalination
Variable Costs						
Purchase	-	100.00	-	100.00	210.00	
Treatment	4.89	188.43	188.43	188.43	188.43	
Power	104.89	-	-	-	-	
Operation & Maintenance	13.41	-	-	-	-	
Capital Cost recovery	75.01					
Total Variable Cost	**198.20**	**288.43**	**188.43**	**288.43**	**398.43**	**1,100**
Unit Cost of Water[39]	915	412			1,745	1,500

Table 8 shows the unit cost of water for various conservation alternatives as presented in a proposal submitted by the County to CALFED and DWR for CII ULFT/washing machine and landscape conservation programs. We have also calculated in a separate analysis[40] the costs for residential ULFTs and washing machines as $50 and $-74 per acre-foot,[41] respectively. According to our calculations, as well as

[36] For an explanation of how this analysis was developed, the assumptions and the results, see Gleick et al. 2003.
[37] Cost that could be avoided if the agency used a different source of supply.
[38] Santa Barbara County Water Agency. July 2000. Water Resources of Santa Barbara County.
[39] Includes fixed costs. Based on data from Goleta Water District. 2002-2003. Sources of Water Supply Costs. Memo from Kevin Walsh.
[40] Gleick et al. 2003
[41] We include reasonably quantifiable and financially tangible "co-benefits" of water conservation as "negative costs" (i.e., as economic benefits). A negative value for cost of conserved water means that water could be free and customers would still save money by implementing the conservation option. This happens when non-water benefits, or "co-benefits" are sufficient by themselves to pay for the water conservation investment. Co-benefits are benefits that automatically come along with the intended objective. For example, high efficiency washing machines reduce water-heating bills and sewage costs, and improved irrigation scheduling reduces fertilizer use. We have not evaluated all co-benefits, only those

those of the County, all conservation alternatives are at least comparable to member agencies' other sources of supply (even though the County estimates do not include co-benefits). The one exception is commercial clothes washers, which according to our analysis, has a cost of about $325/AF. The discrepancy between the two results can be explained, at least in part, by the fact that our analysis internalizes energy and wastewater savings. Thus, the estimates in Table 8 are, we believe, highly conservative – in fact, the cost of conserved water is likely to be substantially below these numbers. Yet even these estimates show that the conservation potential we identify is cost effective.

Table 8: Cost of Conservation Alternatives

	Average Cost to Purchase Product	Average Lifetime Savings (AF)	Administrative and Marketing Cost	Cost of Conserved Water ($/AF)
ET Controller[42]	$200	9.312	$362	$60
Category I Tank[43] Type ULFT	$100	1.223	$28	$105
Category I Flushometer ULFT	$200	1.223	$28	$186
Categories 2&3 ULFT	$150	.654	$28	$272
Waterless Urinals	$450	1.646	$28	$290
Commercial Clothes Washer	$1000	.543	$28	$1,893

These are costs to the water agencies. Costs to consumers are likely to be different, and often lower. And these costs do not include co-benefits such as energy savings, which are especially important for clothes washers.

Supply and Demand Assumptions in the EIR

For all agencies, water supplies are expected to be adequate through 2020 and beyond in all but a worst-case scenario critical drought year. Member agencies' demand and supply from all sources is presented in Table 9.

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that could be quantified in a reasonably objective fashion. Even so, our results are much more favorable for water conservation than less complete assessments that exclude such co-benefits. Including co-benefits dramatically affects the results we achieve; helping to explain why conservation is more economically desirable than some previous analyses have suggested.

[42] Almy, R. 2001. Santa Barbara County Distribution and Installation Program for the Weather TRAK ET Controller. CALFED Water Use Efficiency Proposal Solicitation Package.

[43] Almy, R. Santa Barbara County CII Rebate Program. Proposal to CALFED.

Table 9: Water Supply and Demand Conditions for Cachuma Project Member Units[44]

	Carpinteria	Goleta	Montecito	Santa Barbara	Santa Ynez	***Total***
Supply						
Cachuma Project (%)[45]	2,813 (22%)	9,321 (58%)	2,660 (34%)	8,277 (45%)	2,651 (22%)	25,722
State Water Project	1,000[46]	3,800-7,000[47]	2,208[48]	2,566[49]	1,000[50]	10,574-13,774
Groundwater	3,000	2,350	400	1,400	4,700	11,850
Reclaimed		1,500				1,500
Desalination				3,125		3,125
Other			2,375	6,063	3,600[51]	12,038
Total Supply	6,813	16,971-20,171	7,715	18,306[52]	11,951	61,756-64,956
Demand (average)						
Current (2000)	4,672	14,000	6,073	15,140	5,300	45,185
Build Out (2020)	5,423	16,000	6,835	15,570-17,760	9,050	52,878-55,068
Difference (supply-demand)	2,141-1,390	2,971-4,171	1,642-880	3,166-1,640	6,651-2,901	16,571-10,982

There are two major questionable assumptions in the supply and demand section of the EIR. The first is the demand assumptions and projections for the member agencies. The EIR indicates that mitigation alternatives are capable of meeting 2020, critical dry year demand (alternatives 2 and 4A-B). This projected critical dry year demand is based on current demand levels, which from the previous sections, we know can, and probably will be reduced due to continued investment in conservation programs as well as naturally occurring conservation from mandated efficiency. Shortage (in all alternatives) occurs only when the projections show increase in per capita demand in 2020. Agencies' demand projections do not appear account for continued investment in conservation measures that would reduce demand. In fact, projected per-capita residential demand actually rises for four of the five agencies (demand declines slightly for Santa Ynez, which, at over 200 AFY, would still be more than twice that of Santa Barbara or Goleta). Table 10 shows how forecasted demand is increasing at a faster rate than population. While demand is projected to increase by about 23% between 2000 and 2020, population is projected to increase by only 15%. Per capita demand should be decreasing, rather than increasing, as conservation technologies continue to penetrate the market. Efficient toilets will replace older models, washing machines will continue to capture an increasing

[44] State Water Resources Control Board, Division of Water Rights. August 2003. Draft Environmental Impact Report. 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).

45 Member agencies' annual deliveries from the Cachuma Project are calculated as a percentage of the total supply provided.

[46] Entitlement is 2,000 AFY (50% average annual delivery) plus 200 AFY of drought buffer.

[47] GWD assumes 51-60% average annual delivery of entitlement (7,000 AFY) and drought buffer (450 AFY). Current diversion is limited to 4,500 AFY due to pumping capacity.

[48] MWD assumes 76% average annual delivery of entitlement of 3,000 AFY plus 300 AFY drought buffer.

[49] City assumes 76% average annual delivery of entitlement (3,000 AFY) plus 300 AFY of CCWA drought buffer.

[50] Entitlement is 2,000 AFY plus 50 AFY drought buffer.

[51] Santa Ynez River underflow. Maximum permitted amount is 6,115 AF.

[52] Does not include desalination, which is considered only an emergency supply.

share of the market[53] and a host of other practices and technologies that use water more efficiently will continue to be adopted. While agencies such as Goleta and Santa Barbara have been fairly progressive in promoting conservation, others such as Santa Ynez and Montecito have made little to no investment in conservation and therefore their projections must be put to question.

Table 10: Past, Current, and Projected Water Use and Population[54]

	1990	1995	2000	2005	2010	2015	2020
Total water demand (AFY)	23,705	35,337	40,481	39,820	44,496	46,562	48,698
Residential use (AFY)	12,741	20,779	24,366	25,811	27,336	28,912	30,557
Total excluding agriculture (AFY)	17,397	28,263	32,058	33,885	35,725	37,602	39,542
% Change in urban demand from 2000	-51.3%	-20.9%	0.0%	5.7%	11.4%	17.3%	23.3%
Population			221,476	230,428	238,849	246,880	255,409
Total Per capita (gpcd)			171	172	173	175	176
Residential Per capita (gpcd)			98	100	102	105	107
Population growth from 2000			0%	4%	8%	11%	15%

The other problem with this section of the EIR is the focus on the 1951critical dry year as a basis for decision-making. Using 1951 to represent a critical drought year, the EIR examines the potential shortages experienced by the member agencies. Member units' have sufficient supply to meet demand in all years out of the 1918-1993 period analyzed except for 1951, including during a three-year drought period. During this kind of critical drought year, emergency measures are implemented. There are a number of alternatives that could and should be considered in order to meet critical drought year shortages but using this scenario to drive the planning process is not reasonable.

[53] AB 1561, which is awaiting final approval, requires all newly manufactured home washers in California not to exceed a water factor of 9.5. The new standards would save about a typical family about 7,000 to 9,000 gallons per year.

[54] From agency Urban Water Management Plans.

Conclusions

According to our analysis, serious efforts to implement cost-effective conservation and efficiency programs will give the Cachuma member agencies ample flexibility to mitigate the impacts of the scenarios proposed in the EIR to maintain the endangered steelhead populations on the Santa Ynez River. In addition, impacts to water supplies caused by alternatives that involve greater releases of water than proposed in the EIR can also be mitigated. We estimate between about 5,000 and 7,000 AFY of water can be cost-effectively conserved by programs to implement the conservation measures described in this report. Demand can be reduced so that the impacts of a critical dry year are considerably less severe.

More importantly, the EIR's analysis of water supply and demand is inadequate. A thorough assessment of the proposed alternatives' impacts should include not only various supply scenarios, which it does, but a section of demand scenarios as well. The EIR presents supply and demand conditions based on current demand and the projected member units' demand increases. Missing are demand projections with different, and we believe, realistic levels of conservation. As a result, the scenarios are limited to the single projection of agencies, some of who have shown little interest in conservation. Finally, the decision-making in the EIR seems to revolve heavily around the catastrophic critical dry year scenario that, in reality, would call for a variety of drought emergency measures and is not typically used as the basis for long-term planning.

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ATTACHMENT 19

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Preliminary Report to CalTrout

October 6, 2003

By Thomas P. Keegan
Senior Fisheries Scientist
Ecorp Consulting, Inc.

Skills, Knowledge, and Expertise

I am a fisheries biologist and aquatic/estuarine ecologist with over 24 years of experience working with salmonids in rivers and streams throughout the Pacific Northwest, and northern and southern California. Specific to southern California, I have conducted research on steelhead (and other special-status fish species) issues on the Santa Ynez River, Santa Clara River, Malibu Creek, San Mateo Creek, Cayucos Creek, and numerous small coastal creeks and estuaries. I have special expertise in evaluation of water project impacts (i.e., dams, diversions, and alterations to streamflows and other physical habitats) to special-status fish species, in particular, steelhead, winter-run and spring-run Chinook salmon, and coho salmon, including their early life history, instream habitat requirements, and estuarine behavior. I have authored or co-authored hundreds of EA, EIS, EIR documents, Biological Assessments, Technical Reports, and other research papers regarding impact assessments to steelhead, Chinook and coho salmon, sierran trout, and other special-status fish species.

Specific Areas of Expertise: Relative to the Santa Ynez River System

I was a member of the Santa Ynez River Technical Advisory Committee (SYRTAC) at its inception for about 2 years, on behalf of the Cachuma Conservation Release Board. I assisted in the development of the initial study design and supervised (and conducted) initial sampling efforts in the Santa Ynez River basin for collecting data on the steelhead population and aquatic habitat. I assisted in initial surveys to determine use of steelhead in tributaries to the Santa Ynez. I conducted sampling efforts and habitat evaluations downstream of Bradbury Dam, including the mainstem, tributaries, and lagoon, and performed site visits throughout the basin upstream of Bradbury Dam. I also assisted in the preparation of the first annual data report to the Santa Ynez River Consensus Committee.

Education and Training

I have a B.S. degree in Fisheries Science from Humboldt State University (1979). My resume is attached to this statement.

Membership in Professional Societies
I am a member of the American Fisheries Society (AFS) and The American Institute of Fishery Research Biologists (AIFRB). I am currently the Director of the Northern California District of the AIFRB (since 2001), and am certified by that organization as a professional fishery research biologist. In August 2003, I was elected by the AIFRB National Board of Directors to be the Chairman of National Membership.

Basis for my Opinion
My expert opinion put forth in this statement comes from over 24 years experience as a fisheries biologist and ecologist; my first hand experience with southern California steelhead and habitat assessment, including the Santa Ynez River steelhead population; and my review of pertinent environmental documents and data that have been produced for this project.

I have studied steelhead and steelhead habitat conditions in the Santa Ynez River basin, including the mainstem and tributaries both above and below Bradbury Dam, and the lagoon. I have first hand knowledge of habitat and water quality conditions in the river system and lagoon. I participated in the Santa Ynez River Technical Advisory Committee from its inception for about 2 years. I have also conducted upstream passage studies of steelhead and salmon, both in the Pacific Northwest and in northern and southern California. My studies with steelhead in Northern California and Southern California include assessment of flow requirements at critical life stages, including upstream passage and spawning of adults, downstream passage and instream rearing of juveniles, and rearing of smolt steelhead in the lagoon setting.

My opinion is also formed from my review of many of the environmental documents that have been produced for this project. I have reviewed the NMFS Biological Opinion, which concludes that the Bureau of Reclamation's current operations will not likely jeopardize the continued existence of the endangered Southern California steelhead, although some level of take is likely to occur. This document assumes that establishment of a set of 14 Reasonable and Prudent Measures will maintain existing Santa Ynez steelhead populations. A set of three Conservation Recommendations is also provided to aid in eventual steelhead recovery efforts. I also reviewed the Biological Assessment for the current project. This document suggests that current conditions will allow the existing population of Santa Ynez steelhead to remain stable. However it does not make adequate assurances allow for recovery of the steelhead population in the Santa Ynez River. I have reviewed the Cachuma Project Contract Renewal EIS/EIR, including the Fish Resources Technical Report. I reviewed several documents and data produced by the SYRTAC. I also reviewed the Lower Santa Ynez River Fish Management Plan. Finally, I have recently reviewed the SWRCB Draft Environmental Impact Report (DEIR) for consideration of modification to project water rights permits.

I have also reviewed the work by Shapovalov and Taft (1954), and Dr. Jerry Smith (California State University, San Jose), regarding assessment of lagoon habitat for steelhead rearing in central and southern California river systems.

Introduction

The Santa Ynez steelhead population is considered to be a remnant run. Historically numbering in the thousands, less than 100 fish currently make up the annual escapement. Yet, the Santa Ynez steelhead population is likely one of the largest remaining in the Southern California Evolutionary Significant Unit (ESU). Ensuring its existence and retaining its potential for restoration is critical to the overall ESU's survival and restoration. The cause for the collapse of the Santa Ynez steelhead fishery is largely due to construction of Bradbury Dam, but is further exacerbated by the manner in which the Cachuma Project is operated. I believe there is an opportunity to improve the current status of the fishery, while providing for water supply demand and necessary flood control. I therefore urge the SWRCB to consider modifications to the water rights permits that will allow for improvements to the fishery. At the very least, it is imperative that Reclamation not only adheres to project operations as described in the NMFS Biological Opinion (including the Reasonable and Prudent Measures), but Reclamation must also implement the Conservation Recommendations. Even so, these actions must be considered as a starting point for restoration of the Santa Ynez steelhead population. I believe that flow augmentation, over those proposed in the DEIR will be necessary to achieve restoration of the Santa Ynez steelhead population.

I am further concerned that the current SWRCB water rights proceedings are based on a project description that has not been shown to be capable of restoring and preserving steelhead in the Santa Ynez River. More study is necessary on effects of proposed flows, including water rights releases and fish flows, on critical life stages, adult upstream migration through the mainstem, juvenile downstream outmigration in the mainstem, and lagoon conditions. In addition, there needs to be a better evaluation of study results since implementation of the current project with the interim flows implemented since the issuance of the NMFS Biological Opinion. Based on my review of those data, the current project has not resulted in improved conditions to the steelhead population.

In addition, my opinion, based on review of project documents and first hand knowledge of the project, indicate that the Santa Ynez River steelhead population is not currently in good condition in the Santa Ynez River below Bradbury Dam, nor will it likely achieve that status given the current project description (Alternative 2 in the DEIR).

Good condition

Using Peter Moyle's definition of "good condition", of which I agree for the Santa Ynez River, there are 3 levels to be concerned with: individual, population, and community. The individual level implies healthy individual fish, free from disease, with good growth and the ability to respond appropriately to stimuli (e.g., avoid predators and unsuitable water quality conditions). The population level is made up of healthy fish, with multiple age classes (evidence of successful reproduction and recruitment) and a viable population size (such that it will not go extinct from random factors or unusual events, such as drought). Viable population size can be implied from presence of extensive good quality habitat for all life stages. Community level means that a dynamic assemblage species is present, dominated by co-evolved species.

I have used this definition of 'good condition' in the process of forming my opinion.

Upstream passage of adult steelhead

The ability of adult steelhead to pass unimpeded from the ocean to upstream spawning grounds is a basic requirement for a successful steelhead restoration. Suitable conditions for upstream passage of adult steelhead include sufficient flow and depth of water, good water quality conditions, and the presence of deep pool resting habitat. The Adult Steelhead Passage Flow Analysis report, conducted by the SYRTAC using the "Thompson criteria", presents a cursory evaluation (study based on a small sample size) of passage that concludes a target flow of 30 cfs is adequate to achieve upstream passage for adult steelhead throughout the Santa Ynez River, with the exception of the Lompoc 1 transect where flows in excess of 100 cfs would be required to meet the full Thompson criteria. These evaluations are based on an assessment of identified "critical riffles" between Lompoc and just upstream of Refugio Road. Passage was also evaluated by NMFS and reported in the B.O., using criteria of 8 ft of contiguous wetted channel at 0.5 ft. of depth (BOR 1999). That analysis concluded that flows of 30 cfs at Lompoc (37 miles downstream), 15 cfs at Cargasachi (24 miles downstream), and 25 cfs at Alisal Bridge (10 miles downstream) are considered by NMFS biologists and hydraulic engineers as "close to the minimums at which passage is possible", but not as good migration habitat.

The SYRTAC evaluation states that successful upstream passage would have occurred between 62 and 83 percent of the 75 year record under unimpaired flows (without the Cachuma Project), and from 50 to 83 percent (one day events) with the project. Although it is difficult to precisely compare passage conditions between project and no project condition, it appears that 'with-project' passage is reduced by 12 percent from 'no-project' passage. However, this percentage is higher for multiple-day passage conditions, which are generally necessary for unimpeded upstream passage. Upstream migration rates generally range from 8 to 31 miles per day for adult salmonids (Groot and Margolis 1991), indicating that adult steelhead would have required from about 1.5 to 6 days to ascend to the location of Bradbury Dam with suitable passage flows.

NMFS's evaluation indicates that during normal water years and normal project operations, successful passage (providing at least 14 days of passage per year) would occur in only 38 percent of years, increasing to 63 percent with proposed project supplemental migration flows. Alternative 3A2 in the Cachuma EIS/EIR presents flow strategy that would achieve successful passage in all but 17 years out of the 75-year record, or 84 percent of the entire record. Passage flows provided under Alternative 3A2 represent a pronounced increase over the project flows identified in the DEIR, which can only be considered as being adequate to sustain the current population.

Juvenile rearing and downstream passage of smolt steelhead

Currently, under the pre-surcharge Biological Opinion operations (Alternative 2 in the DEIR) conditions in the Santa Ynez River mainstem are not suitable for steelhead rearing. Historically, the portion of mainstem downstream from Bradbury Dam was primarily used as a corridor for upstream and downstream passage, but also provided limited rearing habitat for downstream migrating juvenile steelhead upstream from Solvang (Shapavolov). Indications are that suitable habitat existed in the channel, with suitable riparian conditions to afford adequate water quality (including water temperature), cover, and prey items for young steelhead to rear. Removal of riparian resources for flood control and other construction activities, along with the absence of suitable flow conditions from the current project, have degraded mainstem rearing habitat. Limited rearing conditions do exist within 8 miles downstream of Bradbury Dam (including the Refugio Reach). Below the Refugio Reach, water temperatures and adequate surface flows are not adequate to allow for suitable rearing and production of steelhead.

Current project operations (Alternative 2) and the other alternatives in the DEIR do not provide flows necessary to improve degraded steelhead habitat downstream of Bradbury Dam. Alternative 3A2 in the Cachuma Project Contract Renewal EIR/EIS (1995) would provide sufficient flow releases to improve downstream rearing conditions, likely into the Alisal Reach and below.

The SWRCB DEIR provides scoring criteria for steelhead habitat under different instream flow regimes (Table 4-41, Page 4-99). The underlining basis for the SWRCB DEIR criteria scoring is the NMFS Biological Opinion and the top-width based habitat vs. flow relationship. The BORs Cachuma Project Contract Renewal EIS/EIR also provides scoring criteria for steelhead habitat (Table 6.4-1 Page 6.4-54). The underlining basis for Reclamation's criteria scoring is the Department of Water Resources IFIM (IFG-4 model). There is a discrepancy between scoring standards that is not readily understandable.

For example, the highest score (a value of 5) obtainable for juvenile rearing under BORs criteria results from flows greater than or equal to 65 cfs. However, under SWRCB criteria, the highest score is obtainable for flows greater than only 10 cfs. Likewise for fry rearing, the highest BOR score is for flows greater than or equal to 50 cfs and less than 160 cfs, while under SWRCB DEIR, the highest score is for flows again greater than only 10 cfs. The result of the SWRCB DEIR revised criteria are similar scores among alternatives 3A, 3B, 3C, 4A-B for adult migration (Table 4-42), spawning (Table 4-43), fry rearing (Table 4-44), and juvenile rearing, (Table 4-45). In all cases, alternative 2 has a lower score than the other alternatives, but not as low as Alternative 1 (historic) scores. However, if the mean monthly flows that are scored using the top-width based approach in the SWRCB DEIR are scored against the IFIM based criteria presented in the BOR EIS/EIR, the scores among all alternatives other than 3A2 are relatively similar, with historic operations (alternative 1) and current operations (alternative 2) having somewhat

lower values, alternatives 3A, 3B, 3C, 4A-B being similar to each other, and 3A2 having substantially (two-fold) higher values than the rest.

The use of the top-width method can be useful for evaluating changes in overall habitat associated with changes in stream flow for specific channel configurations and habitat types (runs and pools), but is not generally appropriate for determining the amount of usable habitat. The SYRTAC report presented a set of assumptions (associated with the absolute and relative change in top-width from one flow to the next) pertaining to the use of this method and interpretation of the results. These "assumptions" provide a framework for evaluating the data collected during this study; however, many of these assumptions are misleading and may only apply to specific channel morphologies and habitat types (runs and deeper pools), and are generally not appropriate for determining changes in usable habitat in riffles, glides, and possibly shallow pools. To determine changes in actual usable habitat (for all life stages), data on key habitat parameters and characteristics (e.g., depths and velocities across the channel, substrate composition and structure, water temperature, etc.) is essential.

The following assumptions (presented in the SYRTAC report) are discussed relative to their usefulness in evaluating changes in habitat with increasing river flows as compared to data obtained from an IFIM.

- The greater the top-width the greater the amount of habitat.

This statement may or may not be true depending on channel morphology, type of habitat, substrate composition, and bank gradient. An increase in wetted perimeter may not directly result in an increase in useable habitat. Velocity and depth across the channel are also key suitability components in describing habitat, and neither of these parameters is taken into account as the stream widens. In low gradient stream reaches with low gradient banks, increases in flow typically result in substantial lateral spreading with minimal increases in water depth and velocity. This newly created habitat is usually very shallow with very slow velocities, is highly susceptible to significant increases in water temperature, and is not usable for steelhead. However, the top-width method would include this newly created habitat as usable for steelhead.

The IFIM provides incremental data (depth, velocity, substrate, etc.) across the stream, which allows for an evaluation of changes in <u>useable</u> habitat with changes in flow based on life stage criteria. The additional data collection associated with the IFIM is critical in assessing the actual benefits of increased flows on steelhead habitat.

- Large changes in top-width indicates a large change in the amount of potential living space available to steelhead

The problems with this assumption are similar to those stated above. The use of the top-width method does not provide sufficient data to evaluate this issue. As stated above, a lateral increase in wetted perimeter does not necessarily indicate an increase in living space for steelhead. Additional margin habitat established via increased flows may or

may not contain habitat characteristics appropriate for steelhead life stages. In some habitat types, this approach may provide sufficient information to generally describe habitat changes with increasing flow. However, depth and velocity data within this newly created area provides a more accurate assessment of habitat quality and quantity.

The IFIM provides the incremental data necessary to evaluate this issue.

- Top-width is used as an index of the amount of habitat available in the past.

The use of top-width as an index of the amount of habitat available in the past is wrought with the same problems mentioned above. The use of the top-width method for evaluating habitat changes does not take into account critical depth and velocity measurements that contribute to the overall evaluation of usable habitat for steelhead. As a result, top-width is likely to substantially over-estimate increases in usable habitat associated with various increases in flow.

- A higher width to depth ratio denotes better quality habitat.

This statement may be true in some situations; however, as stated earlier, this assumption may not apply to all habitats. Without supporting data, this assumption cannot be verified.

Finally, I also believe that Order No. WR 89-18 downstream water rights releases should occur more continuously than currently occurs, to maximize public trust protection and other beneficial uses, including basin recharge. These flows can be used in tandem with other releases to afford further protection to instream rearing fish. Currently, dry river conditions are necessary to trigger these releases, which is not conducive to improving mainstem rearing habitat. In addition, high flow pulse releases during the summer months can adversely affect steelhead.

Lagoon rearing of smolt steelhead

Given the overall habitat degradation that has occurred in the Santa Ynez River, it is critical to restore suitable conditions for smolt steelhead rearing in the lagoon. Studies conducted by Dr. Jerry Smith in smaller central and southern California drainages indicate that lagoons are essential for production of the majority of steelhead smolts than are produced in the remaining watershed. In particular, spring and summer inflows are most important in determining depth, temperature, salinity, and dissolved oxygen concentrations in the lagoon, all of which are essential components of habitat. For steelhead, it is important to maintain overall freshwater conditions, especially in light of removal of access to upstream rearing habitat and degraded lower river rearing habitat. In particular, sufficient inflows should be provided to minimize stratification layers. Dense marine water is unsuitable for steelhead rearing because of unsuitably low dissolved oxygen concentrations and warm water temperatures that occur, especially in the lower marine layer. A freshwater lens overlaying the marine layer exacerbates unsuitable conditions in the lower marine layer. Unstratified freshwater conditions result

in greater amount of suitable habitat and higher quality habitat. Steelhead that include a lagoon rearing phase have been shown to have greater survivability during ocean phase and are more likely to return as adults. Steelhead that are forced to leave the SYR during first year of life have lower survivability than those fish which are allowed to remain at least one year in freshwater.

The alternatives in the SWRCB DEIR do not meet suitable flow conditions to allow for improvement to lagoon habitat. Alternative 3A2 (Cachuma Project Contract Renewal EIR/EIS, 1995) scored highest among the other alternatives in its ability to improve lagoon habitat with providing sufficient inflow to the lagoon to improve steelhead rearing conditions.

More studies of inflow and lagoon water quality condition interactions are necessary to quantify available steelhead rearing habitat.

Adaptive management

Adaptive Management is the key to providing the ability for recovery of the Santz Ynez steelhead population, and southern California steelhead ESU as well. However, it is not enough to simply establish an Adaptive Management Committee (AMC) that will review data as it becomes available and make decisions. It is paramount to set measurable target objective goals for steelhead recovery (e.g., adult population size, juvenile production, age structure percentage, juvenile biomass per acre or stream width). This approach is becoming standard language in for Federal Energy Regulatory Commission (FERC) mediated collaborative Settlement Agreements, dealing with effects of hydroelectric power generation activities on aquatic and terrestrial resources in California streams (e.g., Pacific Gas & Electric's Mokelumne and Rock Creek-Cresta projects, and El Dorado Irrigation District's El Dorado Project on the S.F. American River).

There is no mention of target adaptive management objectives in the SWRCB DEIR (nor in the Lower Santa Ynez River Management Plan or the Bureau of Reclamation's Biological Assessment). The SWRCB, California Department of Fish and Game, Bureau of Reclamation, and other agencies were involved, at least with review, of the adaptive management plan for the Battle Creek DEIR (Appendix D). That plan concludes that the purpose of adaptive management is to design studies and management programs that can be adapted to uncertain circumstances, with a well-planned document anticipating as many circumstances as possible before designing monitoring and data assessment approaches. Eleven objectives were identified pertaining to the adaptive management of steelhead and salmon populations, passage, and habitat. I recommend the inclusion of such an adaptive management plan as a Term and Condition for the current water rights modifications that includes measurable target objectives for such elements as population size, trends in productivity, population substructure, population diversity, and carrying capacity, as are presented in the Battle Creek DEIR Adaptive Management Plan.

Predator control and removal of exotics

The presence of predators and other exotic fishes that are present in the Santa Ynez River (e.g., largemouth and smallmouth bass, bullhead) is a major concern. There are current projects (San Mateo Creek, Santa Margarita Creek) underway that are examining potential removal techniques for exotics. I recognize that this sometimes seems to be an impossible dilemma, but not enough attention has been brought to this subject. Continued strategic removal programs may result in bringing a level of control to the exotic species. The *Lower Santa Ynez River Fish Management Plan* determined that it is feasible to remove warm water species from below Bradbury Dam. A more integrated approach is possible with the use of both passive (fyke nets, fish traps) and active (beach seine, electrofishing, seining, diver-operated devices). Such a plan should be developed

Availability of habitat upstream of Bradbury Dam

I reiterate NMFS Conservation Recommendation (and CDFG Steelhead Restoration and Management Plan) that a study should be designed and implemented to determine effective passage for steelhead at Bradbury Dam, including upstream passage, downstream smolt trapping facility, and screening of the Tecolote Tunnel and other water intakes. It is clear that construction of Bradbury dam has had the most important adverse impact on Santa Ynez steelhead populations by blocking the most important (quality and quantity) spawning and rearing habitat in the Santa Ynez basin. About 150 miles of habitat is no longer accessible to steelhead due to construction of Bradbury Dam, and operation of the Cachuma Project. US Forest Service habitat mapping activities show that the mainstem and tributaries contain suitably sized substrates (gravel and cobble), and habitats for spawning and rearing. Instream cover is also relatively abundant.

The Hilton Creek improvements (flow augmentation and channel development), 11 passage barrier projects, the suite of flow releases and other proposed measures cannot mitigate for the loss of habitat and the ability of the above-dam population to emigrate to the ocean, brought about by construction and operation of the Cachuma Project. The project must include actions that will directly result in restoration of the Santa Ynez steelhead population. Remnant populations of rainbow trout above Bradbury Dam provide a genetic bridge to Santa Ynez steelhead and must be protected. To achieve recovery, genetic information in those populations should be made available to current runs of steelhead below Bradbury Dam. It is worth considering that a connection should be made between the anadromous steelhead below Bradbury Dam and the remnant landlocked population that exists upstream. Therefore, more intensive study that has currently been conducted (e.g., *Upper Basin Actions for the Protection and Enhancement of Southern Steelhead in the Santa Ynez River, Upper Basin Workgroup)* are necessary to determine the feasibility of restoring passage for steelhead upstream of Bradbury Dam.

ATTACHMENT 20

Statement of Peter B. Moyle

1. I am a fish biologist whose general area of expertise is the ecology and conservation of freshwater and anadromous fishes, especially in California. A significant portion of my research has focused on regulated streams and the impacts of dams, diversions, and other factors on fish populations in northern California. I do not have any personal experience working on the Santa Ynez River, aside from compiling information on it to use in my latest book, *Inland Fishes of California* (2002, University of California Press, 505 pp.).

2. I have a B.S. in Zoology (Minnesota), an M.S. in Fisheries Biology (Cornell), and a Ph.D. in Zoology (Minnesota). I have been conducting research on freshwater and anadromous fish in California since 1969. I have served as a Professor of Fisheries Biology at the University of California at Davis since 1972, and was chair of the University's Department of Wildlife, Fish and Conservation Biology for five years. I have authored or co-authored over 170 publications, including *Inland Fishes of California* the standard reference work on California fishes, and four other books and monographs on fishes. My resume and list of publications is attached to this declaration.

3. I am a member of the American Fisheries Society, American Society of Ichthyologists and Herpetologists, Ecological Society of America, Society for Conservation Biology; American Association for the Advancement of Science, and American Institute of Biological Sciences.

4. Awards include**:** Award of Excellence, Western Division, American Fisheries Society (1991); Haig-Brown Award, California Trout (1993); Distinguished Fellow, Gilbert Ichthyological Society (1993); Fellow, California Academy of Sciences (1993); Bay Education Award, Bay Institute (1994); Public Service Award, University of California, Davis (1995); Outstanding Educator Award, American Fisheries Society (1995, with J. J. Cech); Streamkeeper Award, Putah Creek Council (1997); Distinguished Ecologist, Colorado State University (2001).

5. My expertise on the meaning fish in "good condition" in Section 5937 of the Fish and Game Code stems initially from years of research on the ecology of fishes in California streams, much of which was aimed at finding ways to improve conditions for native fish and fisheries. My research has dealt with fish at all ecological levels from individuals to populations to communities to ecosystems. My expertise on Section 5937 specifically stemmed from my work as an expert witness at a trial (Putah Creek Council vs. Solano Irrigation District, Sacramento Superior Court No. 515766, March 1976) over increasing the flows of Putah Creek, the stream that flows past the University of California, Davis, campus, to benefit native fishes. I had been studying the fishes of the stream for nearly 20 years at that time so had developed knowledge over the conditions that would favor the desired fishes and fisheries. This allowed me to develop a detailed definition of what , in my expert opinion, "fish in good condition" meant. CDFG Code Section 5937, was a key factor resulting in the successful outcome of the trial, in which the judge awarded flows for fish down Putah Creek from the Solano Water Project. The judgment was not appealed.

6. Following the trial, I published a peer-reviewed paper on the outcome that included a discussion of my definition of "good condition." The paper is: *Fish health and diversity: justifying flows for a California stream* (1998, Fisheries, Vol 23 No. 7, Pages 6-15). The paper

has Michael P. Marchetti, Jean Baldrige, and Thomas L. Taylor as junior authors, fisheries biologists who assisted me in my preparation for the trial. The definition of good condition, however, was developed by me. The sections below essentially summarize the contents of this paper.

7. Section 5937 of the Fish and Game Code reads as follows: "The owner of any dam shall allow sufficient water at all times to pass through a fishway, or in the absence of a fishway, allow sufficient water to pass over, around, or through the dam to keep in good condition any fish that may be planted or exist below the dam." "Good condition" is not defined in the Section but use of the phrase "any fish" strongly suggests that Section 5937 was meant to be applied broadly to all fish species that depended on the stream for their existence, including anadromous fish such as steelhead. In a later section of the Code, "fish" is defined to include aquatic invertebrates as well as vertebrate fish.

8. In 1993, Darrell Wong, a biologist with the California Department of Fish and Game (DFG), developed a definition of "good condition" for a hearing by the State Water Resources Control Board. This definition was focused on the single species (brown trout) present in the stream in question and basically stated that "good condition " meant that the stream contained fish in good physical health with a population age structure that indicated the population was large and self-sustaining. He also stated that under this definition, maintaining fish in good condition required a stream with high "ecological health." I used Mr. Wong's definition as a starting place for the definition I developed, for a stream containing many species of fish.

9. Because Putah Creek supported over 20 species of fish, including anadromous chinook salmon and Pacific lamprey, I developed a definition of "good condition" which encompassed the DFG definition but which would also protect (1) a unusual assemblage of native fishes, (2) fisheries for non-native game fishes, and (3) anadromous fishes. This definition put "good condition" at three successive levels: individual, population, and community. To satisfy Section 5937, a fish has to be in good condition at all three levels.

10. At the individual level, fish in good condition needed to be healthy. This means they have to be relatively free of diseases and parasites, have robust appearance (i.e., have a suitable weight for a given length), have a growth rate appropriate for the region (i.e., not be stunted), and should respond in an appropriate manner to stimuli (e.g., can avoid predators, including anglers). If water releases from a dam are unfavorable (e.g., too warm, too low, too turbid) to species of fish, it is likely that individuals will be underweight, suffer from outbreaks of parasitic infections, and be more susceptible to predators, especially non-native predators such as largemouth bass, or to dying of stress-related disease.

11. At the population level, to be in good condition under my, and Mr. Wong's definition, each population must (1) be made up of healthy individuals as indicated in the previous section, (2) have multiple age classes, which is evidence of successful reproduction and recruitment, and (3) have a viable population size. A viable population is one that is large enough so it will not go extinct from random factors or unusual events, such as a major drought. Steelhead in the Santa Ynez River are part of the Southern California ESU that has been listed as "endangered" under the federal Endangered Species Act, which means they are a population considered to have a high

risk of extinction in the near future. The fact they are listed strongly suggests the population is not in good condition at the population level. Determination of the actual viable population size for a species usually requires extensive study of their demographic characteristics (age structure, mortality rates, growth rates, etc.) but a reasonable surrogate for an actual population estimate from a 'good condition' point of view is the presence of extensive habitat for all life history stages over long reaches of stream. Thus in Putah Creek, I determined that most native fish were not in good condition because their populations existed only in a short reach below the dam (into which water was released to satisfy riparian rights of streamside landowners) where habitat was limited in quantity and quality.

12. At the community level, "good condition" under my definition means that a dynamic assemblage of fish exists that will predictably inhabit a given range of environmental conditions, usually the historic range that existed on or near the site prior to the construction of a given dam. This concept is essentially equivalent to concept of *biotic integrity* developed by Dr. James A. Karr (1981, 1993) and widely used a measure of stream health, as I have done for California streams, including Putah Creek (Moyle and Marchetti 1999). Thus a fish community in good condition is one that (1) is dominated by co-evolved species, (2) has a predictable structure as indicated by limited niche overlap among the species and the presence of multiple trophic levels, (3) is resilient in recovering from extreme events, (4) is persistent in species membership through time, and (5) is replicated geographically. Because the Santa Ynez River only contained 2-7 species of fish over most of its length historically (Moyle 2002) this community level definition of good condition is less important than for streams with more complex communities. These species were steelhead, threespine stickleback, Pacific lamprey, prickly sculpin, tidewater goby, striped mullet, staghorn sculpin, with the latter three found mainly in the estuary/lagoon. Only the first four presumably occurred in the river above the estuary on a year around basis, including steelhead. The number of species undoubtedly became progressively smaller in an upstream direction. Steelhead was presumably the principal, if not the only species, in headwater streams and likely the most abundant fish where water was permanent and summer temperatures remained cool in the main river.
13. Overall, under my definition, for an individual fish to be in good condition it has to be a healthy individual that is part of a self-sustaining population that is an interacting part of a community of fish species with similar characteristics.

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ATTACHMENT 21

Statement of E. A. Keller, Professor of Geological Sciences, University of California Santa Barbara

Education and Training
I have a Ph.D. degree from Purdue University in 1973. For further details, see attached vita.

Publications
I have over one hundred publications that consist of journal articles, chapters in books and proceedings of symposium, and academic books. See vita for details.

Skills, Knowledge, and Expertise
I have thirty years of experience in research and consulting in the area of fluvial geomorphology, hydrology, geology, and relationships of hydrology and geology to salmonid habitat.

Specific Areas of Expertise: Relative to the Santa Ynez River System
I have over twenty years experience working on streams and rivers in southern California, including the Santa Ynez River, Ventura River, and Mission Creek. These studies have been to evaluate the physical characteristics of the river systems and their relationship to active tectonics, hydrology, wildfire, and fish habitat. With respect to the Santa Ynez River system, I have worked with the city of Santa Barbara on the Mono Creek diversion dam, including the major tributary Indian Creek for the environmental impact analysis of desilting Gibraltar Reservoir. With respect to evaluation of hydrology and habitat for salmonids, I have ten years experience in northern California in the Redwood Creek drainage system to evaluate relationships between large woody debris and fish habitat. I also discovered and helped develop the concept of "cold pools" that result from interactions between the ground water system and river system. The Santa Ynez River System is similar to the Ventura River in that it is in the chaparral environment of southern California and highly influenced by tectonic activity, wildfire, and infrequent but intense precipitation. I evaluated at tributary of the Ventura River following the Wheeler fire, and worked for over ten years on the relationship between active tectonics and the Ventura River.

Membership in Professional Societies
I am a member and fellow of the Geological Society of America and a member of the American Geophysical Union.

Awards and Honors
I have several awards and honors including outstanding alumni awards from Purdue University and California State University, Fresno. I was also elected as a fellow to Emmanuel College, Cambridge University, England. See vita for details.

BASIS FOR MY OPINION
The expert opinion in this document is based upon my experience in southern California rivers as well as thirty years of experience in fluvial geomorphology and evaluation of relations between geology, hydrology, and fish habitat. I have spent numerous days in the field in southern California observing the streams and rivers and conducted two major studies of effects of wildfire on stream processes.

I have had the opportunity to review documents prepared by agencies reporting on the Santa Ynez River system. These include, among other, studies of channel form and classification, and fish habitat by the U.S. Forest Service for the upper and middle Santa Ynez River, Alder Creek, Cachuma Creek, Indian Creek, and North Fork Juncal Creek dated between 4-28-94 and 2-13-97 and "Santa Ynez Steelhead Restoration Feasibility Study" by USFS biologist Sara Chubb dated 6-3-97); reports by the U.S. Bureau of Reclamation; the Santa Ynez River Census Committee and the Santa Ynez River Technical Advisory Committee (including information regarding pool depth and frequency and river habitats below Bradbury Dam); the National Marine Fishery Service (including the 9-11-2000 Biological Opinion for the Operation and Maintenance of the Cachuma Project); relevant excerpts from the current COMB/Bureau of Reclamation DEIR/S, the State Water Resources Control Board DEIR, and from the 1995 Cachuma Contract Renewal EIR/S, and an early report (Shapavolov, 1944) by the Bureau of Fish Conservation, BFC, California Division of Fish and Game.

STATEMENT OF EXPERT OPINION

1) The Santa Ynez River below Bradbury Dam has been hydrologically and sedimentologically altered and can never be returned to the river it was before the three upstream dams and reservoirs were constructed. The best-developed and deepest pools in the river below Bradbury Dam are found immediately below the dam for a distance of about 3 miles from the dam to the Highway 154 Bridge. This reach would benefit most directly from larger and deeper pools and more zones of coldwater upwelling from augmented water flows similar to Alternative 3A2, which was part of the Environmental Impact Report / Statement concerning the Cachuma project contract renewal in 1995. These are:

- 48 cubic feet per second (cfs) 15 February to 14 April for spawning, then
- 20 cfs to June 1 for incubation and rearing, then
- 25 cfs for one week for emigration, then
- gradually decrease releases to 10 cfs by 30 June, then
- hold at 10 cfs to 1 October for steelhead rearing and resident fish, then
- 5 cfs the rest of the year for resident fish.

2) The Refugio reach that extends nearly five miles downstream from Highway 154 Bridge to the Refugio area bridge has a good mix of pools and riffles. The next reach and the next down stream reach known as the Alisal reach would, with additional releases of water from Lake Cachuma contain deeper pools and riffles, more typical of gravel bed rivers.

3) Without additional water releases from Lake Cachuma above that called for on pages 6 and 7 of the BO (the basis for Alternative 3A - 3C and 4A and 4B in the SWB DEIR), including for example a rearing target flow of 2.5 cfs, 5 cfs or 10 cfs at the Highway 154 Bridge depending on whether the reservoir has less 30,000 - 120,000 AF in storage, has greater than 120,000 AF but has not spilled in excess of 20,000 AF, or has spilled greater than 20,000 AF, the main stem is the Santa Ynez River, particularly in the Highway 154, Refugio, and Alisal reaches will continue to have degraded pools and riffles. In other words, without augmentation of flow there would be less areas of submerged gravel in the river bed, shallower and smaller pools and riffles, less

continuous flows, and probably less coldwater upwelling pockets formed by seepage of water from within the alluvium into the bottoms of some pools than there would be under Alternative 3A2.

4) Downstream in the main stem of the Santa Ynez River below the Alias reach, the pools and riffles are greatly reduced in frequency and the channel is more like a "braided stream" and much more sandy as opposed to a gravel bed river gravel. With fewer pools and sandy bed this section is poor habitat for steelhead spawning and rearing. This would change little with additional water releases. However, releasing greater rates of water from Bradbury Dam than proposed in the BO, for instance as proposed under Alternative 3A2 described above, would make it easier for fish to migrate both up and down stream.

5) The morphology of the Santa Ynez River above Lake Cachuma and Gibraltar Reservoir and Juncal Reservoir is not as well understood as below Bradbury Dam. Unlike the river below the dam, limited observations of major tributaries above the dam by various agencies and by myself suggest that these streams are for the most part boulder and gravel bed streams with step-pool morphology or pools produced by large boulder roughness elements. These streams for the most part have not had flows diverted and their watersheds are in a much more natural condition with fewer land uses, roads, grazing, agriculture and development compared to those watersheds below the dam. In particular, some of the streams with good boulder channel morphology that exhibit the more natural conditions described above include Cachuma Creek, Alder Creek, Santa Cruz Creek, Indian Creek and Mono Creek.

6) In conclusion, I recommend the following:

A. In the event that an evaluation of potential alternatives to transport anadromous fish to the Santa Ynez River watershed above Cachuma Reservoir is required, it should include an evaluation of the geomorphological, hydrological sedimentological features of the main river and the major tributaries above the dam to identify suitable receiver locations.

B. Following implementation of increased flow in the lower river, additional evaluation to confirm and quantify the improvement in habitat resulting from increased flow in the lower river.

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E.A. Keller ,10-6-03