MONTEREY PENINSULA
WATER MANAGEMENT DISTRICT

http://www.mpwmd.dst.ca.us

5 HARRIS COURT, BLDG. G • POST OFFICE BOX 85 • MONTEREY, CA 93942-0085 • (831) 658-5600 • FAX (831) 644-9560

MEMORANDUM

DATE: July 10, 2009

TO: Carmel River Advisory Committee

FROM: Larry Hampson, Senior Water Resources Engineer

SUBJECT: Packet for July 16, 2009 Committee Meeting

Enclosed is the meeting packet for the next meeting of the Committee, which will be held on:

Thursday, July 16, 2009
10:00 A.M.
Mid-Carmel Valley Fire Station Community Room

You may also download the meeting packet from the following website:

http://www.mpwmd.dst.ca.us/programs/river/crac/cracinfo.htm

For directions, contact Larry Hampson at the Carmel Valley field office at 659-2543 or by e-mail (larry@mpwmd.dst.ca.us).

Enclosure

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Carmel River Advisory Committee Members

John Dalessio, Chair
Lawrence V. Levine, Vice Chair
Vincent Frumkin
Thomas D. House, Jr.
Lance Monosoff
Susan Rogers
Clive Sanders

Public Comment

Anyone wishing to address the Committee on a matter not listed on the agenda may do so during Public Comment.

DRAFT
AGENDA
CARMEL RIVER ADVISORY COMMITTEE

****

Thursday, July 16, 2009
10:00 A.M. at
Mid-Carmel Valley Fire Station Community Room

1. **CALL TO ORDER/ROLL CALL**

2. **PUBLIC COMMENT**

3. **ELECTION OF CHAIR AND VICE-CHAIR FOR FISCAL YEAR 2009-2010**

4. **CONSENT CALENDAR**

   A. **Consider Approval of Minutes from the April 9, 2009 Regular Meeting.**

5. **UPDATE AND DISCUSSION ON CARMEL RIVER WATERSHED ACTIVITIES – Clive Sanders**

6. **CAPTIVE STEELHEAD REARING IN THE CARMEL RIVER – a discussion lead by MPWMD Senior Fisheries Biologist Kevan Urquhart**

7. **STAFF REPORTS**
   a. **INTEGRATED REGIONAL WATER MANAGEMENT PLANNING**
   b. **UPDATE ON SAN CLEMETE DAM ALTERNATIVES**
   c. **LOWER SAN CARLOS RESTORATION PROJECT**
   d. **ELEVATION –CAPACITY STUDY OF LOS PADRES RESERVOIR**
   e. **FALL 2009 VEGETATION MANAGEMENT PROJECT**
   f. **COMMUNICATIONS RECEIVED BY MPWMD – attached is a copy of a request made to the United States District Court by the Sierra Club and Carmel River Steelhead Association for an order enjoining California American Water to reduce Carmel River diversions (note: this information is provided for information only – there is no analysis or staff recommendation for this item)**

8. **ITEMS TO BE PLACED ON FUTURE AGENDAS**

9. **ADJOURNMENT**

Staff notes regarding these agenda items will be available for public review on Monday, July 13, 2009 at the District office in Monterey.

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MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
CARMEL RIVER ADVISORY COMMITTEE
July 16, 2009

1. CALL TO ORDER/ROLL CALL

2. PUBLIC COMMENT - Anyone wishing to address the Committee on a matter not listed on the agenda may do so during Public Comment.

3. ELECTION OF CHAIR AND VICE-CHAIR FOR FISCAL YEAR 2009-10 – MPWMD Rule 120 (Carmel River Advisory Committee) includes the following provision: "At the first meeting held in each fiscal year, the committee shall elect a chairperson and vice-chairperson to preside at committee meetings."

ACTION REQUIRED: The Committee should elect a Chair and Vice-Chair to preside at Committee meetings during Fiscal Year 2009-10 (July 1 through June 30).

4. CONSENT CALENDAR

A. Minutes from the April 9, 2009 Regular Meeting of the Carmel River Advisory Committee Regular Meeting are attached as **Exhibit A**.

ACTION REQUIRED: The Consent Calendar contains routine items that will be approved or accepted upon ratification of the Consent Calendar. A Committee member may request that a Consent Calendar item be considered separately by the Committee.

5. UPDATE AND DISCUSSION ON CARMEL RIVER WATERSHED ACTIVITIES
BACKGROUND: This is a regular agenda item. Clive Sanders, Administrator for the Carmel River Watershed Conservancy (CRWC), will update the Committee about CRWC activities.

RECOMMENDATION: No action is required. This is a discussion item.

6. CAPTIVE STEELHEAD REARING IN THE CARMEL RIVER – a discussion lead by MPWMD Senior Fisheries Biologist Kevan Urquhart

BACKGROUND: In February 2009, Chair John Dalessio asked that the subject of an adult captive rearing program for the Carmel River be discussed at a Committee meeting. Please see **Exhibit B** for additional background on this item.

RECOMMENDATION: No action is required. This is a discussion item.

7. STAFF REPORTS - Staff will report on the following:

a) Integrated Regional Water Management Planning (Hampson)
b) San Clemente Dam Alternatives (Hampson)

c) Lower San Carlos Restoration Project (Hampson)
d) Elevation-Capacity Study at Los Padres Reservoir (Hampson)
e) Fall 2009 Vegetation Management – see **Exhibit C** (Christensen and Hampson)
f) Communications received – see **Exhibit D**

8. ITEMS TO BE PLACED ON FUTURE AGENDAS

Committee members should bring up any new business at this time to determine whether it should be included on a future meeting's agenda.

9. ADJOURNMENT

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Draft **Exhibit A**

MINUTES
MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
CARMEL RIVER ADVISORY COMMITTEE
10:00 A.M. Regular Meeting at
Mid-Carmel Valley Fire Station Community Room
April 9, 2009

1. CALL TO ORDER/ROLL CALL

MEMBERS PRESENT:	John Dalessio, Vince Frumkin, Tom House, Larry Levine, Lance Monosoff , Clive Sanders
MEMBERS ABSENT:	Susan Rogers (excused absence)
PUBLIC PRESENT:	Monica Hunter (Planning and Conservation League), Tom Skiles (Monterey County Water Resources Agency), William "Bill" Phillips (Monterey County Water Resources Agency), Joyce Ambrosius (National Marina Fisheries Service)
STAFF PRESENT:	Andy Bell, Thomas Christensen, Larry Hampson, Kevan Urquhart

2. PUBLIC COMMENT – Monica Hunter announced an upcoming meeting on May 28, 2009 of the Coast and Ocean Regional Roundtable for Monterey County to discuss improved management between inland and ocean resources, local funding for conservation and restoration and the potential to create a virtual tour of Carmel Valley.

John Dalessio described a recent Supreme Court decision that would allow a private water company, such as California American Water, to partner with a public agency to own a desalination plant in Monterey County. [Monterey County currently prohibits private ownership of desalination facilities.]

3. CONSENT CALENDAR – there were no items on the Consent Calendar

4. UPDATE AND DISCUSSION ON CARMEL RIVER WATERSHED ACTIVITIES – Clive Sanders described efforts to obtain funding to improve steelhead habitat and reduce flooding at the Carmel River lagoon. He said that Jack and Mary Jane Hammerland [property owners on the north side of the lagoon] were investigating the use of vinyl sheet piles to build a flood protection wall on the north side of the lagoon. In addition to a flood wall, flap gates and pumps would be used to prevent flooding of low-lying structures. Clive said that one of the goals of the lagoon work is to encourage a naturally functioning lagoon and beach.

John Dalessio suggested contacting one of the universities in the area to see if there is an interest in partnering on a grant application. He also suggested that any grant application include a proposal to create jobs by including a training program within the project scope.

Vince Frumkin stated that training staff to write grant applications is more effective than hiring consultants.

5. DISCUSSION ON CARMEL RIVER STEELHEAD FISHERY MANAGEMENT – Joyce Ambrosius, the Central Coast Team Coordinator in the Santa Rosa office of the National Marine

Fisheries Service (NMFS), discussed the San Clemente Dam, Los Padres Dam fish passage improvements, and the draft federal recovery plan for steelhead.

There are two proposed alternatives that would meet the Division of Safety of Dam's requirements for Cal-Am to address concerns at San Clemente Dam about dam safety during a maximum credible earthquake or during the probable maximum flood. These alternatives are dam buttressing (Cal-Am's proposed project) and the Dam Removal and River Reroute Project (Reroute). Joyce said that California American Water (CAW) was concerned about potential liability from the Reroute project and that the Coastal Conservancy, Planning and Conservation League (PCL), National Marine Fisheries Service (NMFS) and CAW had been unable to resolve this issue. When the State budget crisis occurred in late 2008, contract work to evaluate this issue was halted. At about the same time, CAW chose to stop work on the Reroute alternative and move forward with the dam buttressing alternative.

A preliminary analysis by NMFS of the buttress alternative indicates that this alternative would receive a jeopardy opinion for impacts to steelhead [Essentially, a jeopardy opinion states that a proposed project would likely result in unacceptable harm to a listed species protected under the Endangered Species Act]. A jeopardy opinion must contain reasonable and prudent alternatives to protect the listed species, but those alternatives must be economically and technologically feasible.

Monica Hunter stated that PCL would like to see the public-private partnership on the Reroute alternative continue in order to keep the costs down for ratepayers and to enhance the environment. She said that there was a possibility that without the partnership continuing, the removal project would have to be completed without any public funds.

Concerning Los Padres Dam fish passage, Joyce said that CAW agreed to fund analysis and construction of improvements for downstream juvenile passage over the dam during spring flows. CAW will also investigate alternatives to improve upstream migration of adults and downstream migration of juveniles and kelts [adult spawners returning to the ocean].

Joyce said that the draft steelhead recovery plan for South Central Coast steelhead is tentatively schedule to be released for public review in October 2009. It will likely include requirements, actions, and recommendations concerning a water management plan, seasonal passage, sediment passage, groundwater extraction effects, restoration of natural channel bottoms, land use plan, reduced encroachment, 50-foot buffer at lagoons, retrofit of storm drains, restoration plans for estuaries, and a public education plan.

Joyce briefly described the 2006 Settlement Agreement between CAW and NMFS in which CAW agreed to fund projects to mitigate impacts to steelhead from Carmel River diversions. The California Department of Fish and Game agreed to be the administrator for the funds. All projects funded through the Settlement Agreement must address impacts associated with CAW diversions of Carmel River water.

Kevan Urquhart briefly outlined some of the issues associated with an adult captive rearing program for Carmel River steelhead and suggested that he could give a more detailed presentation at a future meeting.

6. STAFF REPORTS –

a. Andy Bell reported on the Coastal Water Project Draft EIR. Kevan Urquhart reported that MPWMD had applied for federal grant funds to replace the Sleepy Hollow ford with a bridge, a gravel injection project, and a project to mine gravel from San Clemente Reservoir [note: none of the projects were funded].
b. Larry Hampson reported on the state's Regional Acceptance Process for allowing a planning region into the Integrated Regional Water Management grant program funded by Props. 84 and 1E.
c. Mr. Hampson reported on the progress of a study by CSUMB to determine storage capacity at Los Padres Reservoir.

7. ITEMS TO BE PLACED ON FUTURE AGENDAS

Committee members scheduled July 16, 2009 for the next meeting and requested that the following items be placed on a future agenda:

a. Continue report on adult steelhead rearing program
b. San Clemente Dam update
c. Potential to buy out Camp Steffani

8. ADJOURNMENT

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EXHIBIT B

From: John Dalessio **To:** Larry Hampson; Larry Levine; Thomas Christensen; Thomas House; Susan Tescher; Clive Sanders; Dalessio; Vic Frumkin; Richard H. Rosenthal **Subject:** ASAP **Date:** Saturday, February 07, 2009 5:18:03 PM

Hi all:

The below emails from Clive and Frank Emerson are self explanatory. Should meet as scheduled, and consider taking a position on this issue? Let me know, Yes if you want to meet, and No if you don't want to meet. **ASAP, please.** If we do meet, I'll call the meeting for 9:30, and have us out in an hour or less. Regards, John

-------- Original Message -------
Subject: Point of no return
Date: Sat, 7 Feb 2009 10:39:31 -0800
From: Clive's Email <simbacli@pacbell.net> **Reply- To:** Clive's Email <simbacli@pacbell.net> **To:**John Dalessio <dalessio@mbay.net>

Hi John, attached is a letter from Frank Emerson, VP of the CRSA.

The CRWC board has decided to add their support and willingness to partner in Frank's proposal to create once again a broodstock program for the Carmel river steelhead. Four years of drought and no wetting of the lower river can destroy the population. I was a participant in the last "drop" of juvenile steelhead above Los Padres reservoir in late 1991. It was memorable because of the number of men ,women and children from all over who joined in the hike around the reservoir delivering in large plastic bags the young fish into the river & creeks. Two mule trains carried the juvenile fish in milk churns from the valley. That was the culmination of 4 years work by members of CRSA, and CDFG. Steelhead smolts cocks & hens reared in ponds and then transferred to ocean tanks at Granite Canyon.There after to the hatchery north of Santa Cruz for controlled spawning. MPWMD staff I believe participated in the salt water rearing as volunteers.

My board wishes to send letters to the Federal and State & local agencies addressed in Frank's letter urging that MPWMD be authorized to take on this task with the help of conservationists groups based close by. I thought it imperative that the CRAC be involved and I was proposing present the idea to the meeting this month.

Clive
Clive R. Sanders, Carmel River Watershed Conservancy,
P.O. Box 223833, Carmel, CA 93923 Cell: 831-521-6676 Web: www.carmelriverwatershed,org/

Begin forwarded message:
From: "Frank Emerson" <frankemerson@redshift.com> **Date:** February 2, 2009 9:46:50 PM PST **To:** "Kevan Urquhart" <kevan@mpwmd.dst.ca.us>, "Dick Butler" <Dick.Butler@noaa.gov>, "Jeff Single" <JSINGLE@dfg.ca.gov>, "Jeffrey Jahn" <Jeffrey.Jahn@noaa.gov>, "Margaret Paul" <MPaul@dfg.ca.gov>, "Joyce Ambrosius" <Joyce.Ambrosius@noaa.gov>, "Mathew Fuzie" <MFUZIE@parks.ca.gov>, "Craig Anthony \(E-mail\)" <Craig.Anthony@amwater.com>, "Catherine Bowie" <Catherine.Bowie@amwater.com>, "Sean Hayes" <sean.hayes@noaa.gov>, "Darby Fuerst" <Darby@mpwmd.dst.ca.us>, "John McKeon" <John.McKeon@NOAA.GOV>, "Donna Meyers" <DMeyers@bigsurlandtrust.org>, "Dana Jones" <danajones@parks.ca.gov>, "Pam Armas" <PARMA@parks.ca.gov> **Cc:** "Geoff Malloway" <malloway@redshift.com>, "Clive Sanders" <simbacli@pacbell.net>, "Monica Hunter" <mhunter@pcl.org>, "Roy Thomas" <IIWinos@aol.com>, "Roger Williams" <willrb@comcast.net>, "Paul Chua" <pchua@mbayaq.org>, "Mark Starr" <markstarr@redshift.com>, "Hank H Smith" <f8hawk@aol.com>, "Frank Emerson" <frankemerson@redshift.com>, "Brian Leneve" <leneve@redshift.com>, "Bob Zampatti" <bzamp@redshift.com>, "Barry Brandt" <barrybrandt@msn.com>, "Dick Heimann" <fishpop@aol.com>

Subject: Carmel Steelhead, "Point of No Return"

To Agency Management and Interested Parties:

We are approaching the "Point of No Return" for Carmel River Steelhead. The 2008/2009 water year has not yet produced a sufficiently strong storm, nor enough runoff, to recharge the Aquifer. The result is that the river is still bone dry from just below Shulte Bridge to the Carmel Lagoon and the Sea. Due to this drought condition Adult Steelhead cannot ascend the river to spawn, nor smolt descend to the Ocean to create the next generation of Spawners. In short Carmel River Steelhead cannot "Return Home" and complete their lifecycles.

The other rivers and streams on the Monterey Coast have reached the Ocean, but not the Carmel River. This is man-made habitat loss and constitutes "take" of ESA listed (threatened) Steelhead due to permitted and un-permitted diversions of the Carmel River and it's subsurface flows.

This brings to home some observations and suggestions we have made to the Federal and State Fishery Agencies. Also to the Monterey Peninsula Water Management District (MPWMD), the agency authorized and funded to conduct mitigation efforts on the river.

Mitigation for such "take" and severe habitat loss must include a "Captive Rearing Program" During years when the river does not connect to the sea such a project can maintain a "genetic bridge" or reserve until the river flows naturally again. Wild Smolts that cannot make it to the Ocean would be reared until adulthood, then released back into the river to spawn naturally in 2 -3 years.

Please see the attached paper published in the American Fisheries Society "Journal" in 1996 that summarizes the concept and methods of captive rearing Wild Steelhead to adulthood.

When there is no flow from the Carmel River to the Ocean, due to man-made and/or natural drought 2 primary things happen:

a) Adults (Spawner Steelhead) cannot make it into the river from the Ocean to migrate to the spawning grounds, lay eggs and provide a new generation of juveniles.

b) Smolts from previous years spawning cannot make it out the river to the Ocean and grow into a new year class of Adults.

The result is that multiple year class and life cycle strategies are lost in that one year. In a completely un-altered, un-diverted, un-dammed, undeveloped state the Carmel River and its' Steelhead would not be threatened by this. The large amount of gene pool represented by multiple year classes in the river and the ocean would provide ample stock to recover the population in succeeding wet years. In its degraded, de-watered, dammed and impaired state the population does not recover a robust, full strength, complex and diverse genetic make up during wet years.

For that reason we believe it is incumbent on the Fishery and Water Agencies, Federal and State Gov't. (man) to take action in such precarious conditions to captive rear some smolts from this year class to adulthood in a joint and coordinated effort post haste. We have made this suggestion and asked that this be part of the NOAA, Section 10 (take) Permit for the Sleepy Hollow Rescue and Rearing Program run by MPWMD. CRSA ran a captive rearing project during the 1989-1993 drought when the river did not run to the Ocean for 4 years. This local stakeholder group is credited with preventing the extinction of the native Carmel River Strain of Steelhead. CRSA worked jointly with Ca. Dept of Fish and Game to secure a salt water tank at DFG's Granite Canyon Marine Laboratory.

The fisheries dept. of MPWMD has the personnel and financial resources to do this in years with no flow to the Ocean. They will not have to rescue fry and therefore will have the time to capture smolts that cannot make it to the Ocean and captive rear them. Their funding is stable, coming from a fee charged to all water users in the District for mitigation. What needs to be located and secured for this project immediately is a salt water rearing site. CRSA has resources and volunteers to assist MPWMD where possible.

The other critical need is to end over-pumping of the Carmel River and the underground Water Table.

We need a desalination source of water to meet community needs during dry summer months and drought years. Without this there is no chance to have water in the river except in very wet winters. Even in wet years the river no longer has year round, continuous surface flow, resulting in the loss of many thousands of juvenile steelhead. A truly alternate water supply for human use, not derived from pumping the river, is needed to restore the native habitat that supports this magnificent resource, a federally protected species.

To facilitate replacing Carmel River pumping with desalination water sources, and create a program to preserve the Wild Carmel River Steelhead population until flows are restored, we will be pressing the urgency of this situation with Elected Officials with the hope of securing needed resources and support for these projects.

If you have specific questions about the past CRSA/CDFG captive rearing please call Roy Thomas, (831) 625-2255 at his office.

Sincerely Yours,

Frank Emerson Carmel River Steelhead Association, 501(c)3
P.O. Box 1183 Monterey, Ca. 93940
cell (831) 277-0544

Enhancing Threatened Salmonid Populations: A Better Way

By Roy L. Thomas

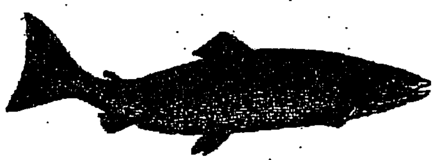
Many West Coast wild stocks of salmon and steelhead have been identified as either threatened, endangered, or extinct, and fisheries management failures associated with these situations are tragic. We can no longer practice supervised neglect, watch wild populations ride the oscillating down slope to near extinction, and then try to use the Endangered Species Act (ESA) to save the day. Implementing the act is too expensive and prone to failure, and as use of the act increases, the legislation becomes increasingly vulnerable to political efforts to weaken or destroy its foundation.

We need to act quickly to preserve our wild populations until the causes of their decline can be mitigated. In many cases, we should intercede on behalf of a declining wild population while assessing whether it represents an Evolutionary Significant Unit (ESU) or why it is declining. To finally mitigate conditions contributing to population decline only to lose the uniquely adapted population native in that habitat is a tragedy.

Recovery of endangered populations can be enhanced by supplementing the remnant spawning population with adults of the same genetic race without significant disruption of the potential for natural recovery. An at-risk wild population can be restored without many of the genetic and disease problems of traditional hatcheries. The idea of supplementing remnant spawning populations is not a perfect solution and is certainly not a substitute for nature, but it is effective at assisting struggling populations with minimal disruption to their genetic integrity.

My idea is to capture a representative number of families and races of outmigrants from a declining river population. Marking and DNA analysis could be used to genetically identify each individual, if necessary. This representative sample of outmigrants could be transported and held at an efficient saltwater-rearing facility. If efficient net-pen techniques are used, the cost of spawning adults produced from wild smolts could be a fraction of what traditional hatcheries spend to produce returning hatchery adults. The wild outmigrants are reared to sexual maturity and at the appropriate time are transported to their native stream to spawn.

Traditionally, fisheries biologists blamed degraded instream habitat as a major limiting factor in anadromous populations. By reducing mortality during the ocean phase of the life cycle, this restoration strategy maximizes enhancement of wild fish most fit to survive during the egg incubation and pre-smolt phases of the life cycle under existing conditions. Reducing mortality during the ocean phase also effectively eliminates natural selection during this stage. However, in cases where the alternative is complete loss of the genetic stock, the elimination of ocean mortality due to recent unfavorable environmental conditions (El Niño) and high-seas netting mortality may be justified.



I observed some of these smolts riding the debris-filled wave of the storm-swollen river and jumping ahead onto the dry gravel in a desperate attempt to clear the sandbar at the river mouth, only to be stranded as the surface flow disappeared into the pumped-dry river gravels.

Rearing wild smolts to maturity in a saltwater facility has such problems as acclimating smolts to salt water, maintaining appropriate temperature and salinity for gonadal development, providing appropriate diets to maintain health, and determining the appropriate time to reintroduce mature adults to fresh water. Many of these problems appear to have been solved by commercial brood-stock operations in the north Pacific and Europe.

Applying the Enhancement Approach

The Carmel River Steelhead Association (CRSA), a group of volunteer conservationists and anglers, used the approach of raising wild smolts to maturity to enhance threatened steelhead populations in the Carmel River, California. This project evolved as a result of a cooperative effort among a number of agencies, including the Monterey Bay Salmon-Trout Project, Monterey Peninsula Water Management District, California Department of Fish and Game (CDFG), and Monterey County Fish and Game Fines Commission.

Prior to 1987, the Carmel River had the largest self-sustaining run of steelhead south of San Francisco, California. This population was of the southern race (currently under consideration for listing under the ESA) and was uniquely adapted to the severe conditions of the river's high temperature and intermittent flow. For the past 20 years, the CRSA has rescued steelhead stranded by the municipal withdrawals from the lower river. From 1981 to 1987, volunteers from the association reared the stranded fish to smolt size and released them into the river when winter rains opened it to the ocean. The spring of 1990 found CRSA

While not a fisheries professional, Roy L. Thomas has spent 22 years working to restore salmonid populations in the Pacific Northwest through the Carmel River Steelhead Association.

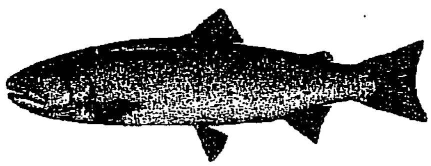
volunteers in a desperate mood because drought conditions, along with severe overdraft of the river's base flow to support golf courses and development, had prevented the river flow from reaching the ocean since 1987. During the drought, I witnessed the native ocean population being decimated by California sea lions that tore apart the overripe fish that circled while waiting for the river to open. Those adults not destroyed by sea lions died from stresses of overmaturity and age. By 1990, few smolts were left to outmigrate because of the lack of returning spawners. I observed some of these smolts riding the debris-filled wave of the storm-swollen river and jumping ahead onto the dry gravel in a desperate attempt to clear the sandbar at the river mouth, only to be stranded as the surface flow disappeared into the pumped-dry river gravels.

Although the southern and central California steelhead take advantage of storm events and high tide to pass over these sandbars, the overdraft zone at the mouth of the Carmel River was impassible for three consecutive years. Because the ocean phase for these steelhead rarely extends beyond three or four years, this unique genetic component was in significant danger of extirpation.

When the CRSA approached the CDFG with the idea of rearing captured smolts to maturity in salt water, agency personnel were initially not supportive of the plan. After negotiating, we developed a three-year cooperative project with the agency and eventually received both technical help and funding. Our association built smolt traps to capture the wild outmigrants. In 1990, with no end to the drought in sight, we captured all the smolts that attempted to outmigrate in an effort to rescue the remaining remnants of this genetic stock.

Ninety of these smolts were transported to the Granite Canyon Marine Laboratory of the CDFG and reared in a 5-ft-by-20-ft fiberglass tank, which we assembled in a parking lot. These fish, which ranged greatly in size, shape, and color, adapted well to their artificial environment. We were able to use discharge water from an abalone and rockfish experiment as a saltwater source. Volunteers worked one to two hours each, one day a week, feeding the fish and cleaning the tank. We had success introducing the wild fish to salt water and converting them from natural to pelletized food, frozen krill, and native baitfish of Monterey Bay. Information on net-pen-rearing salmonids to commercial size was available, but the technology needed for rearing salmonid brood stock in salt water was difficult to find. We called many federal, state, and university fisheries professionals for technical assistance but received little useful advice. The fisheries staff at Nanaimo, British Columbia, were most helpful, sending us a draft brood-fish manual as well as unpublished technical brood-fish information. However, it was difficult to determine when individual fish would be ready to enter fresh water or how to tell which fish would spawn that year.

Despite these problems, more than half the fish tried to spawn the first year. Instead of releasing mature fish into the river the first year, we stripped and fertilized eggs at the Monterey Bay Salmon-Trout Project Fish Hatchery. Although most of the females were successfully returned to the saltwater tank to rear another year, males died on reintroduction to salt water. Apparently, the males required a much longer post-spawning recovery time.



...the results [of our project] clearly demonstrate the potential of raising wild smolts to maturity in captive-rearing programs as a restoration technique for enhancing threatened wild populations of salmonids

The second year we collected 188,000 eggs, and some fish grew to 12 lbs. We released some unspawned adults into the river to spawn, and later we released fry and smolts back into the empty habitat. We even backpacked 53,000 swim-up fry to the headwaters of the Carmel River in the Ventana Wilderness. The third year we had fish grow to more than 20 lbs. More unspawned fish were released to the wild, and 160,000 eggs were taken at the hatchery, again with various sizes of fish released into the river. Although the project was extended to a fourth year, the CDFG terminated the project at the end of that time when drought conditions subsided. Although counts of returning adult steelhead increased as a result of this project, both the CRSA and CDFG continue to be concerned about the future of the Carmel River steelhead population.

This technique of captive-rearing wild smolts to sexual maturity demonstrated tremendous possibilities for restoring and enhancing both steelhead and other salmon. The 90 original wild steelhead smolts, which in nature represent 1.7 to 6 wild returning adults, produced the equivalent of more than 100 spawning fish in the first 3 years.

An Analysis of the Approach

The approach of rearing wild smolts to maturity is not without potential problems and concerns. Eliminating natural selection in the late outmigration and ocean phase of the life cycle has the potential to alter gene pools, especially if the approach were used throughout successive generations. Many fish biologists agree the biggest challenge facing anadromous stocks on the West Coast is degraded instream conditions. Captured wild smolts represent a gene pool that has already survived instream conditions and selection. When the released adult, raised from the captured smolt, spawns in its native stream, spawning site location, mate selection, and egg and parr survival occur under natural conditions. Resulting offspring should be better adapted to use the habitat available than the hatchery products currently in use. However, techniques to enhance the numbers of spawners will be ineffective in systems where degraded instream habitat limits egg survival and smolt production.

Special care should be taken to collect a representative sampling of outmigrating smolts (across the entire outmigration period) to avoid selecting for earlier or later outmigration. Selection occurring within the artificial rearing habitat can also be problematic.

Conditions for rearing wild smolts should be kept as natural as possible. Net-pen rearing appears to offer considerable promise for providing a cost-effective approach to producing mature spawners. The basic technology of net-pen rearing is well-established. Compared with traditional hatcheries, net-pen rearing can generate a high-quality adult for less expense. With appropriate marking, wild smolts from many different rivers could be raised together in regional facilities. However, maintaining genetic stocks at several smaller, isolated facilities would reduce the chances of a disease event destroying an entire genetic unit.

Another important aspect of this strategy is that wild adults can be left alone. No longer must wild adults be forced to spawn in a hatchery possibly with siblings or an inappropriate family or race. The most valuable fishes to a natural population are wild-spawning adults. They have survived all past challenges, and they deserve to be left to spawn naturally with a mate of their choosing. Another reason not to use wild adults in a restoration project is that they are less abundant than smolts and more difficult to catch, and it is hard to capture a representative sample of all families and races necessary to enhance a complex wild population. Compared with the impact of removing an adult, the removal of a few smolts may have less effect on the gene pool and the potential for natural recovery.

While there are genetic selection problems associated with any form of artificial propagation, I believe that the approach of raising wild smolts to maturity is less disruptive to genetic integrity than many traditional propagation programs. In addition, few would disagree that this type of intervention is preferable to the current hand-wringing approach of watching runs decline to Redfish-Lake-size runs. Our pilot project clearly demonstrates the feasibility of this approach. However, additional research and development is needed to develop this approach for widespread use.

Too many depleted and at-risk populations are suffering supervised and unsupervised neglect. Resource managers appear to be waiting and watching the decline until the populations become eligible for ESA listing. By this time restoration may be too expensive or too late. While our project was not assessed in a rigid scientific manner, the results clearly demonstrate the potential of raising wild smolts to maturity in captive-rearing programs as a restoration technique for enhancing threatened wild populations of salmonids. Although I do not think the population is completely restored, we do believe that without effort to save the gene pool, the unique Carmel River steelhead would not be restored in our lifetime, if at all. I encourage fisheries professionals to investigate the feasibility of this enhancement approach and to devote research and development effort to implementing similar programs. Similar enhancement programs could use cooperative approaches among natural resource agencies, angler and environmental groups, and aquaculture and other industries to develop programs to benefit other threatened salmonid populations. I hope that other resourceful individuals or groups will approach public resource agencies, form cooperative relationships, develop a plan, and act on it!

EXHIBIT C

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

PROJECT DESCRIPTION
FOR
SELECTIVE VEGETATION MANAGEMENT AND CONCRETE REMOVAL
IN THE CARMEL RIVER CHANNEL
SUMMER AND FALL 2009

A series of relatively quiet hydrologic years on the Carmel River since 1998 has encouraged significant vegetation growth in the center of the channel in several areas. Winter storm flows capable of scouring vegetation out of the channel bottom have not occurred since a peak flow in February 1998 of 14,500 cubic feet per second (cfs), which was estimated to be a 20-year return flood magnitude. The highest peak flow since 1998 was in April 2006 at 4,210 cfs (about a four-year return flow). This flow did not scour out vegetation that became established in the channel bottom after the very wet 1998 El Niño winter. As a result, there is an increased risk of streambank erosion along riverfront properties in several locations (see enclosed maps) should winter flows rise above about a five-year return magnitude (approximately 5,000 cfs). Erosion can occur as high flows are directed away from the center of the channel by vegetation and debris dams into streambanks.

Five areas impacted by vegetation encroachment in the channel bottom are proposed for selected vegetation removal:

1. Ward Area: beginning at a section of the Ward's private property River Mile (RM) 15.0 and extending approximately 30 feet downstream; several large trees have fallen in the main channel. These trunks will be notched (partially cut) and brances will be trimed. The large section of trees will be placed in the flowing stream to provide large wood habitat.

2. Downstream of Boronda Road Bridge Area: two reaches beginning approximately 20 feet and 100 feet downstream of the Boronda Road Bridge, which is located at RM 12.7, one large tree will have some branches trimmed and its trunk notched, the second section downstream with trees blocking the channel on a gravel bar (150 feet in length) will be removed. One additional reach about ¼ mile downstream (200 feet in length) will also be trimmed. Trees will be placed in the flowing stream to provide large wood habitat. The rest of the branches will be chipped.

3. Robinson Canyon Bridge: beginning at approximately RM 8.4, downstream of Robinson Canyon Road Bridge and extending 230 feet many trees have become established across the active channel. This section will be opened up to allow debris and high flows to pass. Some branches will be placed in the active channel for habitat value and the rest will be chipped.

4. Red Rock Area: beginning approximately RM 8.2 at the Red Rock Restoration Project and extending 150 feet downstream; trees blocking the channel on a gravel bar will be removed. Trees will be placed in the flowing stream to provide large wood habitat. The rest of the

branches will be chipped.

5. Quail 8 Area: beginning approximately RM 4.2 at the Quail 8 condominiums and extending 80 feet downstream; trees extending out and blocking the channel will be trimmed back. Some branches will be placed in the channel for habitat and the rest will be chipped.

A width of up to 40 feet of open channel is desired. A total of approximately 965 lineal feet of stream encompassing approximately 0.44 acres in the channel bottom may be affected by the vegetation removal.

Woody species in the center of the channel, including sycamore, alder, cottonwood, and willow, will be cut by hand, using chainsaws, loppers, and other hand tools. As described in Monterey Peninsula Water Management District's (MPWMD) "Guidelines for Vegetation Management and Removal of Deleterious Materials for the Carmel River Riparian Corridor" (March 2003), a minimum of vegetation will be removed in order to maintain an open passage for flow and debris. Most of the vegetation targeted for cutting is less than eight years old. Trees selected for cutting will be cut to the ground, but rootballs will be left intact. Cut branches and tree trunks will be placed along stream edges to provide shade and cover for aquatic species, in some cases excess vegetation will be chipped. Vegetation on the banks will be left in place to maintain bank stability. Streambank vegetation encroaching into the channel bottom may be cut back to 15 feet from the toe of the streambank (measured toward the center of the channel), if this option would result is less overall impact.

In addition to the vegetation management activities at this site, MPWMD with the help of the California Conservation Corps, will try to remove two large concrete slab/abutments (one 6 feet long, 6.5 feet wide, and 3 feet thick and another 5 feet long, 4 feet wide, and 1.5 feet thick) that is located on a gravel bar (in the dry) along the Carmel River (Garland Park Area: approximately at RM 11.6). This slab/abutment is associated with an old bridge that failed in the past. This remnant abutment impacts the ability of the river to meander and change course during high flows.

In addition, the remnant concrete abutment may limit the rivers ability to convey high flows especially if it anchors or prevents debris piles from passing through the system. For these reasons the Monterey Peninsula Water Management District would like to remove it.

It is anticipated that a crew of ten California Conservation Corps members will work for two days using an air compressor and two jack hammers to break up the concrete abutment. It is anticipated that rebar will be encountered during the process and will need to be cut. Concrete will then be hauled out of the area by hand and disposed of at the local landfill.

It should be noted that the concrete removal project will only take place if budgeted funds and time are available.

MPWMD proposes to conduct these activities between approximately mid August and mid October 2009. Because vegetation will be trimmed, but not removed entirely, no stream diversions or erosion control plans are necessary. Both steelhead and California red-legged frogs may be present in the reaches targeted for vegetation cutting (see enclosed habitat assessments).

Avoidance and minimization measures proposed to protect steelhead include the following:

1. Where possible, trees will be cut to fall away from stream areas that may contain steelhead. Where trees cannot be cut to fall away from stream areas, the direction of fall will be to areas that steelhead are less likely to occupy, such as shallow or open water areas.

2. Work will be conducted in the fall when water temperatures may be less affected by the removal of shade along the stream edge.

Avoidance and minimization measures to protect California red-legged frogs (CRLF) include the following:

1. A qualified biologist will survey project areas using United States Fish and Wildlife Service survey guidelines prior to conducting work in the channel.

2. A qualified biologist will conduct a training session for any workers who have not already participated in such a session.

3. A qualified biologist will inspect project areas daily for the presence of CRLF prior to conducting work in the channel.

4. If CRLF are found at a project site and it is determined that vegetation removal may impact frogs, MPWMD will delay vegetation removal until the frogs move or relocate frogs to another area of the river if delay is not feasible.

Temporary impacts from vegetation removal may include the loss of cover and shade. MPWMD conducts ongoing revegetation activities along the Carmel River that mitigate for such temporary impacts. In addition, MPWMD routinely removes non-native plant species. Additional information about these activities is available by contacting Thomas Christensen, MPWMD Riparian Projects Coordinator, at (831) 659-2543.

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Attorney for SIERRA CLUB and CARMEL RIVER STEELHEAD ASSOCIATION

UNITED STATES DISTRICT COURT

IN THE NORTHERN DISTRICT OF CALIFORNIA

SIERRA CLUB, a not-for-profit California Corporation, and CARMEL RIVER STEELHEAD ASSOCIATION,

Plaintiffs,

v.

CALIFORNIA AMERICAN WATER COMPANY, dba CALIFORNIA AMERICAN WATER, a California Corporation,

Defendant

GARY LOCKE, SECRETARY OF THE UNITED STATES, DEPARTMENT OF COMMERCE, in his official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party)
and

DR. JANE LUBCHENKO, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, in her official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party)
and

RODNEY MCINNIS, REGIONAL ADMINISTRATOR, SOUTHWEST REGION, NATIONAL MARINE FISHERIES SERVICE, in his official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party)

COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF

JURISDICTION

1. This court has jurisdiction under 28 USC §1331 (federal question jurisdiction) and under 16 USC §1540(g)(1), which confers jurisdiction on the district courts to enforce provisions of the Endangered Species Act and regulations promulgated pursuant to authority under the Act. This case arises under the Endangered Species Act, 16 USC §1531 et. seq. It is an action under the citizen enforcement provision of the ESA. 16 USC §1540 (g)(1), which establishes a federal cause of action for any person to enforce provisions of the Endangered Species Act in United States District Courts. 16 USC §1540(g)(1) provides that "any person may commence a civil suit to enjoin any person…who is alleged to be in violation of any provision of this chapter or regulation issued under the authority thereof." Plaintiffs request this Court to enjoin diversions from the Carmel River in Monterey County that "harm" South Central California Coast Steelhead in such a manner as to constitute a "taking" under the ESA, Section 9 (a)(1), 16 USC §1538(a)(1).

VENUE

2. Under 16 USC §1540(g)(3)(A), venue is proper in any judicial district in which a violation of the ESA occurs. California American's unlawful takings of South California Central Coast Steelhead attributable to its diversions of water from the Carmel River occur within Monterey County in the Northern District of California.

INTRA-DISTRICT JURISDICTION

3. This case involves diversions of water from the Carmel River undertaken by California-American Water Company, a California corporation, in Monterey County in violation of the "takings" prohibition of Section 9 of the ESA, 16 USC §1538(a)(1).

PARTIES
PLAINTIFFS

4. The Sierra Club is a national nonprofit organization of approximately 1.3 million members and supporters dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. Roughly 195,000 members live in the state of California.

The Sierra Club's concerns encompass protecting the Carmel River Steelhead and protecting the riparian habitat of the Carmel River. Sierra Club members use the riparian habitat of the Carmel River and the River for recreational, educational, and scientific activities within the scope of the Club's purposes. The presence of steelhead as a natural feature of the River enhances its members recreational experiences as well as their esthetic appreciation of the natural beauty of the River and its riparian habitat.

5. Carmel River Steelhead Association (hereafter CRSA) is a California §501(c)(3) charitable corporation dedicated to protecting the steelhead population and its habitat in the Carmel River Watershed in Monterey County. The CRSA has volunteered hundreds of hours annually in rescuing steelhead that have been stranded in the lower reaches of the Carmel River. The CRSA has been rescuing steelhead in the Carmel River for the last 15years, and is embarking already this June on fish rescues in the River and its tributaries.

DEFENDANTS

6. California American Water (Cal-Am), a California corporation, is a wholly owned subsidiary of American Water Works Company, Inc. California American Water is a privately-owned Class A regulated water and wastewater utility. California American provides water service within Monterey County to the cities of the Monterey Peninsula and to the Carmel Valley. It produces water from the Carmel River by diversions from the Carmel River and by pumping from the alluvium of the Carmel River. Additionally it pumps water from the aquifer below the Seaside Basin to service the Monterey Peninsula.

7. Gary Locke, Secretary Of The United States Department Of Commerce, in his official capacity; Dr. Jane Lubchenko, Administrator, National Oceanic and Atmospheric Administration, in her official capacity; Rodney Mcinnis, Regional Administrator, Southwest Region, National Marine Fisheries Service, in his official capacity, are named as necessary parties under FRCP 19 (a). The necessary parties have negotiated a Settlement Agreement with California American relating to the conservation of the SCCC Steelhead Distinct Population Segment and have interests that may be implicated in the subject of this action. The Settlement Agreement provides that the necessary parties are exercising their enforcement discretion not to prosecute California American for Section 9 takings in return for promises by California American to pay certain moneys for steelhead conservation.

PLAINTIFFS' NOTICE OF INTENT TO SUE

8. Sierra Club and CRSA have sent notice of their intention to file this lawsuit by a letter dated March 18, 2008 to:

Carlos M. Gutierrez,
Secretary of Commerce,
U.S. Department of Commerce
14th & Constitution Ave., Room 5516
Washington, DC 20230

David Berger
General Manager
Monterey Peninsula Water Management District
P.O. Box 85
Monterey, CA 93942

William T. Hogarth
Assistant Administrator for Fisheries
National Marine Fisheries Service
1315 East West Highway I SSMC3
Silver Spring, MD 20910

Rodney McInnis, Regional Administrator,
Southwest Regional Office,
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802-4213

B. Kent Turner, President
California American Water Co.
P. O. Box 951
Monterey, CA 93940

John MacCamman, Director,
Interim Director
California Department of Fish and Game
1416 Ninth Street
Sacramento, CA 95814

Tam M. Doduc, Chair,
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812

9. This letter constitutes the notice required by Section 11(g)(2)(A)(i) of the ESA, 16 U.S.C. § 1540(g)(2)(A)(i), prior to commencement of legal action. As such, it was intended to notify the above-listed organizations that Sierra Club and CRSA intend to take whatever legal steps may be necessary to prevent continued unauthorized takes of steelhead by California American and to seek injunctive relief. Since the Notice, California-American has not ceased making diversions from the Carmel River and its alluvium that give rise to "takings" under the ESA. This letter is attached as Exhibit G to Plaintiffs' Request for Judicial Notice.

10. Steelhead is the name commonly applied to the anadromous form of *Oncorhynchus mykiss*. Steelhead in the Carmel River are part of the South-Central California Coast Distinct Population Segment, which the National Marine Fisheries Service ("NMFS") first listed as a threatened

Evolutionary Significant Unit on August 18, 1997. 62 Fed.Reg. 43937 et seq. (listing the SCCC Evolutionary Significant Unit), and again in 2006. 71 Fed.Reg. 834 et seq. (Jan. 5, 2006) (listing the SCCC Distinct Population Segment ("DPS)) (codified at 50 C.F.R §223.102 (c)(16)). NMFS designated critical habitat for South Central California Coast Steelhead on September 2, 2005. 70 Fed. Reg. 52488, 52516-17 (codified at 50 C.F.R. § 226.211). The critical habitat for the SCCC Steelhead DPS includes the Carmel River and the Carmel River Lagoon.

11. The Carmel River was perennial until diversions began at the old Carmel Dam at about river mile (rm) 18 in 1882. A larger but still small concrete arch dam, San Clemente, was built in 1921 at rm 18.6, approximately in the middle of the watershed, and a somewhat larger earth-fill dam, Los Padres, was built in 1948 at rm 23.5. The initial storage capacities of the dams were 1,300 acre feet (af) at San Clemente, and 3,200 af at Los Padres. Water stored at Los Padres is released into the river, and re-diverted for use at San Clemente. Beginning in the 1950's, diversions from the dam were augmented by diversions from wells in Carmel Valley. The average unimpaired annual flow in the river is approxmately100,000 acre feet, and diversions for domestic and municipal uses by California American Water Company are now approximately 11,000 acre feet. Other diversions are approximately 2,000 af. Flow is highly variable within and between years, however, and in some years all of the flow is diverted. Moreover, surface storage is dwindling. The pool behind San Clemente is now almost entirely filled with sediment, and the pool behind Los Padres is about half full. California-American owns and operates both dams under state license.

12. The seasonal dry periods in the river below San Clemente Dam increased with diversions. In the early 1960's, as diversions from wells in the Carmel Valley increased, riparian vegetation began to die, with consequent bank erosion during wet winters. This erosion peaked in 1983. For many years, the only summer flow in the river below San Clemente Dam was ~1 cfs seepage around the dam, plus inflow from minor tributaries. Beginning in 1983, the Monterey Peninsula Water Management District ("MPWMD") began requiring Cal-Am to release some water from San Clemente Dam for re-diversion by the downstream wells, and over time the required releases increased until the SWRCB effectively prohibited dry season diversions from San Clemente in 2002. However, the river continues to go dry each summer at some point downstream from about rm 9, and the flows above that point are reduced by

the diversions from California-American wells that pump from the Carmel River alluvium. Rearing habitat for steelhead in the Carmel River extends from migration barriers on the upper river and its tributaries to the seasonally dry reach of channel in the Carmel Valley Half the available spawning habitat is above Los Padres Dam.

13. The factors for decline for Carmel River steelhead are habitat blockages, dewatering from urban water diversions and habitat degradation, agricultural and urban development on floodplains and riparian areas, and artificial breaching of estuaries during periods when they are normally closed off from the ocean by a sandbar. Water diversions by California-American, accounting for 85% of diversions from the Carmel River are a principal factor in the decline of the steelhead population in the river.

14. In 1995 the State Water Resources Control Board recognized many of these same factors regarding the decline in Carmel River Steelhead in WRO 95-10, which found that:

> When San Clemente Dam was constructed in 1921 (RM 18.5), a fish ladder was also built. (MPWMD:289,8-8.) Access to a major portion of the steelhead spawning and rearing habitat was effectively eliminated in 1949 with the construction of Los Padres Dam at RM 23.5. (CRSA:5,2.) Although a fish trap was installed downstream of the dam and captured adults transported into the reservoir, the facility proved ineffective at maintaining steelhead populations. (MPWMD:289,8-8.)
>
> Annual counts of steelhead passing through the San Clemente fishway began in 1961. The critical dry years of 1976-77 and 1987-92, drought, and diversion by Cal-Am from its wells have combined to reduce water available to steelhead and have also reduced the steelhead population to remnant levels. Only one fish was recorded in 1991 and 15 fish in 1992. (MPWMD:337,49.) Past reviews of Carmel River environmental problems have identified flow reduction and habitat alteration as major factors associated with steelhead decline. (SWRCB:42,III-44.)
>
> Paralleling the declining steelhead population during this period was the rising urban demand for water. Originally, the Monterey Peninsula water supply was diverted entirely from the two reservoirs and from surface flow. When demand exceeded the developed surface resources, wells drilled in the Carmel Valley alluvium aquifer were added to supplement supply. In recent times, dry season surface flows below the Narrows at RM 10 have been depleted in most years as a result of heavy ground water pumping. This results in the stranding and death of many juvenile fish as surface flow recedes. (DFG:4,32.)"

State Water Resources Control Board, WRO 95-10, at 27-28 (July 6, 1995). (Plaintiffs' Request for Judicial Notice, Exhibit D).

15. According to a 2006 annual mitigation report by the Monterey Peninsula Water District:

> About 1.5 miles of habitat between Boronda Road and Robles del Rio and up to nine miles of habitat below the Narrows may dry up, depending on the magnitude of streamflow releases at San Clemente Dam, seasonal air temperatures and water demand. Beginning as early as April or May of each dry season, the District rescues juvenile steelhead from the habitat in these reaches. The goal of this program is to help maintain a viable steelhead population by transplanting juveniles to permanent river habitats downstream of San Clemente Dam (if it is available), and/or rearing juvenile steelhead at the Sleepy Hollow Steelhead Rearing Facility, located just downstream of San Clemente Dam, if habitat is not available."

(Plaintiffs' Request for Judicial Notice, Exhibit B5).

16. In response to the dewatering of the river, the MPWMD and the CRSA conduct annual fish rescues, and the MPWMD operates a rearing facility, as noted above. According to the 2005-2006 MPWMD annual monitoring report, a total of 20,821 steelhead were rescued from the mainstem Carmel River, including 20,289 young-of-the-year (YOY), 489 older juveniles, and one smolt. There were 43 mortalities in July through September 2005, associated with the MPWMD rescues.

17. Although the fish rescue efforts are helpful, they do not prevent the death of an unknown but presumably large number of juvenile steelhead that perish as flows decline to the level at which rescues occur, or that avoid capture. The mortality figures given above represent fish that perish during the course of the rescue. The rescues cause stress, and many of those successfully rescued will die in the fish rescue facility operated by MPWMD.

LEGAL STATUS OF CALIFORNIA-AMERICAN DIVERSIONS AND PREVIOUS REGULATORY ACTIONS

18. In 1995, in response to Complaints filed by the CRSA and the Sierra Club, with respect to California-American's diversions from the Carmel River and its alluvium, the SWRCB ruled in WRO 95-10 that water in the Carmel Valley alluvial aquifer is "flowing in a known and definite channel" and therefore legally is part of the river. The Board determined that Cal-Am's Carmel Valley wells require a permit to appropriate water from the SWRCB, which Cal-Am to this date has not

obtained. Accordingly, the SWRCB found that Cal-Am was diverting water unlawfully from the Carmel River.

19. In WRO 95-10, the SWRCB also found that Cal-Am had rights to divert only 3,376 acre-feet annually (afa). The SWRCB found that: "Cal-Am is diverting about 10,730 afa from the Carmel River or its underflow without a valid basis of right." (Order 95-10 at 39). The SWRCB also found that Cal-am's diversions were "having an adverse effect on: the riparian corridor along the river below San Clemente Dam at RM 18.5, wildlife which depend on the instream flows, and riparian habitat, and steelhead which spawn in the river." Accordingly, SWRCB ordered Cal-Am to immediately reduce its diversions from the river by 20%, to divert water as far downstream as practicable, and to take other remedial mitigation measures.

20. WRO 95-10 has since been modified by WRO 98-04 and WRO 2002-02, but the essential terms of the order remain unchanged. The Board has imposed additional constraints on California American's pumping from the River alluvium. In WRO 2002-02, the SWRCB ordered Cal-Am to take additional steps to move its diversions downstream during "low flow periods," that is, during times when stream flow in the Carmel River at the Don Juan Bridge (RM 10.8) gage is less than 20 cfs for five consecutive days. However, Cal-Am continued to divert 11,285 afa. In dry months most of its production from the Carmel River comes from its most downstream wells. In other words, although Condition 2 in WRO 95-10 ordered Cal-Am to "diligently implement" one or more actions "to terminate its unlawful diversions from the Carmel River", the SWRCB has tolerated Cal-Am diversions of about 7,900 afa (without a valid basis of right) for an interim period without it obtaining an appropriation permit, pending the obtaining of an alternative water supply or valid appropriation permits, or the construction of a New Los Padres Dam (which was rejected by the voters in 2001). As of this date, no alternative water supply has been obtained; Cal-Am has obtained no permit to divert 7700 afy from the River and voters have rejected New Los Padres Dam.

21. In February, 2008, the SWRCB issued a proposed Cease and Desist Order against California-American Water Company that would significantly curtail its unlawful diversion from the Carmel River (by 15% during the first three years, by 20% for the next 2 years, by 35% for the next to years, and by 50% by 2014) because California American had not ceased its unauthorized diversions,

has failed to obtain an alternative water supply to replace its unauthorized diversions from the Carmel River, and has not obtained any permit from the SWRCB to divert water from the Carmel River and its alluvium. Although an eight day evidentiary hearing on the proposed CDO was concluded in August 2008, the SWRCB has made no decision on the proposed CDO. The matter remains pending before the State Board.

22. On September 18, 2001, NOAA (NMFS) and California-American entered into a Conservation Agreement ("Conservation Agreement"), which required California-American to implement certain measures to reduce the impact of its operations in the Carmel River on steelhead and their habitat. Since September 2001, Cal-Am has implemented the measures set forth in Phase l of Tier I of the Conservation Agreement. These measures include ceasing surface water diversions at San Clemente Dam during low flow periods, ceasing diversions from the Upper Carmel Valley Wells during low flow periods, and installing a booster station to move water from the lower Carmel Valley to the Upper Carmel Valley.

23. Phase II of Tier I of the Conservation Agreement required Cal-Am to maintain a continuous surface flow in the Carmel River as far downstream as possible in AQ3 (a defined area of the Carmel Valley Aquifer) by offsetting its water diversions in upstream sections of AQ3 with expanded diversion capability in AQ4, and in the lowermost reaches of AQ3. Phase II required Cal-Am to increase well capacity downstream of, and including, the San Carlos Well by 3.0 to 5.0 cfs. Because the California Department of Health Services determined that extractions from the San Carlos Well constitute groundwater under the influence of surface water, the San Carlos well was taken out of service due to potable water quality concerns, as there is no means of providing surface water treatment at that location. This resulted in no net gain in pumping capacity in the lower aquifer. California-American was therefore unable to comply with Phase II of Tier I of the Conservation Agreement.

24. In a Settlement Agreement signed June 29, 2006, Cal-Am and NOAA agreed that in light of Cal-Am's need to focus its financial and personnel resources on a long-term water supply project, rather than those interim measures in the Carmel River, Cal-Am would not be obligated to proceed with the additional measures set forth in the 2001 Conservation Agreement.

25. Under the Supplemental Agreement with NMFS, California American agreed to continue to implement all of the measures described in Phase I of Tier I of the Conservation Agreement and to provide funding for projects "to improve habitat conditions for, and production of, SCCC steelhead and/or otherwise aid in the recovery of SCCC steelhead in the Carmel River watershed."

26. In return for Cal-Am's agreement to the terms and conditions of the June 29, 2006 Agreement, NOAA agreed to "exercise enforcement discretion relative to any potential violation of the ESA committed by CAW involving its pumping operations or water withdrawal from the Carmel River."

27. The 2006 Agreement was never implemented and the funding for the habitat improvement projects was never accomplished. NOAA exercised its enforcement discretion not to prosecute California-American for any Section 9 violation.

28. In 2009 the parties to the 2006 agreement signed a new Settlement Agreement, which contained virtually identical language to the 2006 Settlement Agreement. California American has paid $3.5 million into a custodial account (held by CDFG) as a first installment payment for habitat improvement on the Carmel River.

29. Returns of steelhead this year constituted a 17 year low. Only 95 returning steelhead were counted below San Clemente Dam.

30. California American has not obtained an incidental take permit, nor has NMFS approved a habitat conservation plan, regarding California-American's Carmel River diversions, pursuant to Section 10 of the ESA, 16 USG §1539(a)(1)(B).

31. California-American continues to divert water from the Carmel River and its alluvium in a manner that harms steelhead that are listed as threatened under the ESA, in violation of the takings prohibition of Section 9 (a)(1), 16 USC § 1538(a)(1).

FIRST CAUSE OF ACTION

32. Plaintiffs incorporate by reference Paragraphs 1 through 31, herein.

33. The Endangered Species Act, 16 U.S.C. §§1531, et seq., was enacted in 1973 for the express purpose of providing a means of conserving the ecosystems of endangered or threatened species, to provide a program for the conservation of such species, and to take appropriate steps to

achieve the purposes of various treaties and conventions regarding wildlife protection listed in the ESA. 16 U.S.C. § 1531(b).

34. An "endangered species" is defined by the ESA as any species which is in danger of extinction throughout all or a significant portion of its range. A "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. 16 U.S.C. §1532(20).

35. The ESA provides a means by which the Secretary of Commerce or the Secretary of Interior may designate by regulation any species as threatened or endangered because of any of the following factors:

(a) the present or threatened destruction, modification or curtailment of its habitat or range;

(b) overutilization for commercial, recreational, scientific, or educational purposes;

(c) disease or predation;

(d) the inadequacy of existing regulatory mechanisms; or

(e) other natural or manmade factors affecting its continued existence.

36. Section 9(a)(I)(B) of the ESA provides that it is unlawful for any person to "take" any endangered species. 16 U.S.C. § 1538(a)(1)(B). By regulation, NMFS has extended this take prohibition to threatened species, such as the SCCC steelhead DPS. See 16 U.S.C. § 1533(d); 50 C.F.R. §§ 223.101 et seq. The §4(d) rule establishing taking regulations pertaining to the SCCC Steelhead ESU contains no applicable exceptions from the take prohibitions with respect to Cal-Am's diversions and operations that impact the SCCC steelhead. See 50 C.F.R. §223.203.

37. 16 U.S.C. § 1532 (19) defines "take" as meaning, to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." See also 50 CFR §216.3. 50 CFR §222.102 defines "harm" (in the definition of "take") as meaning an act which actually kills or injures fish or wildlife. The definition of "harm" goes on to recite:

> Such an act may include significant habitat modifications or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering.

38. As set forth above, Cal-Am's diversions from the Carmel River and its alluvium "harm" steelhead by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, and sheltering.

39. This prohibition applies equally to persons engaged in activities that are not intended or designed to take species listed under the ESA, but may do so incidentally. Incidental takings that do not jeopardize the continued existence of a listed species may be authorized by the Secretary pursuant to an incidental take permit issued under Section 10 of the ESA, 16 U.S.C. §1539. Activities involving incidental takings must be conducted in accordance with terms and conditions set out in the section 10 permit.

40. California American has not obtained an incidental take permit under Section 10 of the ESA, nor has it sought approval by NMFS of a Section 10 habitat conservation plan, regarding the effects of the operation of its diversions on steelhead. In consequence, Cal-Am does not have an incidental take permit for its operation of the Project and is strictly liable under Section 9 and the regulations promulgated under ESA for any taking of threatened steelhead in the SCCC DPS that results in harm to steelhead from such operation. 16 U.S.C. §§ 1533(d), 1539(a)(I)(B); 50 C.F.R. §§ 224.102, 222.102, 223.101, 223.203.

41. In its preface to rule-making governing Take of 14 threatened steelhead ESU's, NMFS stated that activities like those of Cal-Am's diversions and dam operations are likely to result in "takings" of listed steelhead.

> "NMFS agrees that water diversions and …may have other deleterious effects on salmonid habitat. These may include impacts on sediment transport, turbidity, and stream flow alterations. …NMFS has revised the take guidance. One change is the water withdrawals have been added to the list of activities that are likely to injure or kill salmonids." 65 Fed.Reg. at 42422, 42429 (July 10, 2000).

42. In its 2000 Take Guidance, NMFS listed the following categories of activities most likely to result in injury or harm to listed salmonids:

> E. Removing water or otherwise altering streamflow when it significantly impairs spawning, migration, feeding, or other essential behavioral patterns. 65 Fed. Reg. 42472.

43. In its rule-making for listing the SCCC steelhead DPS, NMFS identified "Destruction/alteration of the steelhead habitats for any listed DPS, such as … draining … diverting …

altering stream channels or surface or groundwater flow" as an activity that could potentially harm steelhead and result in a violation of the take prohibition in Section 9." 71 Fed. Reg. 834, 858 (Jan. 5, 2006).

44. California-American is currently "taking", and will continue to take, SCCC Steelhead in violation of Section 9 of the ESA without an incidental take permit unless it is enjoined from continuing such taking by this Court. Its diversions are continuing to cause "harm" to SCCC steelhead within the meaning of the ESA and its implementing regulations. Cal Am has been diverting water from the Carmel River and its alluvium in a manner that is resulting in the unlawful taking of steelhead in violation of Section 9 of the ESA.

RELIEF REQUESTED

45. Plaintiffs request a Court Order enjoining California American to reduce and abate its Carmel River diversions to the degree necessary to preserve and prevent harm to the breeding, spawning, rearing, migrating, feeding and sheltering behaviors of South Central California Coast steelhead and to order Cal-Am to take such actions as are necessary to eliminate its unlawful take of South California Central Coast steelhead. (16 U.S.C. §1540(g)(1)(A).

46. Plaintiffs request the court to retain jurisdiction to supervise compliance with its orders.

47. Plaintiffs request preliminary injunctive relief ordering California American to reduce its diversions by 35% of its annual production, with respect to the 2009-2010 water year on a monthly basis, to begin immediately, and not to cease until the Carmel River is flowing to the ocean with sufficient discharge and duration to allow steelhead to reach and pass over San Clemente Dam.

48. Plaintiffs request attorneys fees, costs, and such other relief as may be just and proper.

Date: ___________________ ____

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UNITED STATES DISTRICT COURT

IN THE NORTHERN DISTRICT OF CALIFORNIA

SIERRA CLUB, a not-for-profit California Corporation, and CARMEL RIVER STEELHEAD ASSOCIATION, Plaintiffs, v. CALIFORNIA AMERICAN WATER COMPANY, dba CALIFORNIA AMERICAN WATER, a California Corporation, Defendant GARY LOCKE, SECRETARY OF THE UNITED STATES, DEPARTMENT OF COMMERCE, in his official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party) and DR. JANE LUBCHENKO, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, in her official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party) and RODNEY MCINNIS, REGIONAL ADMINISTRATOR, SOUTHWEST REGION, NATIONAL MARINE FISHERIES SERVICE, in his official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party)	**DECLARATION OF DR. JOHN G. WILLIAMS IN SUPPORT OF SIERRA CLUB MOTION FOR PRELIMINARY INJUNCTION**

I, Dr. John G. Williams, hereby declare under penalty of perjury:

Qualifications:

1. Since 1990, my professional work has focused on the biology of salmon and steelhead, on restoration of these fish and their habitats, and on methods for assessing the relationship between the flow and habitat in streams. I am the author of a major monograph on salmon and steelhead in the Central Valley of California, written with funding from the CALFED Bay-Delta Authority. I have published other papers in professional journals and given talks at professional meetings on the biology and management of steelhead and Chinook salmon. I am currently preparing a report on the use of the Sacramento-San Joaquin River Delta under contract with the U.S. Fish and Wildlife Service. I was recruited by the National Marine Fisheries Service (NMFS) to serve on the Central Valley Technical Recovery Team for Central Valley salmonids, and I was selected by CALFED to serve on a panel that reviewed the 2005 NMFS Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (OCAP BO).

2. I have published articles in professional journals and given talks at professional meetings on instream flow assessment. I am currently working on a project at the UC Davis Watershed Center on that topic, with professors Peter Moyle, Jeff Mount, and Matt Kondolf, funded by the California Energy Commission; my role is to write a major review of methods used for instream flow assessment, with emphasis on how to incorporate ideas and techniques from statistics, ecology and other areas of biology into the assessments.

3. I am also very familiar with the Carmel River. I have served on both the Board of Directors and the staff of the Monterey Peninsula Water Management District, and have written reports on the Carmel River while on the staff, and subsequently as a consultant. I am co-author of an article in a professional journal on the effects of diversions from wells along the river on its surface flow (Kondolf et al. 1987). I helped organize two scientific meetings on efforts to restore the river. I have also participated in various proceedings before the State Water Resources Control Board (SWRCB) regarding the Carmel River, mainly representing the Ventana Chapter of the Sierra Club. More detail on these and other aspects of my scientific qualifications are provided in my curriculum vitae, which is attached as

Exhibit A.

Summary:

4. The steelhead population in the Carmel River is part of the South-Central California Coast Steelhead (SCCCS) Distinct Population Segment (DPS) which was listed as threatened by the National Marine Fisheries Service (NMFS) in 1997. The Carmel River population has declined substantially since 2001, and is now at high risk of extinction. Steelhead (*Oncorhynchus mykiss*) are anadromous fish that spawn and rear as juveniles in freshwater, but gain most of their growth in the ocean. Non-anadromous *O. mykiss* are known as rainbow trout.

5. Diversions by the California-American Water Company (Cal-Am) dry up the Carmel River in the summer and fall, and deplete inflow to the Carmel River lagoon. Rearing habitat for steelhead is destroyed where the river goes dry, and is degraded in the lagoon and in a portion of the river above the dry reach. The diversions also delay the beginning of the migration season for adult steelhead and shorten the migration season for juveniles migrating downstream to the ocean. A dam owned by Cal-Am is also a serious migration barrier for steelhead, especially juveniles migrating downstream. This increases the importance of the habitat in the lagoon and lower river.

6. Cal-Am now diverts about 11,000 acre feet from the Carmel River, but in 1995 the State Water Resources Control Board determined that it had rights to only 3, 376 acre feet, and some of these rights are now dubious because of continuing loss of capacity of a reservoir. Thus, almost 8,000 acre feet of Cal-Am's annual diversions are unlawful. Reducing Cal-Am's diversions from the Carmel River by ~ 35% during the low flow season would significantly reduce the harm to steelhead and steelhead habitat.

The Carmel River:

7. The Carmel River flows northwest out of the Santa Lucia Mountains and the Sierra de Salinas in Monterey County and reaches the ocean just south of the town of Carmel. The upper river and tributaries in the Santa Lucia Mountains provide most of the runoff and potential steelhead habitat. Flow in the Carmel River is highly variable within and between years, but the unimpaired flow at the

mouth averages about 100,000 acre feet. During the summer dry season, unimpaired flows are low enough that the mouth of the river would close, forming a seasonal lagoon from which water would seep through the beach into the ocean.

8. The Carmel River flows in a confined canyon to about river mile (rm) 17, where it enters an alluvial basin known as the upper valley. There is a bedrock constriction called the Narrows at about rm 10. Below this, the river enters a larger alluvial basin, the lower valley, which extends to the ocean.

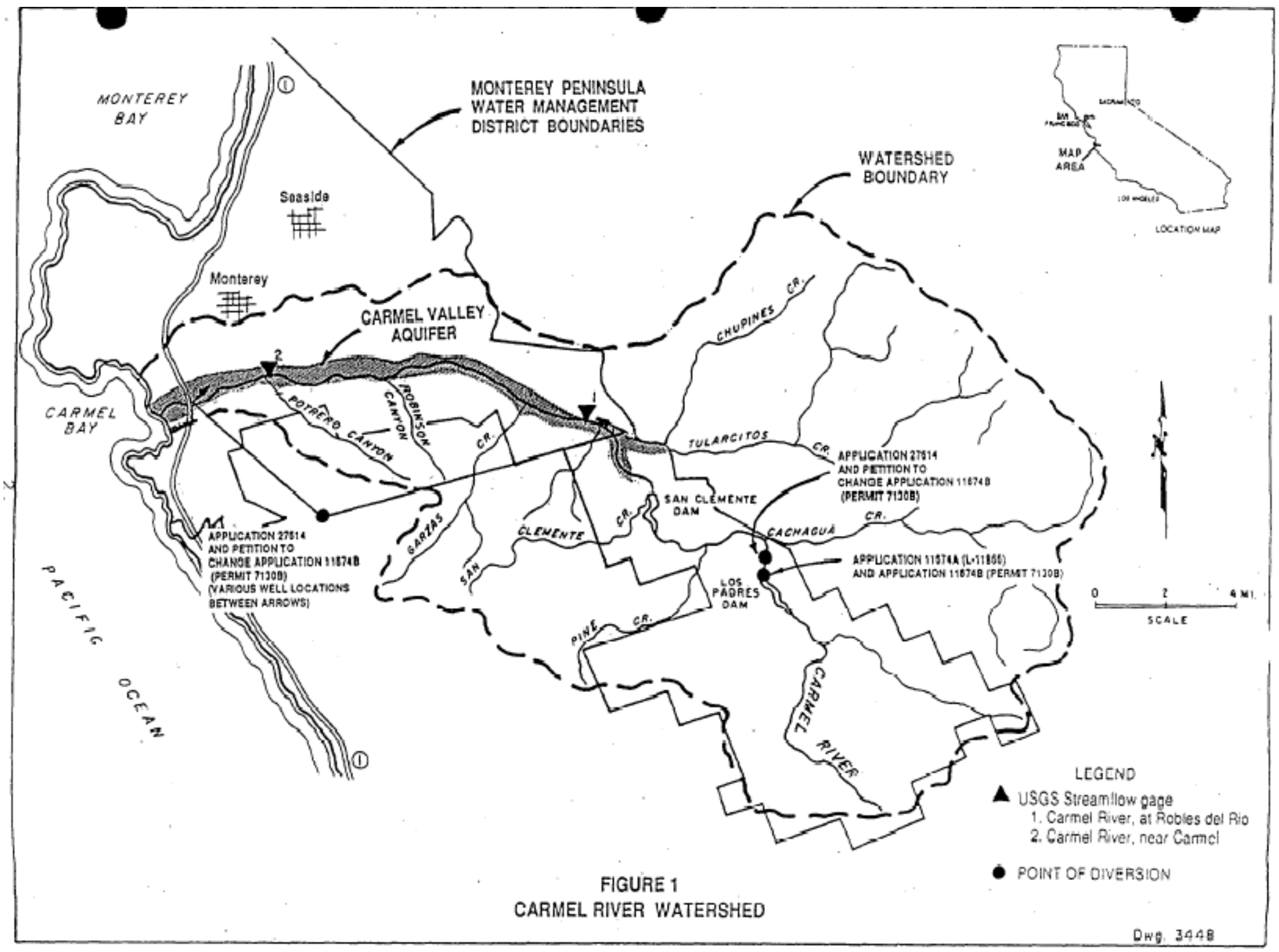


Figure 1. A portion of Figure 1 in SWRCB Order WR 95-10, showing the Carmel River watershed and the boundaries of the Monterey Peninsula Water Management District, as well as the locations of the USGS stream gages mentioned below.

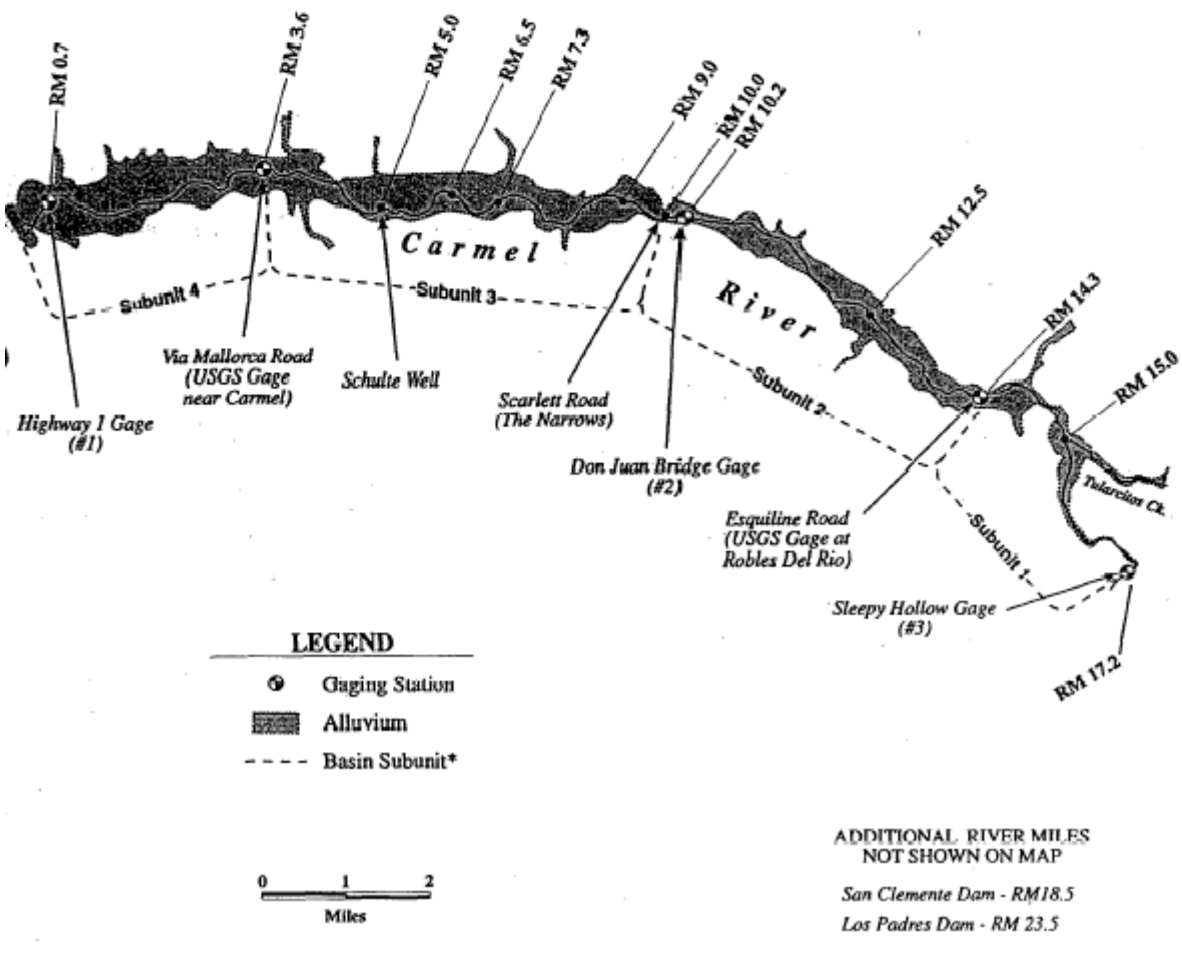


Figure 2. A portion of Figure 4 in Order WR 95-10, showing river miles along the lower Carmel River and the outline of the Carmel Valley alluvial aquifer. The upper valley includes subunits 1 and 2 shown on the map, and the lower valley includes subunits 3 and 4.

9. Water is diverted from the Carmel River by the California-American Water Company (Cal-Am) to supply the Monterey Peninsula area, including parts of Carmel Valley. Diversions to supply the Monterey Peninsula began in 1882, when the old Carmel Dam was at about river mile (rm) 18 in 1882 (Williams 1983). A larger but still small concrete arch dam, San Clemente, was built in 1921 at rm 18.6, approximately in the middle of the watershed, and a somewhat larger earth-fill dam, Los Padres, was built in 1948 at rm 23.5. The initial storage capacities of the dams were 1,300 acre feet (af) at San

Clemente, and 3,200 af at Los Padres, but sediments now fill almost all of the San Clemente reservoir and over half of the Los Padres reservoir.

10. Water stored at Los Padres is released into the river, and rediverted for use at San Clemente or from wells along the Carmel River father downstream. Initially, the wells were located in the upper Carmel Valley, where the quality of the groundwater is better. Beginning in the late 1960s wells were developed progressively farther downstream. Diversions by Cal-Am are now approximately 11,000 acre feet, and other diversions for local use are approximately 2,000 af. Diversions routinely cause parts of the lower river to go dry in the summer, and increase the duration of the period when the mouth of the river is closed. Because flow is so highly variable, in some years all is diverted, so that the river does not reach the ocean. This happened for three years in a row in 1988-90. Flow to the lagoon continues through the summer only in very wet years, such as 1983.

11. Diversions from the wells continue after the surface flow of the river goes dry. These continuing diversions deplete storage in the alluvial aquifer, which is recharged when the surface flow resumes in the following wet season. The rate of recharge typically is greater than the rate of surface flow early in the wet season, so that after the flow in the river in the upper valley becomes greater than the rate of diversions, there can be considerable delay in the resumption of surface flows to the lagoon (Figure 3). In some cases, such as February 1990, the river may start to flow to the lagoon, and then dry up again.

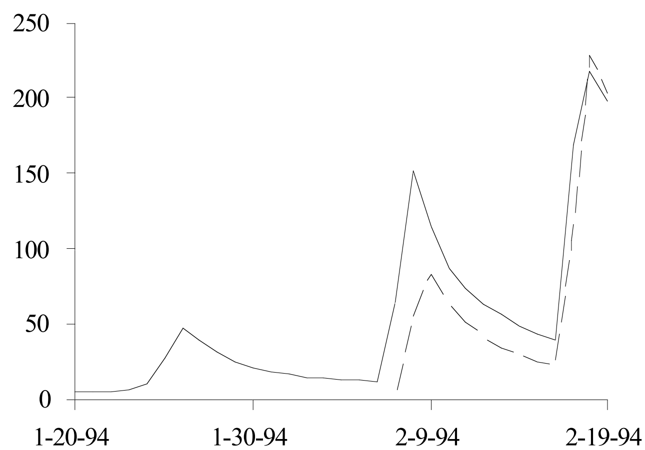


Figure 3. Comparison of flow at the Robles del Rio gage (solid line) at rm 14.3 and the Near Carmel gage (dashed line) at rm 3.6, showing the delay in the resumption of flow in the lower valley due to diversions from the aquifer. Prepared with data from the USGS gages 11143200 and 11143250.

12. In response to complaints by the Ventana Chapter of the Sierra Club, the Carmel River Steelhead Association, and two other parties, the SWRCB determined in 1995 in Order

WR 95-10 that water in the Carmel Valley alluvial aquifer is flowing in a known and definite channel formed by the bedrock boundaries of the aquifer. Essentially, the water in the aquifer is the subsurface flow of the river. Therefore, Cal-Am cannot lawfully divert water from the aquifer for non-riparian uses without a permit from the SWRCB. Order WR 95-10 also determined that Cal-Am had legal rights to divert only 3,376 acre feet, consisting of 1,137 pre-1914 rights, 60 acre feet riparian rights, and 2,179 acre feet from the permit for Los Padres Dam. However, the USGS now estimates the useful capacity of the dam at 1,480 acre feet, because of continuing sedimentation, which implies that Cal-Am's rights are now only 2,677 acre feet per year. Accordingly, about 8,000 acre feet of Cal-Am's continuing diversions from the Carmel River are lawful.

13. Order WR 95-10 required Cal-Am to reduce its diversions from the Carmel River by 20%, from about 14,000 acre feet to about 11,000. In Order WR 2002-02, the SWRCB required Cal-Am to cease diverting from San Clemente Dam and from wells in the upper valley when flow in the upper valley is below 20 cfs, i.e., during the annual summer-fall low flow season. During this season, almost all of the diversions from the River occur through pumping from the most downstream wells below the Narrows. See Figure 2, supra.

Carmel River steelhead habitat:

14. Steelhead habitat in the Carmel River has been studied by Dettman and Kelley (1986, Exhibit B-6, Request for Judicial Notice) and by Snider (1983). Rearing habitat for steelhead in the Carmel River extends from migration barriers on the upper river and its tributaries to the seasonally dry reach of channel in the Carmel Valley. It also includes the lagoon. Snider (1983) reported that about half the available spawning habitat was above Los Padres Dam. Dettman and Kelley (1986) estimated that there are 14.38 miles (or ~423,000 square feet) of good to excellent rearing habitat there. As they noted (p. 44):

> Most of the steelhead habitat in the Carmel River above Los Padres is within the confines of the Ventana Wilderness Area. The river's flow is unregulated, roads have not caused erosion, and the physical steelhead habitat probably looks much like it did before the arrival of European man. The river's configuration is controlled by its steep gradient (320 ft/mile), numerous rock outcrops, and large boulders that have lodged in the channel. Deep pools, separated by short, shallow glides and long, cobble/boulder riffles and runs are

> numerous throughout the upper Carmel River. The stream is heavily shaded by a dense canopy of riparian trees, including white alder, sycamore, big leaf maple, California bay laurel, canyon live oak, and sometimes by steep canyon walls.

15. However, Dettman and Kelley found that most of the *O. mykiss* present above Los Padres were not anadromous, and that the total population was less than half of what they had found in comparable habitat in other coastal streams.

What is the steelhead life cycle?

16. Steelhead are part of the same genus as Pacific salmon, and share the main elements of their life cycle: they reproduce in fresh water, but gain most of their growth in the ocean. Steelhead life histories are highly variable, but in the most common case, maturing adults return to the stream where they were hatched. The fish spawn in gravel nests called redds that are dug by the female, and the female covers the eggs with gravel after they are fertilized. The embryos develop in the gravel and hatch as "alevins," larval fish attached to a substantial quantity of egg yolk. The alevins remain and grow in the gravel until they have nearly depleted the yolk, and enclosed the remainder within their bellies. The emerging fish, about an inch long, are called fry. As they grow and develop scales and dark vertical marks on their sides, they are called parr. A year or more later, they go through various physiological changes in preparation for life in the ocean, and at this stage are called smolts. The fish spend a year or more in the ocean, and then return to their natal stream to spawn. Unlike most Pacific salmon, some steelhead, especially females, survive spawning, return to the ocean, and return to freshwater to spawn again; while these post-spawning fish are still in the river, they are called kelts. Not all members of the species migrate to the ocean; non-anadromous *O. mykiss* are known as rainbow trout. Some populations, including the Carmel River population, include both anadromous and non-anadromous components. As is common practice, I describe only the anadromous fish as steelhead.

What is known about the historical population size of Carmel River steelhead?

17. The Carmel River once had a substantial steelhead population. Estimating numbers is speculative, and presumably the population varied a good deal from year to year, but probably the average was in the tens of thousands. I base this estimate on information I have gathered over the years,

mainly when I was working on the Carmel River Watershed Management Plan (Williams 1983) and the Carmel River Lagoon Restoration Plan (Williams 1989).

18. In a report written while I was on the MPWMD staff (Williams 1983:22-23), based on the information I had available, I wrote that:

> In historical times the Carmel River supported a spectacular run of steelhead, then known as salmon. Bob Norton of Carmel, who came to the area in 1903 as a small child, still has a lucid mind and an excellent memory of the early part of the Century. He remembers as a teenager seeing steelhead "too thick to count" in the lagoon, and also seeing wagon loads of fish that were caught by hand in the surf, hauled up to town, and given away. Most fishing at the time was done at night with torches and spears, or with snag hooks; it was not for sport. He recalls that a Chinese family living in the Rancho Canada area dried large quantities. Leonard Williams, whose wife's family owned a ranch at the mouth of the river [now the Mission Ranch], remembers hearing from his father-in-law that it used to be a night's work to spear a wagonload.

19. I later found support for these memories in the transcript of testimony from a trial in 1931 (*Otey v. CSD,* 219 Cal. 310; SC 5, attached) which concerned a disputed title to the beach north of the river mouth. Carmel Martin, who grew up in what is now called the Mission Ranch, adjacent to the Carmel River lagoon, testified that "All of our family, when we were young folks, we used to spear steelhead trout or salmon, as we called them then, in the mouth of this river all winter long, … We would fish for steelhead and spear them, and, in order to spear them, you had to get right into the stream. … we were in the water, all the way from our ankles up, until the law went into effect, prohibiting the spearing of steelhead, which was 15 or 20 years ago, I believe." His half-brother, Williams Stewart, testified that "I will state that I lived near the mouth of the river for 36 years continuously (1874-1912). … In winter time us boys were spearing those steelheads night and day. We would go down at low tide, and we would wait for them at night so we were pretty well familiar with that part of the county."

20. A wagonload is not a well defined unit of fish, but evidently there were a considerable number of them to be caught: enough to make it worthwhile to stand in the water at night in the winter, which is not a comfortable experience even with modern wet gear. The only specific number of which I am aware is a report in a self-published book about the Martin Family, cited in Williams (1989), that the "boys" at the Martin Ranch speared 1,300 in one winter. Presumably, this was an exceptional year, but

if we speculate that the boys speared 1% of the run, which would have been quite a feat, then the run that year would have been 130,000.

What is the current population of steelhead?

21. The number of mature fish returning from the ocean is not precisely known, because fish are counted when they pass over San Clemente Dam, and some fish spawn in the river downstream from the dam or in tributaries such as Garzas Creek that join the river below the dam. Counts at San Clemente Dam are highly variable, and were zero during the years when the river did not reach the ocean, 1988-90. The counts increased rapidly (from zero) after 1990 to reach a peak of 800 in 1997, but have declined again since 2001. Only 95 adults were counted at San Clemente Dam in 2009, and only 21 adults were passed over Los Padres Dam (Figure 4). These numbers are the lowest since 1994. Biologists on the MPWMD staff also observed 39 redds below San Clemente, down from 135 redds in 2008 (April Report to MPWMD Board of Directors, http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2009/20090521/21/item21.htm), which suggests that the total adult steelhead population was less than 200.

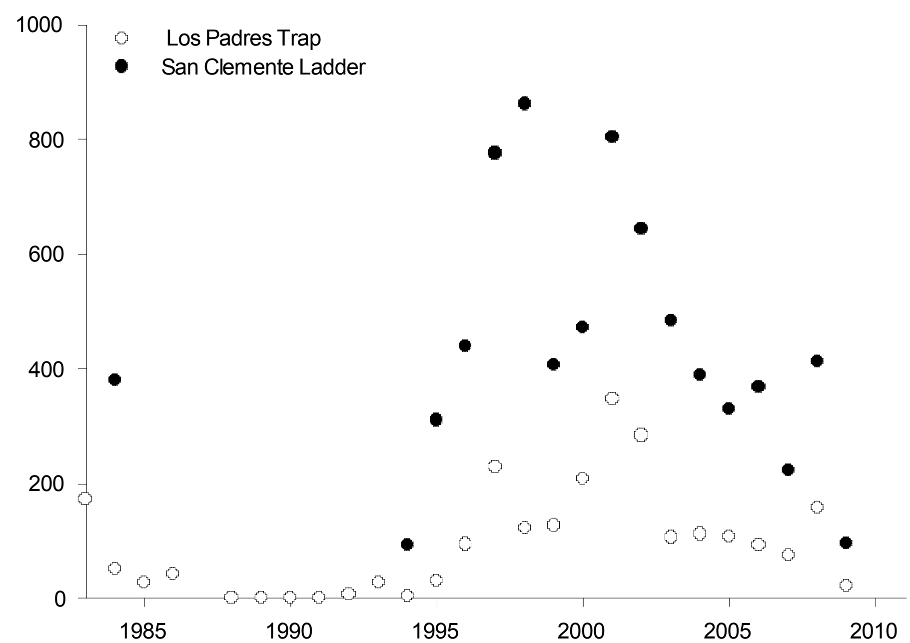
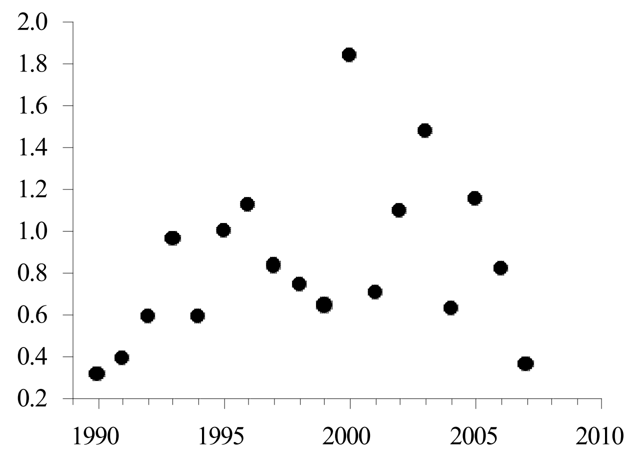


Figure 4, "Adult Steelhead in the Carmel River, showing the numbers of adult steelhead passing upstream over San Clemente and Los Padres dams" Data for the figure were obtained from the MPWMD website (http://www.mpwmd.dst.ca.us/fishcounter/fishcounter.htm and http://www.mpwmd.dst.ca.us/wrd/lospadres/lospadres.htm).

22. Data on juvenile steelhead also show a recent decline. Staff of the MPWMD have estimated the population density at study sites along the Carmel River since 1994. Not all of the sites have been sampled in each year, but review of the data for the individual sites shows generally the same trend as for the averages. Data for the most recent years are preliminary, and the MPWMD has not yet released the data for 2008. However, MPWMD biologists noted in their April 2009 Report on redd observations, cited above, that only about 20 non-smolting juveniles were observed during the redd survey, and stated that "The lack of smolts continues an unexplained three-year pattern." The observation does not bode well for a recovery in the number of adult steelhead in the next few years.

Figure 5. Average number of juvenile steelhead per foot of stream at sites sampled by the MPWMD. Data from MPWMD Annual Mitigation Program Reports (http://www.mpwmd.dst.ca.us/programs/mitigation_program/annual_report/annual_reportrev1.htm (2007 Data from MPWMD, Carmel River Steelhead Annual Population Survey, attached as Appendix I).



What is known about the timing of the decline in the Carmel River steelhead population?

23. While working on Williams (1983), I talked to several CDFG biologists and wardens, most notably Leo Shapovalov, the senior author of a major study of coho salmon and steelhead on Waddell Creek (Shapovalov and Taft 1954) and an authority on California steelhead, who began observing steelhead in the Carmel River in 1940 and testified for CDFG during the initial SWRCB hearing on Los Padres. According to my notes (Exhibit SC6, attached herewith), Shapovalov "believes that the run dwindled after Los Padres was built." (In 1948-49). Lester Golden, who was a warden from 1954 to

1971, reported that the run varied a lot from year to year, but with a general downward trend.

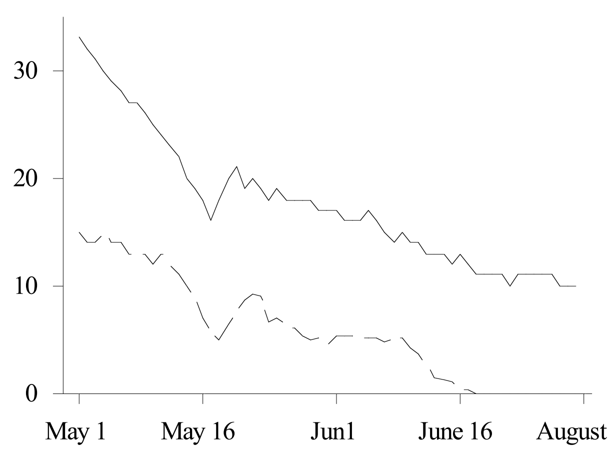
What accounts for the decline in the run?

24. A variety of natural and anthropogenic factors have been involved. For example, the population peak around 2000 and subsequent decline corresponds to a similar trend in Central Valley Chinook, so it seems likely that changing ocean conditions were partly responsible for the decline since 2001. Droughts, as in 1976-77 and in 1988-90, have also had an obvious effect in the recent period. In the longer term, diversions and dams, especially Los Padres Dam, are mainly responsible. Diversions reduced dry season flow and habitat downstream from San Clemente Dam, especially the Carmel River lagoon, and Los Padres Dam blocked access to upstream habitat. Mismanagement of the Carmel River lagoon probably is also a factor.

<u>Reduced flows in the Carmel River:</u>

25. Cal-Am's diversion have been a major factor in the decline of Carmel River steelhead, by drying up the lower river. Comparison of spring 2008 flows at the USGS gages at Robles del Rio, at rm 14.3 and Near Carmel, at about rm 3.5, clearly shows the effects of the diversions (Figure 6). Historical evidence indicates that before diversions began in the late 19th Century the Carmel River was perennial except perhaps in very dry years (Williams 1989). Typically, the river now goes dry around rm 9, near the upstream limit of Cal-Am's main well field. Even now, in very wet years, the Carmel River flows to the lagoon throughout the summer, so it is evident that increasing diversions have increased the proportion of years without continuous surface flow into the lagoon, as well as the duration of the seasonal dry periods.

Figure 6. Flow at the Robles del Rio gage (solid line) and the Near Carmel gage (dashed line) for May and June, 2008. Data from USGS gages 11143200 and 11143250.



The effect of groundwater pumping on surface flows, steelhead, and riparian vegetation is documented in many MPWMD reports, as well as in the scientific literature, for example in Kondolf and Curry (1986) and Kondolf et al. (1987). Regarding steelhead, MPWMD (2008, SC8, attached) noted that:

> About 1.5 miles of habitat between Boronda Road and Robles del Rio and up to nine miles of habitat below the Narrows may dry up, depending on the magnitude of streamflow releases at San Clemente Dam, seasonal air temperatures and water demand. Beginning as early as April or May of each dry season, the District rescues juvenile steelhead from the habitat in these reaches. The goal of this program is to help maintain a viable steelhead population by transplanting juveniles to permanent river habitats downstream of San Clemente Dam (if it is available), and/or rearing juvenile steelhead at the Sleepy Hollow Steelhead Rearing Facility, located just downstream of San Clemente Dam, if habitat is not available.

26. It is obvious that fish lose habitat when a stream dries up, or nearly so. The State Water Resources Control Board has found that 95-10 (p. 28): "In recent times, dry season surface flows below the Narrows at RM 10 have been depleted in most years as a result of heavy ground water pumping. This results in the stranding and death of many juvenile fish as surface flow recedes." (Order WR 95-10. Request for Judicial Notice, Exhibit D)." Although the steelhead rescues referred to above save some fish, some perish during the rescues (MPWMD 2008, Exhibit SC8, attached), and presumably a much larger number are not rescued and perish as the stream goes dry.

27. It is less obvious how habitat changes with smaller reductions in flow. How such changes should be assessed is a major unsolved problem in fisheries biology (Castleberry et al. 1996, Exhibit SC 9, attached). However, there is now empirical evidence that moderate reductions in summer flow reduce the growth rate of juvenile steelhead, and this seems likely to decrease their prospects for survival. The effects of flow reduction on growth is being studied by Bret Harvey of the U.S. Forest Service. He has published a study showing that a major (~75%) reduction in late summer flow resulted in a major decrease in growth rate in juvenile steelhead in Jacoby Creek in Humboldt County (Harvey et al. 2006, SC 19B, attached). At the 2008 meeting of the Cal-Neva Chapter of the American Fisheries Society Harvey presented further work on this topic in a talk titled "The influence of streamflow reductions on salmonids in small streams." The abstract for this talk (Exhibit SC 19A, attached) which I attended and

later discussed with Dr. Harvey, stated:

> Reduced streamflow can alter a variety of processes that affect fish populations. While some empirical data suggest large dry-season streamflow reductions in small streams can affect the growth of salmonids, some population modeling suggests small reductions in dry-season streamflow will not detectably affect fish population dynamics. Empirical observations addressing the effect of moderate changes in streamflow seem desirable. To address this issues, we contrasted the retention and growth of tagged fish in 350-m long study reaches above and below a diversion on West Weaver Creek in northwestern California. The diversion reduced dry-season streamflow by 15-25%. We PIT tagged a total of 298 steelhead > 70 mm fork length in June 2007 and re-sampled them in October. Minimum retention of fish in the upper (control) reach as indicated by recapture of tagged fish exceeded minimum retention of fish in the lower (treatment) reach, 50% v 34%. Both % change in length (5% v 3%) and specific growth (0.01 versus -0.05) of recaptured fish were higher in the control reach compared to the reach below the diversion (t tests, both with sample sizes of 83 (upper reach) and 50 (lower reach), P = 0.01). The observed difference in growth dynamics raises concerns about the consequences of moderately reduced streamflows for population dynamics and highlights some uncertainties in salmonid population modeling.

28. The results of the second year of work support the results of the first, as described in the attached summary report from Dr. Harvey to the US Forest Service, provided to me by email (Exhibit SC 19B, attached).

> The two years of steelhead monitoring data indicate a consistent effect of the diversion on the retention and production of steelhead. Fish grew faster upstream of the diversion in both years, but the difference was detectable statistically on in 2007. We hypothesize that higher minimum stream flows in 2008 compared to 2007 created more favorable conditions for growth that also increased the variance in growth among individuals."

Degradation of the lagoon:

29. Loss of surface and subsurface inflow to the lagoon probably is another important factor in the decline of Carmel River steelhead. Lagoons are important habitat for steelhead in California. According to Bjorksteadt *et al.* (NMFS 2005:125), discussing steelhead habitat in the North- Central Coast Recovery Domain:

> Lagoon habitats are a common feature of watersheds throughout the NCCCRD. Lagoons are formed when deposition of sand on beaches during the spring and summer forms a

> sandbar across the mouth of a river and thus blocks direct flow into the ocean. After sandbars form lagoon size is usually dramatically increased, but inflows that convert the lagoon to freshwater or very strong winds are necessary to prevent strong salinity stratification in lagoons. Such stratification, even in shallow lagoons, prevents vertical mixing of heat and oxygen and often results in warm water (especially in the bottom salt water layer), poor bottom dissolved oxygen, and low production of invertebrates as food for steelhead (Smith 1990). <u>If streamflow is sufficient to maintain freshwater in the lagoon, such environments can provide highly productive habitats for juvenile steelhead</u>. Although the conditions under which a lagoon provides favorable habitat have been characterized in general terms, *e.g.*, the presence of a well-mixed water column and sufficient dissolved oxygen levels (Smith 1990), spatial and temporal variability in the suitability of lagoon habitats is not well understood, nor has the influence of such habitats on the dynamics of steelhead populations been adequately documented. <u>In some small systems, though, juvenile steelhead grow extremely well in lagoon habitats, and this might have important implications for later survival in the ocean.</u> (emphasis added).

28. The importance of lagoon habitat for steelhead in central California has since been better demonstrated. As described in Boughton *et al.* (2007:pp 12, 15, Exhibit SC 11, attached):

> Studies of coastal O. mykiss populations in central and southern California reveal three principal life-history groups, which we here designate as fluvial-anadromous, freshwater resident, and lagoon-anadromous (Smith 1990, Hayes *et al.* 2004, Bond 2006). Both anadromous groups classify as winter steelhead, in that adults migrate during the winter rainy season. Fluvial-anadromous fish spend one or two summers (occasionally more) in freshwater streams as juveniles, then smolt and migrate to the ocean, using the estuary only for acclimation to saltwater and as a migration corridor (also occasionally for spring-time feeding). Freshwater residents (commonly known as rainbow trout) complete their entire lifecycle in the freshwater stream network. Finally, lagoon anadromous fish spend either their first or second summer as juveniles in the seasonal lagoon at the mouth of the stream. This last group may be unfamiliar to most steelhead biologists, so we will describe it a bit more fully below.
>
> In the study area, the estuaries at the mouths of rivers and creeks are typically transformed into lagoons during the dry season, when the combination of low streamflow and coastal wave action allows a sandbar barrier to form between the ocean and the stream's mouth. Several case studies indicate that the resulting seasonal lagoons comprise exceptionally good rearing habitat for juvenile steelhead. Smith (1990) described data collected in 1986 from three creeks between Santa Cruz and San Francisco, in which juvenile steelhead reached high densities and grew extremely fast in the lagoons. Bond (2006) described a more intensive study conducted over 4 years in a fourth creek, with similar conclusions. Fast growth is generally beneficial to fish because large fish have lower mortality rates than small ones,

particularly in the marine environment (Sogard 1997; see Ward *et al.* 1989 for a steelhead example). Indeed, of 27 adult steelhead examined by Smith (1990), back-calculation of growth rates (using scale samples) suggested that 60% - 70% had the high juvenile growth rates typically observed in lagoons. [http://www.cemar.org/pdf/Bond%20Thesis%20Lagoon%20Rearing.pdf] Bond (2006) conducted a discriminant-function analysis on scale samples from 406 adults, and concluded that 85% of successfully returning adults had reared in the lagoon. From these and other data, Bond (2006, p. vii) concluded that "estuary-reared steelhead showed a large survival advantage and comprised 85% of the returning adult population despite having been between 8% and 48% of the juvenile population. Although the … estuary comprised less than 5% of the watershed area, it was critical nursery habitat, as estuary-reared juveniles make a disproportionate contribution to the spawning adult pool."

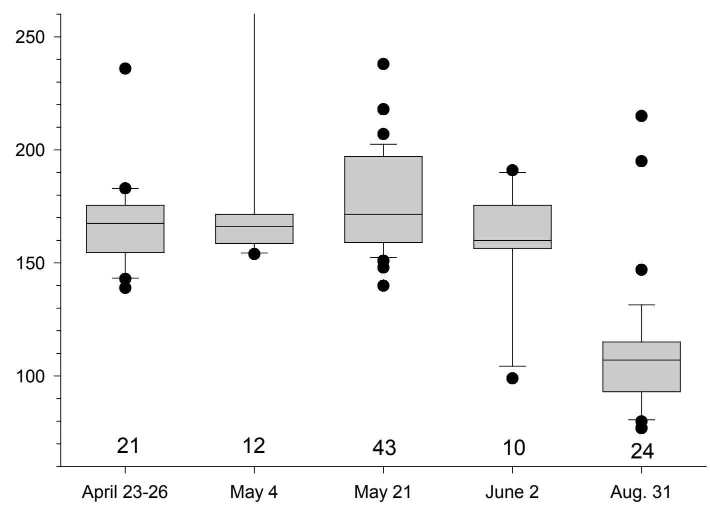
Bond's (2006) [http://www.cemar.org/pdf/Bond%20Thesis%20Lagoon%20Rearing.pdf] work suggests that the lagoon anadromous life history is very important for the viability of many anadromous populations. However, the other life-history types are also important because lagoons sometimes prematurely breach or become anoxic, with high mortality costs for the lagoon-anadromous component of the population (Smith 1990). In the winter following a lagoon failure the fluvial-anadromous life history would tend to predominate in the outgoing smolt run, and thus it probably contributes to the long-term viability of the population. Finally, the long history of severe droughts in the study area (Haston and Michaelson 1997) leads one to believe that segments of mainstream migration corridors may dry up for multi-year periods, preventing anadromy of any type. During such events the adults in the ocean and the freshwater residents in the perennial segments of streams are the only buffer against extirpation (in the study area, many stream systems are spatially intermittent during dry periods, with alternating segments of surface and subsurface flows). Of these two groups of fish, only the freshwater residents would be capable of reproduction during an extended drought lasting longer than the lifespan of the fish. This suggests that the freshwater-resident component is critical for long-term viability of the ESU through multiple droughts. Conversely, the anadromous life-history types are necessary for migratory recolonization of basins from which the species has been extirpated by a catastrophic event. Additionally, the anadromous types probably allow some populations to maintain a larger size (and thus a lower extinction risk) than if they were solely composed of freshwater-resident fish.

29. There is evidence that a lagoon-anadromous life history is also important for Carmel River steelhead. In *Otey v. CSD* (Exhibit SC-5), Carmel Martin testified that "… in spring after the steelhead trout stopped running, then we would fish for the small steelhead trout with a fishing rod. We did not use rods, however, we simply used a piece of cane pole to fish, and we continued fishing for trout, more or less through the summer season, until the water got somewhat stagnant, by being impounded for a

long period of time, when the trout tasted of the brackish water, …"

30. In 1982, consultants to the MPWMD sampled juvenile steelhead in the Carmel River lagoon (Dettman and Kelley 1986, Request for Judicial Notice, B-6). They captured fish with median lengths about 170 mm from April to early June (Figure 7). These would have been fluvial-anadromous fish, using the terminology from Boughton *et al.* (2007). Beginning in early June, they also captured smaller fish, which would have been lagoon- anadromous. As described in Dettman and Kelley (1986:91): "Almost all of the steelhead captured in the lagoon prior to June were yearlings … Young-of-the-year moved into the lagoon during June and July."

Figure 7. Box plots of the length of juvenile steelhead captured in the Carmel River lagoon in 1982. Data from Dave Dettman (1986). The "boxes" span the 25th to 75th percentiles of the data, the line across the box shows the median, the ends of the "whiskers" show the 10th and 90th percentiles, and the circles show outliers. The numbers above the dates give the sample sizes.



31. Unfortunately, the fish that moved into the lagoon in 1982 mostly perished. In the fall, waves washed over the beach, and the sea water sank under the fresh water in the lagoon, because of its greater density. The lagoon remained stratified, and the lower layer became anoxic, forcing the fish close to the surface where they were preyed upon by birds.[1] This is the kind of event mentioned by Boughton *et al.* (2007) in the quotation above, and is exacerbated by the lack of surface or subsurface inflow to the lagoon. Inflow of fresh water will increase the thickness of the surface layer of oxygenated water, and by increasing the elevation difference between the lagoon and the ocean will increase the rate at which the anoxic water seeps through the beach back to the ocean. Recent work on Scott Creek in

[1] This was observed by Gary Stern, now of NMFS, who then worked for D. W. Kelley and Associates.

Santa Cruz County using passive integrative transponder (PIT) tags shows that fish in the lagoon often move back upstream in the fall, likely in response to such inputs of seawater (S. Hayes NMFS, Santa Cruz, pers. comm. 2008). However, this behavior requires that there be surface inflow into which to move back. See Hayes, et al (2008). (SC Exhibit 24, attached)

32. In some years, however, the Carmel River lagoon remains habitatable through the summer. For example, about 3,000 were captured there in December 2006, before the mouth of the river opened (Kevan Urquhart, MPWMD, fisheries biologist pers. comm. 2008). This many large smolts could easily account for the temporary increase in returns in 2008 evident in Figure 4.

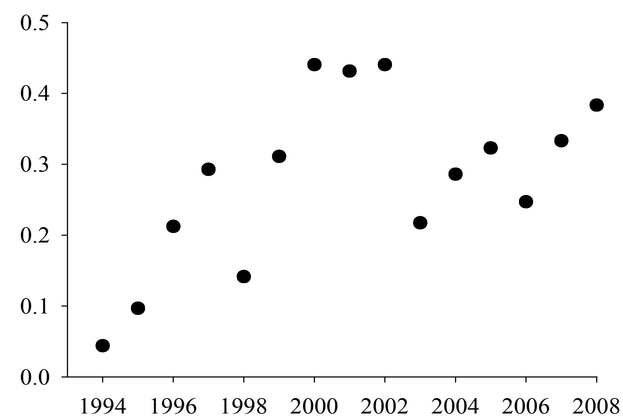
33. Another factor reducing the habitat value of the lagoon has been artificial opening of the lagoon to prevent flooding. Initially, according to testimony in *Otey v. CSD*, the lagoon was opened artificially when flow in the river began or increased in the late fall, to ensure that the opening would stay south of the large septic tank in the beach that served as Carmel's sewage treatment facility in the early years of the town. In the 1920's, Bruno Odello began farming artichokes on the south side of the river near the lagoon, and he took over opening the lagoon, to prevent water damage to the plants. Later, houses were built along the north side of the lagoon at elevations that would flood if the lagoon were not opened, and Monterey County took over the task. This is a matter of continuing controversy, for at least two reasons. Frequently, when the lagoon is opened, it drains nearly completely, posing the risk that juvenile steelhead in the lagoon may be carried into the sea before they are quite ready for it. Second, juvenile steelhead have a rich feeding opportunity when the water in the lagoon rises and floods the adjacent marsh. Draining the lagoon closes off this opportunity.

Impaired passage over Los Padres Dam

34. The historical information reviewed above, especially the reported decline in the run after the construction of Los Padres Dam, indicates that *O. mykiss* in the upper Carmel River watershed used to be strongly anadromous. Currently, the majority of the population above Los Padres Dam seems to be resident, based on the investigations of Dettman and Kelley (1986), supra, and on the small numbers of steelhead that have been trucked around the dam in recent years (Figure 4). According to SWRCB Order

WR 95-10, <u>supra</u>, at p. 28, "Access to a major portion of the steelhead spawning and rearing habitat was effectively eliminated in 1949 with the construction of Los Padres Dam at RM 23.5." There is evidence that a condition of Order WR 95-10 requiring the removal of a large rock just below the spillway, and other improvements such as a new trap for upstream migrants, have resulted in a greater proportional use of the habitat above Los Padres Dam by steelhead (Figure 8), but the proportion of anadromous fish using the upper watershed is still small. Conditions in the watershed above Los Padres Dam have not changed, however, so the shift toward a resident life history must be a response to changes in conditions for migration. That is, it appears that the *O. mykiss* in the upper Carmel River have evolved toward a resident life history, because mortality associated with passage at Los Padres Dam has outweighed the fitness benefits associated with migrating to sea. Unfortunately, this is likely to make Carmel River steelhead less adapted for upstream habitat (McClure et al. 2008). As a consequence, habitat in the lagoon and lower river is now of greater importance for the anadromous population.

Figure 8. The percentage of adult steelhead passing San Clemente Dam that also pass Los Padres Dam. Data from MPWMD.



Are the Cal-Am Diversions Causing "Harm" to the SCCC Steelhead DPS by Causing Habitat Modifications That Injure Steelhead By Impairing Breeding, Spawning, Rearing, Migrating, Feeding and Sheltering?

35. In its preface to rule-making governing take of 14 threatened steelhead ESUs[2], NMFS stated that activities like those of Cal-Am's diversions and dam operations are likely to result in "takings" of listed steelhead.

> "NMFS agrees that water diversions and …may have other deleterious effects on salmonid habitat. These may include impacts on sediment transport, turbidity, and stream flow alterations. …NMFS has revised the take guidance. One change is the water withdrawals have been added to the list of activities that are likely to injure or kill salmonids." 65 Fed.Reg. at 42429.

36. In this Take Guidance, NMFS listed activities most likely to result in injury or harm to listed salmonids, and included 65 Fed. Reg. 42472.):

> A. Constructing or maintaining barriers that eliminate or impede a listed species access to habitat or ability to migrate…
> D. Removing or altering rocks…gravel…that are essential to the integrity and function of a listed species habitat.
> E. Removing water or otherwise altering streamflow when it significantly impairs spawning, migration, feeding, or other essential behavioral patterns.

37. The lower Carmel River has been designated by NMFS as critical habitat for the SCCCS. The agency has determined that it contains "those physical and biological features that are essential to the conservation of the SCCCS DPS." See 50 CFR 424.12(b). See 70 F.R. 52488 (2005). Joint NMFS/FWS regulations for listing endangered and threatened species and designating critical habitat at 50 CFR 424.12(b) state that the agency ''shall consider those physical and biological features that are essential to the conservation of a given species and that may require special management considerations or protection." See 68 Fed. Reg. 55928.

38. Essential features for the listed DPS's of steelhead include sites essential to support one or more life stages of a population necessary to the conservation of the DPS. Specific types of sites and their generic features include:(1) Freshwater spawning sites with sufficient water quantity and

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[2] Final Rule Governing Take of 14 Threatened Salmon and Steelhead Evolutionarily Significant Units (ESUs). 65 Fed. Reg. 42422, 42429 (July 10, 2000). (Steelhead are now grouped by Distinct Populations Segments (DPS) in place of ESUs.)

quality and adequate substrate to support spawning, incubation and larval development;(2) Freshwater rearing sites with sufficient water quantity and flood plain connectivity to form and maintain physical habitat conditions and allow salmonid development and mobility; sufficient water quality to support growth and development; food and nutrient resources such as terrestrial and aquatic invertebrates, and forage fish; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels and undercut banks;(3) Freshwater migration corridors free of obstruction and excessive predation, with adequate water quantity to allow for juvenile and adult mobility; cover, shelter and holding areas for juveniles and adults; and adequate water quality to allow for survival;(4) Estuarine areas that provide uncontaminated water and substrates; food and nutrient sources to support growth and development; and connected shallow water areas and wetlands to cover and shelter juveniles; and(5) Marine areas with sufficient water quality to support salmonid growth, development, and mobility; food and nutrient resources such as marine invertebrates and forage fish; and near shore marine habitats with adequate depth, cover, and marine vegetation to provide cover and shelter. 68 Fed. Reg. 55929.

What are the impacts of Cal-Am's diversions on certain physical and biological features that are essential to the conservation of SCCC Steelhead?

39. *1) Freshwater Spawning Sites* The effects of Cal-Am's diversions *per se* on steelhead spawning habitat are small, although in recent years steelhead may spawn far enough downstream that the diversions may dry up the river before newly hatched juveniles emerge from the redds. For example, the April 2009 MPWMD redd survey report noted that eight redds were observed downstream from rm 8.5, in the section of the river that regularly goes dry in the summer. See SC Exhibit 22, attached.

40. *2) Freshwater Rearing Sites*

Cal-Am's diversions destroy rearing habitat in parts of the lower Carmel River by drying it up, and degrade the rearing habitat in other parts of the river, or at other times of year, by reducing the quantity of flow. The reduced flow can be expected to reduce the growth and survival of juveniles in the affected reaches, as described above.

41. Cal-Am's diversions have also affected rearing habitat in the lower river by killing riparian trees, from which insects fall into the river to provide food for juveniles (Dettman and Kelley 1986). Although there has been considerable recovery of riparian vegetation in the upper valley, and some recovery in the lower valley, it seems likely that the supply of terrestrial insects to the river is less than formerly. However, as far as I know there are no recent data on this point. Loss of vigorous and mature riparian vegetation also tends to reduce the structural complexity of the rearing habitat.

42. 3) Freshwater Migration Corridors

The lower Carmel River is a freshwater migration corridor for Carmel River steelhead, both as adults moving upstream and juveniles moving downstream, but only when it has water in it. Returning adult steelhead are affected mainly be the delay in the resumption of flow to the lagoon and subsequent opening of the mouth of the river. Adults waiting in Carmel Bay for the river to open are subject to predation by sea lions. Adults are secondarily affected when kelts migrate back to the ocean. I have seen kelts in pools near the wetting front as the river advances down the valley in the fall, and such fish may be stranded if the wetting front retreats. I understand that kelts also migrate downstream in the spring, when they may be stranded as the river goes dry. Juveniles migrating down the river can be affected in the same way as adults. Older juveniles may migrate downstream as flow resumes at the beginning of the wet season, and like kelts be subject to risk of stranding if the wetting front retreats. Younger juveniles migrating downstream in the spring may be stranded or blocked, especially in dry years when flow to the lagoon ends earlier in the spring.

43. Estuarine Areas

Cal-Am's diversions affect the Carmel River lagoon by reducing the surface and subsurface flow of the river into the lagoon. This can damage water quality in the lagoon as described above. The reduced inflow also shortens the duration of the period when the level of the lagoon is high enough to flood the adjacent marsh and allow juvenile steelhead the opportunity to feed there.

What is the importance of the Carmel River steelhead population for the South Central California Coast (SSCC) Steelhead Distinct Population Segment (DSP)?

44. Historically, and even recently, the Carmel River population has been one of the largest within the SCCC steelhead DPS. NMFS has given this population the highest rating for conservation value. 70 Fed. Reg. 52530 (Sept. 2, 2005). NMFS considers the Carmel River population of SCCC steelhead to be one of the core populations identified by the NMFS Technical Recovery Team as important for recovery of the SCCC steelhead DPS. "Since the Carmel River is the only river in the Carmel Biogeographic region the recovery of the SCCC steelhead population in the Carmel River is essential to the recovery of the SCCC steelhead DPS – not just because of its unique status but because it is historically one of the largest and, therefore, potentially viable steelhead populations within the SCCC steelhead DPS." NMFS Fisheries Biologist Ambrosius Testimony, Request for Judicial Notice, B1 at 3). In its Draft Recovery Outline NMFS concludes that "the continued appearance of steelhead may depend on robust runs occurring in Biogeographic Population Groups in the northern portion of the South-Central California Coast Steelhead DPS." Request for Judicial Notice, Exhibit B-*2)*

What is the current risk of extinction of the Carmel River steelhead population.

45. The current risk of extinction of the Carmel River population of anadromous steelhead can be evaluated using criteria given in Lindley et al. (2007), of which I am a co-author. Note that Lindley et al. are essentially the NMFS Central Valley Technical Recovery Team, so these criteria are the NMFS population viability criteria for listed Central Valley Chinook and steelhead. The criteria are summarized in Table 1 of Lindley et al. (2007), which is copied below; the most relevant are population size and population decline.

46. Population size: Although the current population size in the Carmel River is not known precisely, as explained above, the census population N is certainly less than 2,500. This is true even though, for purposes of this table, the census population is for a generation, which on average includes the spawners for about 3 years, since steelhead mature at different ages (Shapovalov and Taft 1954). Using this criterion, the risk of extinction is moderate.

47. Population decline: In pertinent part, Table 1 of Lindley et al. (2007) defines "precipitous decline" as "decline within the last two generations to annual run size less than or equal to 500 spawners, or run size greater than 500 but declining at greater than or equal to 10% per year. Under

this criterion, the risk of extinction is high. Since Lindley et al. (2007) classify a population's risk of extinction as high if the population ranks as high for any of the criteria, the risk of extinction of the Carmel Valley steelhead population ranks as high.

Criterion	Risk of Extinction: High	Moderate	Low
Extinction risk from PVA	> 20% within 20 years – or any ONE of –	> 5% within 100 years – or any ONE of –	< 5% within 100 years – or ALL of –
Population size[a]	$N_e \leq 50$ –or– $N \leq 250$	$50 < N_e \leq 500$ –or– $250 < N \leq 2500$	$N_e > 500$ –or– $N > 2500$
Population decline	Precipitous decline[b]	Chronic decline or depression[c]	No decline apparent or probable
Catastrophe, rate and effect[d]	Order of magnitude decline within one generation	Smaller but significant decline[e]	not apparent
Hatchery influence[f]	High	Moderate	Low

[a] Census size N can be used if direct estimates of effective size N_e are not available, assuming $N_e/N = 0.2$.
[b] Decline within last two generations to annual run size ≤ 500 spawners, or run size > 500 but declining at ≥ 10% per year. Historically small but stable population not included.
[c] Run size has declined to ≤ 500, but now stable.
[d] Catastrophes occuring within the last 10 years.
[e] Decline < 90% but biologically significant.
[f] See Figure 1 for assessing hatchery impacts.

Table 1. [also Table 1 of Lindley et al. 2007] Criteria for assessing the level of risk of extinction for populations of Pacific salmonids. Overall risk is determined by the highest risk score for any category. (Modified from Allendorf et al. 1977)

What is the necessary amount of reduction in diversions necessary for the remainder of this water year to re-address harm (within the meaning of the ESA regulations) to steelhead in the River caused by Cal-Am's illegal takings?

48. I have estimated some of the benefits to steelhead habitat in the Carmel River in 2009 that would result from reductions in diversions from the River. To do this, I required an estimate of flows in the Carmel River in 2009, and an estimate of Cal-Am diversions for 2009. In connection with a draft agenda prepared in connection with a 2009 Memorandum of Agreement (MOA) meeting among Cal-Am, the Department of Fish and Game, and the MPWMD, the MPWMD stated that the recession curve in the Carmel River in 2009 will be similar to the recession curve in 2008, although offset because rains occurred later in 2009 than in 2008. This appears reasonable, based on flows to date at the USGS Near Carmel gage (Figure 9). Also, because weather conditions in 2008 and 2009 have been generally similar to date, I assumed for this analysis that Cal-Am demand and therefore production in the two years will be similar, for the period June through December. This is the period for which the MPWMD projects flow. If there are early rains in the fall of 2009, or if the summer is unusually foggy, then production may be lower in fall 2009, but this would not have a major effect on the analysis. I obtained Cal-Am production data for 2008 from Darby Fuerst of the MPWMD (Exhibit SC21, attched), and shown in Table 2 for July through December.

Figure 9. Discharge at the USGS Near Carmel gage for 2008 (solid line) and 2009 (dashed line) through June 12, showing that the rate of decline is similar in the two years, although it is somewhat slower in 2009.

Month	Upper Valley	Lower Valley	Seaside	Total
July	**29**	**921**	**486**	**1436**
August	**27**	**932**	**446**	**1405x**
September	**29**	**958**	**402**	**1389**
October	**30**	**823**	**394**	**1247**
November	**28**	**620**	**311**	**959**
December	**12**	**594**	**252**	**858**

Table 2. Cal-Am production data in acre feet for July through December 2008, obtained from Darby Fuerst, MPWMD. See Exhibit 21, attached.

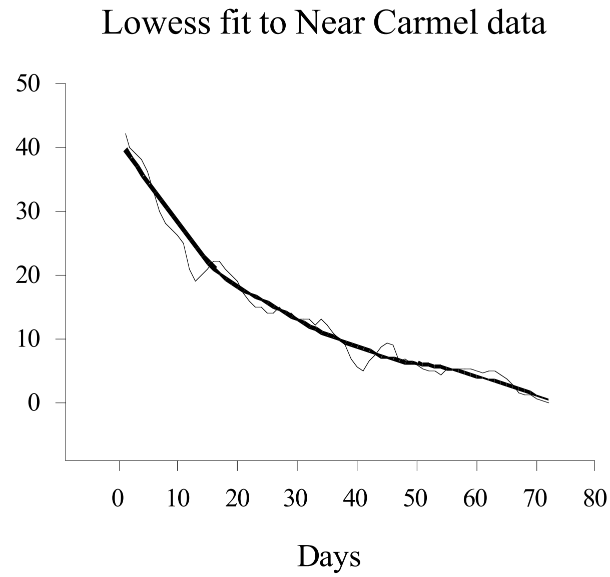
49. Cal-Am's diversions from the subsurface flow of the Carmel River have at least four effects on steelhead habitat in the river: they decrease the number of days that flow reaches the lagoon;

they increase the risk that steelhead will be stranded; they increase the portion of the river that goes dry in the summer and the period that it is dry, and they reduce flow in the river some distance upstream from the point at which the river goes dry. Reducing Cal-Am's diversions would reduce these effects. Accurately quantifying the reductions would require a sophisticated model of surface/subsurface flow interactions and also information on the spatial distribution over time of Cal-Am pumping. It would also require better information than exists on the relation between flow and steelhead habitat in the lower Carmel River. However, it is possible to develop a rough index of reductions in the first three effects from reductions in diversions.

50. To develop such an index, I assumed that flow in the lower river will decrease at the same rate in 2009 as in 2008, although with a time lag (Figure 9). To reduce the effects of short-term variation in flow on the analysis, I fit a smoothed curve to the 2008 recession curve, and used the smoothed curve as a predicted recession curve (Figure 10). Using this curve, and the current flow at the Near Carmel gage, we can predict that the river will go dry at the Near Carmel Gage sometime in the first week in August; flow to the lagoon will also cease at about the same time. By converting a proposed reduction in monthly demand into an equivalent rate of flow, and applying the recession curve to this rate, one can generate a rough and conservative estimate of the number of additional days of river flow that would result. For example, 25% of Cal-Am's total July production for 2008 is equivalent to a flow of 5.85 cubic feet per second (cfs), which corresponds to the discharge 20 days before flow ends, using the smoothed curve. This indicates that reducing Carmel Diversions by 5.85 cfs would extend the duration of flow at the Near Carmel Gage by 20 days.

51. Using this approach, there is a roughly linear relation between the percentage reduction in demand and the increased number of days with flow to the lagoon, which would be expected because the smoothed recession curve is roughly linear for the last 55 or 60 days of flow. However, the actual effect would be non-linear, since reductions in demand would make the recession curve less steep, so that larger reductions in demand would have proportionally greater effect on the duration of flows. Accordingly, the approach *underestimates* the effect of reductions in pumping. Taking into account the above factors, it is my judgment that flow to the lagoon will last more than three weeks longer if Cal-Am reduces its diversions from the surface and subsurface flow of the Carmel River, starting in July, 2009, by an amount equal to 25% of its total production in 2008 for the corresponding month. This corresponds to approximately a 36% reduction in its diversions from the Carmel River.

Figure 10. Assumed 2009 recession curve at the USGS Near Carmel gage (heavy line), based on a Lowess smooth of the final 72 days of flow at the gage in 2008.



52. Another salient effect of diversions from the subsurface flow of the river is that the water table is drawn down during the summer, and this typically delays the resumption of flow to the lagoon in the late fall or winter. The duration of this delay depends on the size of the storms that end the summer drought. If the first storm is large, it may generate flows that exceed the infiltration capacity of the aquifer, so that there is little delay in flow reaching the ocean. However, if the initial storms are small, the delay may be considerable. Unfortunately, medium storms are not "just right," as discussed in a quotation in my testimony from a NMFS report, because the resulting flow may initially exceed the infiltration capacity of the aquifer, and then fall below it, so that fish can be stranded when the lower river goes dry after flowing for a short time. Often, the river does not reach the ocean until around the end of the calendar year. Assuming that Cal-Am production had been reduced by 25% from July through December 2008, this would have resulted in about 1,823 acre feet less depletion of the aquifer than actually occurred. Such a reduction in production in 2008 probably would not have made a large difference, since the river did not reach the ocean until February 2009. However, with a different set of early season storms, the difference in water quality in the Lagoon could have been considerable.

53. Finally, there are the questions how much farther down the valley the river would have flowed with decreased diversions, how much of the surface stream would have been less depleted, and how much ecological benefit the increased flows would have provided. The first two questions are difficult, and also would require sophisticated modeling to answer accurately. The third question can be answered qualitatively, by reference to the studies by Dr. Harvey, discussed above: we can expect the reduced flows to result in reduced growth. Because the mortality rate of juvenile salmonids generally

decreases as they get larger, I believe that reductions in diversions would increase the survival of juvenile steelhead in the affected reach, not just during the dry season of 2009, but also after they reach the ocean.

Conclusion:

54. It is my professional judgment that the decline in the number of steelhead passing over San Clemente Dam provides very strong evidence that current conditions in the Carmel River put the steelhead population there at high risk of being reduced to a remnant, and of suffering deleterious genetic change that would make the population less capable of increasing in response to improved environmental conditions. Accordingly, immediate action is warranted to reduce this risk. The evidence described above indicates that the habitat benefits from reductions in Cal-Am's unpermitted diversions will increase in proportion to the reductions raised to some power greater than 1. I therefore recommend that there be a reduction in Cal-Am's diversions from the Carmel River equal to 25% or more of Cal-Am's 2008 system production, on a monthly basis, beginning not later than 1 July 2009 , and that such curtailment of diversions continue until the Carmel River is flowing to the ocean with sufficient discharge and duration to allow adult steelhead to reach and pass over San Clemente Dam.

Executed and signed this ____ day of June, 2009 in ______________, California.

DATED______________

By: ________________________________

Dr. John Williams

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Table IX-4

Carmel River Juvenile Steelhead Annual Population Survey [1]

	Lineal Population Density at Survey Stations (numbers per foot of stream) [2, 3]												
	Red Rock (Mid Valley)	Scarlett Narrows	Garland Park	Boronda	DeDamp Park	Stonepine Resort	Sleepy Hollow	SCR Delta Lower Station	SCR Delta Upper Station	Los Compadres	Cachagua	Overall Annual Average	
YEAR	RM 7.7	RM 8.7	RM 10.8	RM 12.7	RM 13.7	RM 15.8	RM 17.5	RM 19.0	RM 19.6	RM 20.7	RM 24.7	(nos./ft)	(nos./mi)
1990				ND		0.50	0.27			0.26	0.22	0.31	1,650
1991				0.12		0.74	0.39			0.09	0.62	0.39	2,070
1992			0.67	0.36		0.96	0.30			0.40	0.83	0.59	3,098
1993		0.62	0.91	0.92	0.82	0.84	0.52			1.22	1.84	0.96	5,075
1994	ND	0.44	0.23	0.43	ND	0.50	0.29			1.51	0.71	0.59	3,100
1995	0.49	0.65	1.01	1.61	ND	1.42	0.69			0.50	1.63	1.00	5,281
1996	0.24	1.52	0.82	1.05	2.03	1.22	0.29			0.95	1.92	1.12	5,890
1997	0.02	0.22	1.02	1.74	1.15	0.5	0.22			1.15	1.41	0.83	4,359
1998	0.19	0.30	0.67	0.34	1.50	0.27	0.60			0.54	2.24	0.74	3,901
1999	0.17	0.26	0.50	0.32	0.62	1.67	0.45			0.46	1.35	0.64	3,403
2000	0.91	1.03	0.64	1.38	5.86	1.71	1.46			1.41	2.3	1.83	9,680
2001	ND	0.48	0.35	0.63	0.68	1.08	0.32			0.47	1.62	0.70	3,716
2002	ND	0.68	0.85	1.67	0.83	1.07	0.5	0.33	0.68	1.52	2.73	1.09	5,734
2003	1.53	0.82	2.16	1.86	1.45	1.55	1.23	0.58	1.09	1.69	2.16	1.47	7,738
2004	0.25	0.46	0.78	1.21	0.43	1.24	0.55	0.21	0.41	0.45	0.89	0.63	3,302
2005	1.23	0.60	1.34	1.16	0.91	1.62	1.63	0.21	0.85	0.98	2.10	1.15	6,082
2006	1.13	0.64	0.86	0.87	0.47	0.37	0.95	1.65	0.28	0.82	1.00	0.82	4,339
2007	ND	0.15	0.50	0.77	0.06	0.33	0.16	0.36	0.25	0.49	0.50	0.36	1,885
Station Ave (no./ft)	0.62	0.59	0.83	0.97	1.28	0.98	0.60	0.56	0.59	0.83	1.45	0.84	4460
Station Ave (no./mile)	3,252	3,123	4,392	5,106	6,746	5,160	3,174	2,939	3,133	4,374	7,647		
Overall Station Averages:												0.84	4,459

[1] Surveys completed in October and results based on repetitive 3-pass removal method using an electrofisher.

[2] RM; indicates miles from rivermouth

[3] ND indicates stream was dry at sampling station or that site was not sampled that year. Blanks = site not added yet.

u/beverly/excel/popsurvey/stat total density1990_07 modified 020709

IX-19

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UNITED STATES DISTRICT COURT

IN THE NORTHERN DISTRICT OF CALIFORNIA

SIERRA CLUB, a not-for-profit California Corporation, and CARMEL RIVER STEELHEAD ASSOCIATION, Plaintiffs, v. CALIFORNIA AMERICAN WATER COMPANY, dba CALIFORNIA AMERICAN WATER, a California Corporation, Defendant GARY LOCKE, SECRETARY OF THE UNITED STATES, DEPARTMENT OF COMMERCE, in his official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party) and DR. JANE LUBCHENKO, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, in her official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party) and RODNEY MCINNIS, REGIONAL ADMINISTRATOR, SOUTHWEST REGION, NATIONAL MARINE FISHERIES SERVICE, in his official capacity, Defendant (Joinder under FRCP 19(a) as a Necessary Party)	**AFFIDAVIT OF DR. PETER B. MOYLE IN SUPPORT OF SIERRA CLUB MOTION FOR PRELIMINARY INJUNCTION (Signed Electronically)**

I, Dr. Peter B. Moyle, do hereby declare as follows:

1. I am a fisheries biologist, and am considered by my peers to be an expert on the biology and status of anadromous fish in California.

2. I have a B.S. in Zoology (Minnesota), an M.S. in Fisheries Biology (Cornell), and a Ph.D in Zoology (Minnesota).

3. I have been conducting research on 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 peer-reviewed publications, including *Inland Fishes of California*, the standard reference work on California fishes, and five other books and monographs. My curriculum vitae and a list of publications is attached to this declaration as Exhibit A.

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. Recent 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),and recognition as Distinguished Ecologist by Colorado State University (2001). In 2008, I was given the sole national Award of Excellence by the American Fisheries Society, as well the national Outstanding Achievement Award by the American Institute of Fishery Research Biologists.

4. I am frequently consulted by state and federal agencies for information and advice on fisheries management, especially in relation to salmon, steelhead, and trout. In 1993, I was involved in efforts to evaluate the ecosystem management strategy, commonly referred to as the FEMAT (Federal Ecosystem Management Assessment Team) or Northwest Forest Plan, as part of a group that evaluated the effects of various alternatives on fish, including coho salmon steelhead.

5. Additionally, I was the head of the Delta Native Fishes Recovery Team (1993-1995, US Fish and Wildlife Service); a member of the Sierra Nevada Ecosystem Science Team (1994-1996, US Forest Service) and a member of the Core Team to write the Strategic Plan for the CALFED Ecological Restoration Program (1998). I was a member of the Independent Science Board of the CALFED Ecosystem Restoration Program1998-2007) and was co-author of the National Research Council's final report on the causes of the decline and strategies for recovery of coho salmon and other fishes in the Klamath River Basin (National Research Council 2003).

6. I have previously served as an expert witness or consultant on fisheries in a number of venues. I was retained as a consultant by the City and County of San Francisco in a relicensing proceeding before the Federal Energy Regulatory Commission (FERC), and served as an expert witness for the Putah Creek Council, in the *Putah Creek Water Case*, Judicial Council Coordination Proceeding No. 2565 (Sacramento Superior Court). In 2000, I served as an expert witness for Environmental Protection & Information Center (EPIC) on coho salmon in the case *Environmental Protection & Information Center v. Andrea Tuttle*, Case No. 00-0713-SC (N.D. Cal.). In March, 2004, I was deposed as an expert witness, on behalf of the Yurok Tribe, on the 2002 Klamath River salmon kill in the case *Pacific Coast Federation of Fisherman's Associations et al. v. Bureau of Reclamation et al.*, Case No.C 02-020006 SBA (N.D. Cal.). In addition served as an expert witness for the Natural Resources Defense Council on NRDC vs Rodgers (E.D. Cal. No. Civ. 88-1658 LKK) on restoring flows and salmon to the San Joaquin River and on NRDC et al. vs. Kempthorne (U.S. District Court, Fresno, 05-CV-01207)

for providing more water for delta smelt.

7. I have also been called on to provide expertise on salmon and native fish restoration in other venues and proceedings, including state and federal legislative hearings. For example, I presented expert testimony regarding Section 5937 in proceedings before the California State Water Resources Control Board involving the Santa Ynez River (in re Santa Ynez River Public Trust Proceedings on U.S. Bureau of Reclamation Water Rights Permits, Applications 11331 and 11332, 2003).

8. Most recently, I was the lead author of <u>Salmon, Steelhead, and Trout in California: Status of an Emblematic Fauna</u>, ("the Salmonid Report"), a report commissioned by California Trout. In

preparing this report, I worked with two other scientists at the Center for Watershed Sciences at UC Davis. The report represents the independent, peer-reviewed work of myself and my colleagues, although members of California Trout were consulted for their expertise on particular salmonid species as needed. One of the 32 species accounts in this report a review of the biology and status of the South-Central California coast steelhead (*Oncorhynchus mykiss*), the steelhead which inhabits the Carmel River.

9. While I do not have much personal familiarity with South-Central California coast (SCCC) steelhead in the Carmel River, I have worked on steelhead elsewhere in the California and have reviewed much of the literature on SCCC steelhead for the salmonid status report. I also work with Dr John Williams on instream flow studies. Dr. Williams is a leading expert on salmon and steelhead in California, and is the foremost expert on steelhead in the Carmel River. I have reviewed his declaration and am impressed with its thoroughness and the depth of his knowledge of these remarkable fish.

10. Rainbow trout ("*Oncorhynchus mykiss*") exhibit two principal life-history forms: sea-run (anadromous) and resident. Steelhead are anadromous rainbow trout, which return from the ocean as large silvery trout, much larger than their resident cousins. In general, rainbow trout, which include steelhead, exhibit the largest native geographic range and the most complex suite of traits of any salmonid species. Anadromous steelhead and resident rainbow trout in many rivers are part of a single gene pool which contributes to the ability of coastal rainbow trout to adapt to systems that are highly unpredictable and undergo frequent disturbance. Steelhead rear in streams for 1-3 years before turning into smolts and migrating out to sea. They remain in the ocean for varying lengths of time (1-4 years), where they feed on large crustaceans and fish. Spawning adult steelhead typically spend at least one year in the ocean, and unlike salmon can spawn more than once; some steelhead may repeat spawning 2-4 times.

11. SCCC Steelhead have evolved to live in the variable conditions of south coast rivers. In particular, they are dependent on winter rains to provide upstream passage though estuaries (lagoons) and flowing mainstem rivers. This reliance on rainstorms suggests that SCCC steelhead have a

restricted and rapid spawning period. Spawning typically occurs between January and May, with a peak in February through mid-April.

12. Because of higher river temperatures in their range, SCCC steelhead prefer higher elevation headwaters as spawning and rearing areas; however, a majority of these areas have been blocked by human-made barriers such as dams. In addition, channel connectivity – that is a continuous flow of water from spawning and rearing areas to the ocean – is critical for steelhead access to historic spawning areas. Adult steelhead require a minimum depth of approximately 17-20 cm of water to move upstream and a long stretch of shallow water is often a barrier to upstream migration until higher flows arrive. Historically, the largest populations of SCCC steelhead were found in the largest rivers within their range, such as the Carmel River.

13. Although SCCC steelhead have adapted to naturally stressful conditions such as drought, fire, and floods, human-made factors have placed such severe burdens on steelhead that all populations are in severe decline. In the UCD analysis of SCCC steelhead status, my co-authors and I determined that total numbers in all rivers declined by more than 90% in the past 50 years and that without extensive stream restoration this remarkable fish would be extirpated within 50 years. Not surprisingly, the National Marine Fisheries Service listed SCC steelhead as a threatened species in 1997. Restoring flows to the Carmel River, connecting headwaters to the lagoon at the mouth, is therefore not only important for maintaining steelhead in the Carmel River but for keeping SCCC steelhead from going extinct.

14. I declare under the penalty of perjury of the laws of the State of California that the foregoing is true and correct.

Executed this ___, 2009 at Davis, California.

DR. PETER B. MOYLE