STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

WR ORDER 2001 – 04 - DWR

In the Matter of Condition 6 of Order WR 95-10 as modified by Order WR 98-04
California-American Water Company

SOURCE: Carmel River

COUNTY: Monterey

ORDER PURSUANT TO CONDITION 6 OF
ORDER WR 95-10 AS MODIFIED BY ORDER WR 98-04
ISSUED TO
CALIFORNIA-AMERICAN WATER COMPANY (CAL-AM)

1.0 INTRODUCTION

On July 6, 1995, the State Water Resources Control Board (SWRCB) adopted Order WR 95-10 regarding complaints filed against the California-American Water Company (Cal-Am) concerning Cal-Am's operations on the Carmel River in Monterey County. On February 19, 1998, the SWRCB adopted Order WR 98-04, which amends Order WR 95-10. Condition 6 of Order WR 95-10, as modified by Order WR 98-04, (Condition 6) requires Cal-Am to evaluate whether its existing diversions to the Carmel Valley Filter Plant (CVFP) can be changed in order to maintain more surface flow in the Carmel River.

Condition 6 states:

> "Cal-Am shall conduct a study of the feasibility, benefits and estimated costs of supplying water to the areas now served by the CVFP from its more nearby wells downstream of the plant (Study 1) and shall also conduct a similar study of utilizing the existing or expanded Begonia Treatment Plant or other facilities located further downstream in lieu of the Carmel Valley Filter Plant (Study 2). This latter study shall be completed within 1 year of the date of entry of this Order. Petitioners shall have an opportunity to comment on the scope of the study. The study shall be under the direction of the Division of Water Rights, and will be conducted by a consultant approved by the Division. If the Chief, Division of Water Rights finds that the measures identified in the studies are

feasible, Cal-Am must implement supplying water from the facilities identified by the Division according to a schedule approved by the Division of Water Rights.

The objective of supplying water from the wells is to maintain surface flow in the stream as far downstream as possible by releasing water from San Clemente Dam for maintenance of fish habitat. The results of the study and recommendations shall be provided to the District and DFG for comment."

Cal-Am completed two studies pursuant to this condition. The first study is titled "Reconnaissance-Level Hydrogeologic Study Alternative Source of Water Supply to Carmel Valley Filter Plant", Fugro West, Inc., September 1996 (Study 1). The second study is "Reconnaissance-Level Feasibility Study for the Operational Reconfiguration of Lower Carmel Valley Wells", Denise Duffy & Associates, Inc., June 1999 (Study 2).

2.0 FEASIBILITY

To determine whether modification of the diversion practices of Cal-Am at San Clemente Dam (re-operation) is feasible, the Division of Water Rights (Division) evaluated the alternative methods of operation considered in each study to determine the following:

- Whether the measures are physically possible to implement,
- Whether the measures result in a measurable gain in fish habitat,
- Whether existing wells can be utilized for re-operation,
- Whether the extraction of water from wells has the potential to induce seawater intrusion,
- Whether the extraction of water from wells will cause localized adverse hydrologic impacts.

Although the SWRCB considered the cost of various alternatives, measures were not eliminated from consideration solely on the basis of cost for implementation.

3.0 SUMMARY

Cal-Am should satisfy Condition 6 by ceasing surface diversion at San Clemente Dam. The water presently diverted at San Clemente Dam should be diverted from the Carmel River subterranean stream between river miles 9.0 and 17.2. Cal-Am should satisfy the water demands of its customers by extracting water from its most downstream wells in this stream reach to the maximum practicable extent, except that Cal-Am may divert up to 1.25 cfs to serve the Carmel Valley Village using the wells in AQ1.

4.0 EXISTING FACILITIES

Cal-Am's Carmel River diversion facilities and the subaquifers that comprise the groundwater basin are shown in Figure 1. Cal-Am diverts surface water at San Clemente Dam and groundwater from its wells shown in Figure 1, and depending on the source, either treats the water at the CVFP or the Begonia Iron Removal Plant (BIRP), or else

chlorinates the water at the well site. Chlorination at the well site is the only treatment required for the wells from river mile 14.3 to about river mile 9.0 (Robles No. 3 well downstream to the Scarlett No. 8 well, and also including the Berwick No. 7 well) (Report 1, pp. 17, 18, 19: Report 2, p. 20.)

The CVFP is located in the upper valley, and primarily serves the Carmel Valley Village (Village) and upper valley areas. CVFP has a treatment capacity of 15 cubic feet per second (cfs). When CVFP production exceeds demand in the upper valley, the excess is provided to other areas within Cal-Am's service area through the Cal-Am distribution system. The water supply for the CVFP is a combination of surface water diverted at San Clemente Dam and groundwater extracted from the two Russell wells in subaquifer one (AQ1). (Report 1, p. 9.) The maximum monthly demand to serve the Village is 1.25 cfs. (Report 2, p. 27.)

The BIRP, which has a capacity of 27.9 cfs, is used for iron and manganese removal. Water from the wells in subaquifers 3 and 4 (AQ3 and AQ4), with the exception of the Scarlett #8 and Berwick #7 wells, is treated at the BIRP.

The two wells in AQ1 have a combined diversion capacity of 1.28 cfs. Cal-Am operates nine wells in subaquifer two (AQ2), with a combined diversion capacity of 5.63 cfs. (Report 1, p. 9 including Cal-Am's Water West wells.) The Scarlett #8 well in AQ3 has a diversion capacity of 2.67 cfs, and the combined diversion capacity of the 10 wells in AQ3 is 23.5 cfs. (Report 2, p. 22.) There is one well in subaquifer four (AQ4), with a diversion capacity of 3.79 cfs. (Report 2, p. 22.)

5.0 EXISTING DIVERSIONS

Pursuant to Order WR 95-10, Cal-Am reports its Carmel River diversions to the SWRCB for the period August 1995 to the present.

Table 1
(all amounts are in acre-feet (af))

Water Year Data[1]	Surface Diversions at San Clemente Dam to CVFP	Diversions in AQ1	Diversions in AQ2 (including Water West wells of Cal-Am)
1996 Water Year	3,527.3	63.6	132.6
1997 Water Year	3,160.4	60.8	295.6
1998 Water Year	1,555.6	124.5	366.6
1999 Water Year	1,384.4	231.3	602.5
2000 Water Year	260.1	906.2	197.1

[1] A water year begins October 1 of one year and ends on September 30 of the following year. For example, the 1996 water year begins on October 1, 1995 and ends on September 30, 1996.

6.0 DESCRIPTION OF STUDIES

As required by Condition 6, Cal-Am conducted two studies to evaluate the feasibility, benefits and costs of reducing the surface diversions at San Clemente Dam and diverting the flows from Cal-Am wells downstream of the dam. The baseline modeling run for each study assumes operating criteria in effect at the time of the study. The operating criteria are based on annual agreements between Cal-Am, the Monterey Peninsula Water Management District (District) and the California Department of Fish and Game (DFG), and are listed in attachment 1. The studies report the relative hydrologic effects that would occur as a result of each study's proposed alternatives to revise the operating criteria as compared to the baseline criteria.

As required by Condition 6, Study 1 evaluated options to modify surface diversions at San Clemente Reservoir to supply water to the areas now served by the CVFP. The study looked at the hydrologic conditions that would result from modifications during two periods: summer (May 1 through October 31) and winter (November 1 through April 30).

During the summer period, Study 1 assumes that the following operating criteria are in effect: (1) an existing 4 cfs bypass flow requirement for the benefit of fish will be met; and (2) up to 4 cfs of surface diversion that is made at San Clemente Dam under the baseline scenario is instead bypassed at the dam and then diverted at Cal-Am's downstream wells to benefit fish. During the winter period, the study assumes that 8 cfs of surface diversion that is made at San Clemente Dam under the baseline scenario is instead bypassed at the dam and diverted at downstream wells to reduce the turbidity of source water at the CVFP. Although this portion of the study was designed for a different purpose, there are resulting benefits for fish.

Study 1 evaluates the following alternate locations for diverting the water from Cal-Am's wells:

1. Water would be diverted in AQ1 using the existing Russell wells and an expanded Russell well field.
2. Water would be diverted in AQ1 and AQ2 using the existing Russell wells in AQ1 and existing wells in AQ2 located upstream of the Del Monte Regulating Station.
3. Water would be diverted in AQ1 and AQ2 using all existing wells.

As required by Condition 6, Study 2 evaluated alternatives to modify surface water diversion at San Clemente Dam to supply water from the existing or expanded BIRP or other facilities to the areas now served by the CVFP. Study 2 assumes that water diverted at San Clemente Dam under the baseline scenario is bypassed at the dam and diverted instead from wells in AQ3 and AQ4. These alternatives were considered:

1. No surface diversion, with the water diverted at existing wells in AQ3 and AQ4.
2. No surface diversion, with the water diverted at existing wells in AQ3 and AQ4 plus a new 1,400 gallons per minute (gpm) capacity well in AQ4.

3. Surface diversion limited to 1.25 cfs, with the water diverted at existing wells in AQ3 and AQ4.
4. Surface diversion limited to 1.25 cfs, with the water diverted at existing wells in AQ3 and AQ4 plus a new 1,400 gpm capacity well in AQ4.

7.0 CONCLUSIONS OF THE STUDIES

This section summarizes the conclusions of the studies.

7.1 Study 1

Study 1 first evaluated the hydrologic impacts of the alternatives, and then considered whether the proposed actions would benefit fish and if so, to what extent. Alternatives were considered hydrologically feasible if they did not cause excessive drawdown of water levels in the vicinity of the well(s) used for diversion.

During the summer, Alternative 1, pumping from wells in only AQ1, results in excessive drawdown and is hydrologically feasible only if at least four new wells in AQ1 are constructed. The other alternatives, in which diversions occur from existing wells in both AQ1 and AQ2, had no negative impacts to water levels during the summer period and are hydrologically feasible during this period.

During the winter there are hydrologic impacts at Robles Well No. 3 under Alternatives 2 and 3. If Robles No. 3 is pumped at its capacity of 1.95 cfs, the river dries up in the vicinity of the well. This impact does not occur during the summer period because less water is pumped at the well. The impact can be avoided in the winter period if pumping at Robles No. 3 is limited to 0.98 cfs, which is about half of its capacity. However, the combined capacities of the existing wells in AQ1 and AQ2 of 6.91 cfs are inadequate to divert an additional 8 cfs of flow, even when Robles No. 3 is pumped at full capacity. In order to divert 8 cfs of additional winter bypass, new wells are needed. Under Alternative 1, if pumping occurs only from AQ1, seven new wells are required in order to avoid hydrologic impacts. Alternative 2 requires five new wells and Alternative 3 requires two or three new wells. Provided that new wells are constructed to increase Cal-Am's diversion capacity to 8 cfs and are sited to avoid excessive drawdown all three alternatives are hydrologically feasible during the winter.

The study then considered whether the proposed alternatives resulted in improvements to fish habitat. The study used steelhead as an indicator species to evaluate the environmental impacts of the alternatives. Steelhead spawn in the reach of the Carmel River upstream of the Shulte River Bridge (River Mile 6.7). The study relied on existing fisheries information that was developed as a result of two fishery studies: a 1996 study by Dettman and Kelley[2] and a 1989 IFIM study by Don Alley. The Dettman and Kelley study looked at the same range of flows as those that would result from, and the same river reach as would be affected by, implementation of the proposed alternatives.

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[2] "Assessment of Carmel River Steelhead Resource", Dettman-Kelly, 1986, Vol. 1.

Dettman and Kelley produced an index that characterizes the quantity and quality of rearing habitat as a factor of substrate, flow depth and flow velocity. The IFIM study looked at flows in the same range as those that may result from implementation of the alternatives, but looked at the reach of the Carmel River upstream of San Clemente Dam. Nevertheless, the results of the IFIM study can be used to estimate benefits to fish in the reach between San Clemente Dam and the Narrows because the stream gradient, substrate, underlying geology and riparian habitat are similar in the two reaches. The IFIM study considered conditions for spawning; egg incubation; and fry, juvenile and steelhead habitat.

The best fishery habitat downstream of San Clemente Dam is found in the stream reach between the dam and the Narrows. Forty-one percent of the total effective steelhead spawning habitat occurs in the stream reach between San Clemente Dam and the Narrows; 28 percent of the total rearing habitat for young-of-year steelhead is found here; and 23 percent of the habitat for yearling steelhead occurs in this reach. The remainder of these three habitat types is located upstream of San Clemente Dam. (Study 2, pp. 13, 16.) The lower river below the Narrows contributes less to maintenance of steelhead than the river upstream of the Narrows because 9 miles of the lower river goes dry most summers. (Study 2, p. 16.) Furthermore, little spawning occurs downstream of the Narrows because the lower river has little of the clean gravels necessary for spawning. (Study 2,
p. 13.)

The study concludes that all of the alternatives benefit fish. Benefits are highest directly below San Clemente Dam and decrease with distance downstream as water is diverted from the river. Direct benefits of the alternative operations include deeper flows and increased surface turbulence that provides protection from predators. Other benefits to steelhead include lower water temperatures and increased dissolved oxygen levels. These benefits also positively affect the production of food sources used by steelhead.

Under some hydrologic conditions, there is not sufficient water available at the dam in the summer to bypass an additional 4 cfs of water. Assuming that the entire additional 4 cfs is bypassed and diverted from wells in AQ1 and/or AQ2, the volume of water in the 3-mile bedrock reach below the dam during the summer months is approximately doubled, with a proportional improvement to this prime fisheries habitat. (Study 1, pp. ES3 and 30.) If less water is available for bypass at the dam, the resulting benefits would be proportionately reduced.

The modeling results show that when flows below the dam are 8 cfs (4 cfs due to ceasing surface diversion in addition to the 4 cfs existing fish bypass requirement) and the water is diverted from the Russell wells in AQ1 and the Panetta and Garzas wells in AQ2 (alternative 4), the average summer flow in AQ1 and AQ2 is: (1) 3.7 cfs in wet years; (2) 3.1 cfs in normal years; and (3) 2.5 cfs in dry years. (Study 1, p. 27.) This results in water depths of 1.0 foot adjacent to Robles No. 3 well, and approximately 1.5 to 2.0 feet throughout the remainder of AQ1 and AQ2. (Study 1, p. 25.)

Ceasing winter surface diversion of 8 cfs and diverting the water from existing wells in AQ1 and AQ2 (combined diversion capacity of 6.91 cfs) plus additional, new wells with diversion capacity of 1.09 cfs results in an average flow in AQ1 and AQ2 of 9.9 cfs. The associated water depth is 3 feet adjacent to Robles No. 3 well, and approximately 3.5 to 4.0 feet elsewhere in AQ1 and AQ2. (Study 1, pp. 18, 19)

7.2 Study 2

Study 2 used methodology similar to Study 1. Study 2 assumes that the new well in AQ4 is installed at a site located 7,000 feet upstream[3] from the ocean. No other new well sites in AQ4 were evaluated. The study concludes that a new well at this location is not advisable as increased groundwater diversions in this location significantly increases susceptibility to seawater intrusion and adversely impacts the lagoon environment.

Study 2 concluded that significant changes to Cal-Am's treatment and distribution system are required to provide water to the upper valley from AQ3 and/or AQ4. The changes include: (1) modifications to the existing BIRP to treat increased flows and higher concentrations of iron from the new well in AQ4; (2) installation of a booster pump and 26,000 feet of 12-inch diameter transmission pipeline to convey water from BIRP to the upper valley; and (3) additional wells to meet peaking and reliability requirements.

To determine whether the diversion alternatives would result in environmental benefits, Study 2 evaluated the increased depth of flow and the duration of flow that would result from each alternative. Increases in flow may maintain continuous surface flows farther downstream and improve the condition of the aquatic habitat. Increased water depth and duration of flow is better for steelhead rearing than less depth and flow duration. (Study 2, p. 31.) Under current conditions, surface flow ceases at various locations on the river due to both climatic conditions and water diversions, and the lack of flow affects the aquatic biota.

The Carmel River flows through a relatively narrow channel in the upper river basin. As the river flows through the Narrows, the channel broadens (at about river mile 9.0). Flow depth is calculated by the formula Q (discharge) = Area (width times depth) x V (velocity). Based on this formula, for a specific discharge and velocity, doubling the channel width would halve the flow depth. Thus, foregoing surface diversions of 4 cfs (for example), would result in greater flow depths in the narrower river channel above river mile 9.0 than the broader downstream river channel. Study 2 found that moderate increases in flow result in very small changes in river depth in the broader section of the river (i.e., below river mile 9.0).

Eliminating all surface diversion at San Clemente Dam and use of wells in AQ1 (Study 2, Alternative 1) resulted in a maximum flow increase of 13 cfs, a yearly average of about 3 cfs, and an average of about 1.5 cfs in dry months at the Narrows. (Study 2, p. 43) Changes in flow depth were analyzed at the upper end of AQ3 (Narrows gage), the lower end of AQ3 (near Carmel gage) and in AQ4 (Lagoon gage). The maximum increase in

[3] Cal-Am has access to a site at this location.

depth at the Narrows is 0.3 foot, and the average increase is 0.07 foot. (Study 2, p. 46, Table 5.) Due to channel widening, the maximum increase in depth at the "near Carmel" gage at the lower end of AQ3 is one-third of the increase at the Narrows, or 0.1 foot, and the average depth increase ranged from 0.007 (no new well in AQ4) to 0.009 foot (new well in AQ4). (Study 2, p. 46, Table 5.) Continuing downstream, the maximum increase in depth at the Lagoon is 0.05 foot, and the average increase is 0.002 foot.

Study 2, Alternative 2 provided a maximum depth increase of 0.11 foot and an average depth increase of 0.02 foot at the Narrows. At the near Carmel gage, the maximum depth increase is 0.15 foot, and the average is 0.004 foot. (Report 2, p. 46, Table 5.) Average depth increase at the Lagoon gage was 0.001 foot. (Report 2, p. 46, Table 5.)

Study 2 also assessed the duration of surface flow for each alternative. Duration was determined by comparing the number of days of surface flow at the Narrows, the near Carmel gage and the lagoon under the baseline condition and each alternative. Eliminating surface diversion at San Clemente Dam resulted in 86 additional days of flow at the Narrows during the 8-year study period when compared to baseline diversions. This would benefit aquatic biota at the Narrows by maintaining a surface stream farther downstream than would otherwise occur. (Study 2, Table 4, pp. 36, 37.) Reducing surface diversion to 1.25 cfs resulted in 10 additional days of flow at the Narrows over baseline conditions. (Study 2, Table 4.)

Year round flow does not presently occur at the "near Carmel" (lower AQ3) gage and Lagoon (AQ4) and was not restored by operational reconfiguration. Even though the total number of days of flow increased due to re-operation, little benefit is predicted at these downstream locations because pumping demand by Cal-Am and others is greater than summer streamflow, and results in a groundwater basin that is not full, except in the wettest years. Under these conditions, the summer flows percolate into the groundwater basin. (Study 2, p. 41.)

8.0 ESTIMATED COSTS

Both studies identify the measures needed to implement the alternative well operation scenarios analyzed and estimate the costs of each measure. In many instances, a cost range is provided by Cal-Am because there are several alternative modes of operation that will meet the specified criteria. For instance, water diverted from AQ3 or AQ4 downstream of the Scarlett #8 well requires iron and manganese removal. This can be accomplished at an enlarged BIRP, by pretreatment and subsequent treatment at the existing BIRP, or by constructing a new treatment plant. The price range for distribution system improvements is based on the number of new wells installed and plumbing costs.

- Divert 4 cfs in AQ1 and/or AQ2 costs from $85,000 to $475,000.
- Divert 8 cfs in AQ1 and/or AQ2 costs from $610,000 to $910,000.
- Divert flows in AQ3 or AQ4 downstream of Scarlett #8 well
    1. Treatment cost at BIRP or other alternative facility ranges from $3.9 to $8.3 million.

2. Distribution system to convey water from either the BIRP or a treatment plant in AQ4 to the upper Carmel River valley ranges from $5.2 to $6.8 million. The distribution system improvements include installation of approximately 26,000 feet of 12-inch diameter transmission pipeline, and a new booster pumping station.

9.0 COMMENTS OF AGENCIES AND INDIVIDUALS

Condition 6 states that the petitioners shall have an opportunity to comment on the scope of Study 2[4]. The scope of work for Study 2 was circulated for comment on September 30, 1998, as required by the order. Comments on the scope of work were received from Carmel River Steelhead Association (CRSA), California Sportfishing Protection Alliance, Carmel Development Company (Carmel Development), and the California Environmental Law Project. The Division reviewed the comments, and Cal-Am was requested to revise the scope of work for Study 2 in conformance with the Division's comment letter dated December 28, 1998. Cal-Am submitted a revised scope of work for Study 2, which was approved by the Division on March 19, 1999.

Condition 6 also states that the District and DFG shall have an opportunity to comment on the studies and recommendations. The District commented on both studies. The Division of Water Rights circulated Study 2 to all the interested parties. Comments on Study 2 were received from DFG, the Sierra Club, CRSA, Carmel Development, the National Marine Fisheries Service (NMFS), and Liz Gerritsen. The comments on the studies and recommendations are summarized below.

9.1 District

The primary critique of the first study by the District is that the selection of the "winter and "summer" diversion periods is not well defined, and the assumed requirements are not always consistent with actual operations and the seasonal availability of water in the Carmel River. The District further notes that an expanded well field in AQ1, under certain operating conditions, could have a significant adverse affect on fish migrating from Tularcitos Creek to the Carmel River. The District made a number of specific comments regarding misstatements made in the study and made recommendations regarding improvements that could be made in the presentation of information. Nevertheless, the District concurred with the Study conclusion that it is hydrologically feasible to move Cal-Am's point of diversion to a location downstream of San Clemente Dam and that such a move would increase streamflow in the affected reach. The District recommended that the bypass flows be diverted from the stream system using the lowermost wells possible in AQ2, after setting the baseline diversions at San Clemente Dam at low levels to meet the needs in the Village area. The District also concurs with recommendations made in the Study that additional analyses should be conducted of some elements of the water supply system.

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[4] Condition 6 was revised in 1998 to include this provision. Study 1 was completed in 1996, prior to adoption of this provision. Accordingly, the opportunity to comment on the scope of work only applies to Study 2.

The primary critique of the second study by the District is the lack of sufficient information to fully evaluate the benefits of well re-operation. The District states that more information should have been provided on historical demands of the upper valley and diversions to the CVFP. The District also comments that the studies were not integrated and that, taken separately, the studies are too restrictive to provide a framework for developing reasonable solutions to meet the goal of Condition 6.

The District also suggests that the proposed new well in AQ4 could be operated in a way that does not induce seawater intrusion. The District states that other methods of diverting the bypassed water in AQ4 should have been evaluated.

The District contends that expanded use of the wells in AQ2 and AQ3 that do not require treatment at the BIRP is a reasonable and economical solution. The existing wells are currently inactive during the summer low-flow season (except for maintenance pumping) and could provide sufficient capacity to produce water in lieu of the diversion through the CVFP. The combined capacity of the Los Laureles Nos. 5 and 6 wells and the Scarlett No. 8 well is 4.3 cfs, which exceeds the typical seasonal low-flow production through the CVFP.

The District concludes that better information on the environmental benefits of re-operations could have been obtained by using more measuring locations and evaluating additional flow parameters. The District notes that the riverine habitats and aquatic biota, including steelhead, would significantly benefit from increases in flow in the area above the Narrows. During dry and critically dry years; a 1.5 cfs change would represent up to a 50 percent increase in flow. An increase by 5 to 13 cfs in winter-spring flows, would benefit juvenile steelhead and facilitate fish passage through the lower river channel, downstream to the point where the water is diverted from the river. (9-15-99 District Letter, p. 10.)

Condition 5 of Order 95-10 requires Cal-Am to pump from the downstream wells first. The District states that the resulting re-operation has increased the wetted length of river habitat by up to 2.5 miles and resulted in the production of up to 10,000 juvenile steelhead. (9-15-99 District Letter, p. 6.) Thus, well re-operation provides demonstrable fishery benefits.

9.2 DFG

DFG comments that Study 2 understates the environmental benefits of the re-operation scenarios evaluated in the study because the criteria used to evaluate environmental impacts is too limited. DFG believes that re-watering the reach of the river between the "Narrows" and the "near Carmel" assessment points will provide the greatest benefits to steelhead. DFG requests that the SWRCB require Cal-Am to re-evaluate environmental benefits of re-operation based on information on the relationships between flow and habitat in various reaches of the river that has been developed as a result of recent investigations.

9.3 Sierra Club

The Sierra Club challenges the conclusions of the second study and argues that the models used for the study are inappropriate for that purpose and do not reflect current operating rules. The Sierra Club also alleges deficiencies in the description of the baseline conditions, especially with regards to Cal-Am's production and distribution systems. The Sierra Club states that the environmental benefit analysis in Study 2 is inadequate. The Sierra Club notes that the estimated cost of re-operation could be reduced by eliminating wells that are intended to serve as backup wells for use during well outages. The Sierra Club argues that these wells are unnecessary because water could be diverted at the CVFP if an emergency occurs. Lastly, the Sierra Club notes that the report does not contain sufficient information to allow for an independent review of its conclusions. The Sierra Club requests that the second study be rejected as unsatisfactory.

9.4 CRSA

CRSA contends that the second study is inadequate. CRSA notes that the study evaluates impacts during the most severe drought on record (1987-91) and that the surface diversion criteria that are used to establish the baseline for measuring changes due to re-operation are not representative of historic operations. CRSA argues that the study should have compared benefits from modeled alternative to actual historic conditions. CSRA further notes that different gages could have been used to measure flow parameters; additional flow parameters should have been used to evaluate impacts; and the life cycle needs of public trust resources should have been evaluated.

CRSA does not concur with the conclusion in the second study that installation of a new well in AQ4 is infeasible, due to the potential to induce seawater intrusion. Specifically, CRSA contends that the Cypress Point fault is a geologic impediment to seawater intrusion.

CRSA recommends that all of the water that Cal-Am presently diverts from the Carmel River be left instream and diverted from the river in AQ4[5].

9.5 Carmel Development

Carmel Development mischaracterizes the studies as an environmental impact report. Carmel Development states that the study contains insufficient data to support its conclusions. Carmel Development states that additional model runs with different extraction methodology would demonstrate that it is possible to divert additional water from a new well in AQ4.

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[5] Condition 6 limits the scope of study to the quantity of water supplied to the areas served by the CVFP, which is a fraction of Cal-Am's total service commitment.

9.6 NMFS

NMFS asserts that the models used for the second study are inappropriate in that they rely on erroneous baseline operating criteria. The models did not analyze whether instream flows could be increased over additional length of river by moving diversion points downstream.

9.7 Liz Gerritsen

Liz Gerritsen is a property owner near the BIRP. Ms. Gerritson commented that the study failed to consider the impacts on neighbors of the BIRP as it is currently operated. Condition 6 did not direct Cal-Am to consider these impacts.

10.0 RESPONSE TO COMMENTS

This section discusses issues raised by the commentors. The Division generally concurs that the studies should have presented more information to allow an independent review of the results.

10.1 Scope of the Studies

A scoping document was prepared for Study 2[6] in order to identify any deficiencies in the proposed study and correct inadequacies prior to preparing the study. The scope of work states that the CVSIM and CVGWM models will be used to prepare the study. No comments on using these models to prepare Study 2 were submitted to the Division.

The scope of work states that Cal-Am will investigate use of new well(s) on the property that was donated to Cal-Am in AQ4 for purposes of re-operation. The bypassed flows would continue downstream to this site, and would then be diverted from the river. No other well sites in AQ4, or alternative modes of diversion from AQ4 (such as seasonal limits on diversion from AQ4), were identified in the scope of work. No objections to use of this well site and relocating as much diversion to AQ4 as possible[7] were submitted to the Division.

10.2 Adequacy of Models

The Sierra Club comments that the models used are not well suited for the determining stream and aquifer interactions. Studies 1 and 2 utilize the Carmel Valley Simulation Model (CVSIM) for surface flows and the Carmel Valley Groundwater Model (CVGWM) using MODFLOW code for groundwater flow. All models have limitations that require the exercise of caution when interpreting model results. However, models provide a valuable tool for making quantitative comparisons among different operating scenarios. Although the models used in the studies may have certain limitations, they are

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[6] Condition 6 does not require a scoping document for Study 1.

[7] Cal-Am studied alternatives to relocate its San Clemente Dam surface diversion solely to AQ4, or a combination of AQ3 and AQ4.

the best tool currently available to conduct the required assessment. As a result, the Division approved Cal-Am's proposal to use these models in the studies.

10.3 Modeling Assumptions

Several commenters suggest that the baseline criteria are inappropriate and do not reflect actual operating criteria. We concur that the release requirements assumed in the studies do not represent the regulatory conditions specified in the MOA.

CRSA contends that the hydrologic period used in the modeling for Study 2 is inappropriate because the period 1986 to 1993 includes the years of the most severe drought on record, thus giving more weight to dry years. However, the CSRA also notes that the effect of water diversions are problematic only during droughts. (Comment Letter date 9/1/99.) The modeling period simulates conditions from a full basin condition in 1986 to another full basin condition in 1993, thereby avoiding groundwater storage depletions that would make it difficult to determine whether hydrologic results are caused by seasonal variation or re-operation. Furthermore, the simulation period includes the drought period 1987-1991. It is reasonable to assume that the proposed actions will have the greatest impacts during drought conditions, both in terms of benefit to the fisheries, as noted by CRSA, and effect on groundwater levels. Therefore, the study period is appropriate.

CRSA also contends that the baseline assumption, diversion of 1.25 cfs at San Clemente Dam, is inappropriate. CRSA asserts that the model results should not have been compared to a fixed diversion of 1.25 cfs at the dam. The second study evaluates three diversion scenarios at the dam: (1) the baseline scenario; (2) 1.25 cfs diversion; and (3) no diversion. (Study 2, pp. 27 & 28.) The baseline studies are described as simulating the conditions in place at the time the study was completed. It is not appropriate to compare modeled alternatives to actual historic conditions as suggested by CRSA because actual conditions are the result of many parameters that change over time. It is more appropriate to perform a comparative analysis using modeled simulations where conditions other than the proposed change are constant in the various studies.

10.4 Evaluation Criteria For Fishery Benefits

Several commentors criticize the study for not evaluating environmental benefits at additional locations. Because environmental benefits are dependent on depth of flow, quantitative evaluations can only be made when two conditions exist: (1) there is a node in the CVSIM model at which flow can be predicted, and (2) there is a gage in the river at or near the location represented by the node, so that river stage can be correlated to flow. There are no additional locations where these two criteria are met. (Study 1, Appendix titled CVSIM Model Overview, p. 9.) We agree with the commentors that a more thorough evaluation of the qualitative impacts should have been made based on known relationships between rearing habitat and streamflow. However, the available information is sufficient for the SWRCB to comply with Condition 6.

10.5 Costs:

The cost estimates for equipment and facilities in Study 2 are consistent with industry prices. However, each diversion alternative has such a wide range of options regarding the number of wells needed for Study 1 and the required plumbing and types and locations of treatment facilities for Study 2, that it is difficult to conduct a meaningful cost/benefit analysis. This difficulty is compounded by the uncertainty that always exists when efforts are made to assign a value to natural resources. As stated in section 2.0, measures were not eliminated from consideration solely on the basis of cost.

10.6 Alternatives Selected for Study

Commentors suggest that alternatives selected for evaluation are not adequate to meet the objective of Condition 6. They specifically object to the fact that Study 2 only considered one pumping scenario regarding operation of the proposed new well in AQ4. The commentors state that the well could have been operated so that it did not result in seawater intrusion. Although we concur that it would have been possible to evaluate other pumping scenarios regarding the well, we find that the scenario studied is consistent with Condition 5 of Order 95-10 that requires that diversions occur at the most downstream well to the extent possible.

Commentors also contend that the studies do not consider enough other alternative pumping scenarios regarding use of wells in AQ2 and AQ3. Although it is true that more scenarios could have been studied, we conclude that the alternatives considered are adequate for a reconnaissance-level study. Furthermore, the Division approved the alternatives. (March 19, 1999 Division letter.)

10.7 Seawater Intrusion

CRSA argues that Study 2's conclusion that the proposed new well in AQ4 will cause seawater intrusion is not supported by other information. CSRA states that there is a geologic barrier to seawater intrusion. We disagree. The U.S. Geological Survey (USGS) reports that there is no geologic barrier to seawater intrusion, because the Carmel River has cut through the uplifted block of basement rock that formed a groundwater ridge just west of Highway 1 to a depth of more than 86 feet below sea level. ("Analysis of the Carmel Valley Alluvial Ground-Water Basin", USGS Report 83-4280, p. 12.) Furthermore, the study results on susceptibility to seawater intrusion were supplemented by well sampling data. The wells that are furthest downstream in AQ4 exhibit traits of saltwater intrusion and indirect influence of brackish water. (12-3-99 and 1-7-2000 Cal-Am well sample data submittals.)

11.0 FEASIBILITY ANALYSIS

The feasibility criteria are set forth in section 2.0. In this section, we consider whether, and the degree to which, the alternatives identified in Study 1 and 2 meet the feasibility criteria.

11.1 Whether the Measures are Physically Possible to Implement

The Division concludes that it is physically possible to bypass water that was in the past diverted at San Clemente Dam, and to divert that water at downstream locations. Cal-Am is able to reduce diversions below 1995 levels, and has already done so. Table 1 documents that annual diversion at San Clemente Dam has continually declined for the 1996 to 2000 water years. Surface diversion was 3,527 af in the 1996 water year and declined to 260 af in the 2000 water year.

Cal-Am directly diverts water at the dam, and such diversion is generally measured as a flow rate, in cfs. The flow rate associated with Cal-Am's annual diversion generally ranges from 1.5 to 3.0 cfs during the summer seasonal low flow period. (9-15-99 District comment letter.) The typical winter-spring surface diversion is 5 to 13 cfs. (ibid)

11.2 Whether the Measures Result in a Measurable Gain in Fish Habitat

In general, fishery benefits are greatest when the quantity of water remaining instream is maximized and is allowed to flow downstream from the dam through the Narrows. This is because the prime fishery habitat downstream of the San Clemente Dam occurs between the dam and the Narrows. Study 2 concludes benefits to fish are associated with letting the water remain instream in AQ3, although these benefits are characterized as being minimal. The comment letters indicate that the benefits of letting the water remain instream in AQ3 could be greater than indicated in Study 2, if additional parameters were analyzed.

During summer months, steelhead are not generally present in the Carmel River downstream of Schulte River Bridge at river mile 6.7 in AQ3 because of (a) low flows and (b) spawning and rearing habitat quality is near zero because the channel substrate is sand. (12-1-1997 District Letter, p. 6.) Furthermore, there are minimal fishery benefits that accrue in the summer in the downstream end of AQ3 and in AQ4 because the channel is relatively wide and summer streamflow is relatively low, with correspondingly shallow water depth.

11.3 Whether the Extraction of Water From Wells Has the Potential to Induce Seawater Intrusion

Re-operating by diverting water from existing wells in AQ3 and AQ4 and a new well in AQ4 can divert brackish water if the new well in AQ4 is located too close to the lagoon and may induce seawater intrusion. Seawater intrusion is an unacceptable hydrologic impact and, therefore, this alternative should not be implemented.

11.4 Whether Re-Operation Will Require New Facilities

To determine whether re-operation requires new facilities, we evaluated the localized hydrologic impacts of bypassing 8 cfs at the dam and diverting water that would have

been diverted at the dam through the existing wells and any necessary new wells in AQ1 and AQ2.

11.4.1 Whether the Extraction of Water from Wells will Cause Localized Hydrologic Impacts

Pumping from AQ1 alone or from AQ1 and AQ2 will result in no localized hydrologic impacts if diversions at Robles Well No. 3 are limited to 0.98 cfs. The existing wells in AQ1 and AQ2 are adequate to divert an additional 4 cfs, the maximum amount that has been authorized as surface diversion from May to December of each year since 1997. These wells have inadequate capacity in the winter, however, to divert 8 cfs of bypassed surface diversion at the dam. Additional pumping capacity must be available. If this additional capacity is obtained by constructing new wells in AQ1 or AQ2, the new wells must be properly sized and sited.

Rather than construct new wells, water that cannot be diverted in AQ1 and AQ2 could be diverted from the wells in AQ3 in the vicinity of RM 9.0 and upstream. The combined capacity of the wells in these three aquifers is adequate to divert 8 cfs of water bypassed at San Clemente Dam. However, it is not known whether this pumping scenario results in localized hydrologic impacts. Therefore, Cal-Am should conduct a hydrologic study for the limited purpose of determining whether diverting the water from the subterranean stream between river miles 9.0 and 17.2 will cause localized hydrologic impacts in the Carmel River.

11.4.2 Costs

Generally, alternatives that can be implemented without requiring the construction of new wells or other facilities are the most economical. None of the alternatives considered in the studies can be implemented unless new facilities are constructed. The commentors have identified an alternative, however, that does not require new wells. (see 11.3.4 "Other Considerations")

Re-operation by diverting bypassed water at wells in AQ1 or a combination of wells in AQ1 and AQ2 requires that new wells be constructed and also requires installation of new pipes or the relocation of the Del Monte Regulating Station. Nonetheless, it is less costly to divert from the upper river in AQ1 and AQ2 to serve Cal-Am's upper valley customers than from AQ3 and AQ4. As noted previously, Cal-Am lacks adequate capacity to divert 8 cfs from AQ1 and AQ2. Accordingly, additional diversion is needed from elsewhere in the river if re-operation occurs during the high flow season.

Re-operation by diverting bypassed water at wells in AQ3 and AQ4 is the most costly alternative, because the water diverted downstream of the Scarlett #8 well in AQ3 requires treatment at the BIRP for iron and manganese removal and then conveyance upgradient to Cal-Am's upper valley customers. We conclude that the cost for diversion from AQ3 can be minimized if the water is diverted from the Scarlett #8 well in AQ3 upstream (river mile 9.0) because this avoids the cost for iron and manganese removal.

Only 1.25 cfs of the water treated at the CVFP is needed to serve the Village, and the remaining water is used throughout the Cal-Am distribution system. (Report 2, p. 27.) The Village demand can be met using the existing Russell wells in AQ1, which already convey water to the CVFP for local use. (Report 1, p. 9.) By allowing diversion of 1.25 cfs at the existing wells in AQ1, Cal-Am can achieve many of the fishery benefits of the other alternatives while avoiding the resulting economic impacts.

Cal-Am has reduced surface diversions at San Clemente Dam from its 1995 level, and concurrently increased diversion from AQ1 and AQ2. Therefore, Cal-Am may already have made the system modifications necessary to cease surface diversions at the dam and use its existing wells to divert the water.

11.5 Other Considerations

In its letter approving the scope of work for Study 2, the Division required Cal-Am to integrate the results of the two studies. Cal-Am did not do this; however, DFG, the District and the Sierra Club recommend an alternative that the bypassed water be allowed to flow downstream for a distance of 9.5 miles, to the Scarlett #8 well at river mile 9.0, and then be diverted by Cal-Am. This scenario has most of the advantages of the alternatives considered in Study 1 and those considered in Study 2 and few of the detriments.

Water diverted at the wells in AQ2 and the Scarlet #8 well and Berwick #7 is treated at the wells and can be distributed through existing distribution facilities. If wells in AQ1 provide water to the Village, water from the wells in AQ2 and the Scarlett #8 well does not need to be conveyed to the CVFP[8] or to the Village. This will reduce costs, although it will result in less fishery benefits downstream of the Russell wells than requiring the water to flow farther downstream. On balance, however, Cal-Am should be allowed to divert 1.25 cfs from the Russell wells in AQ1 to serve the Carmel Valley Village.

Cal-Am should conduct a limited analysis for the purpose of determining whether pumping the balance of the bypassed water from wells in AQ2 and AQ3 causes localized hydrologic impacts. Cal-Am should notify the Division Chief if localized impacts are expected to occur, and propose methods to limit those impacts.

12.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

This action is exempt from the California Environmental Quality Act (CEQA) pursuant to California Code of Regulations, Title 14, sections 15307, 15308 and 15321.

Section 15307 and section 15308 exempt actions by regulatory agencies that are taken for the protection of natural resources and for the protection of the environment, respectively. In this case, the action will restore flow to a section of the Carmel River that is important for the reproduction and rearing of steelhead trout, a threatened species.

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[8] Water from these wells does not require treatment other than chlorination.

Section 15321 exempts enforcement actions by regulatory agencies. This order results from an enforcement action taken by the SWRCB against Cal-Am as set forth in Order WR 95-10, as modified by Order WR 98-04.

The exceptions to the categorical exemption described in section 15300.2 of Title 14, California Code of Regulations do not apply.

13.0 FINDINGS

1. The Division finds that it is feasible for Cal-Am to divert the water presently diverted at San Clemente Dam from the Carmel River subterranean stream between river miles 9.0 and 17.2.

2. Cal-Am should satisfy the water demands of its customers by ceasing diversions at San Clemente Dam and by extracting water from the stream reach between river miles 9.0 and 17.2 using its most downstream wells to the maximum practicable extent, except that Cal-Am may divert up to 1.25 cfs to serve the Carmel Valley Village using the wells in AQ1.

3. Cal-Am should conduct a hydrologic study to determine whether the diversions set forth in finding 2 cause localized hydrologic impacts in the Carmel River in the vicinity of the wells used to divert the water that is presently diverted at San Clemente Dam.

4. This action is categorically exempt from CEQA pursuant to California Code of Regulations, Title 14, sections 15307, 15308 and 15321.

ORDER

IT IS HEREBY ORDERED THAT:

Cal-Am shall comply with Condition 6 of Order WR 95-10, as modified by Order 98-04 as follows.

1. Unless Cal-Am notifies the Chief of the Division of Water Rights as required by Paragraph 2, below, Cal-Am shall within 40 days of issuance of this order divert the water presently diverted at San Clemente Dam from the Carmel River subterranean stream between river miles 9.0 and 17.2. Cal-Am shall satisfy the water demands of its customers by extracting water from its most downstream wells between river miles 9.0 and 17.2 to the maximum practicable extent, except that Cal-Am may divert up to 1.25 cfs to serve the Carmel Valley Village using the wells in AQ1.

2. Within 30 days of the date of this order, Cal-Am shall conduct a hydrologic study for the limited purpose of determining whether the conditions specified in Paragraph 1, above, cause localized hydrologic impacts in the Carmel River in the vicinity of the wells used to divert the water which is presently diverted at San Clemente Dam. Cal-Am shall notify the Chief of the Division of Water Rights within 10 days of completing the study if adverse hydrologic impacts are expected to occur.

3. Paragraph 1 may be modified by the Chief of the Division of Water Rights if new information becomes available which shows that further expansion of downstream pumping is feasible and beneficial for maintenance of fish habitat in the lower Carmel River. Any changes to Paragraph 1 shall occur after notice and an opportunity to comment on the proposed change.

Dated: April 18, 2001

Harry M. Schueller, Chief
Division of Water Rights