APPENDIX D
WATER AVAILABILITY ANALYSIS

October 24, 2005

WATER AVAILABILITY ANALYSIS

TO: Victoria Whitney, Division Chief, Division of Water Rights, State Water Resources Control Board

FROM: Steven M. McCabe, P.G., C.HG. The Source Group
DATE: October 24, 2005

SUBJECT: WATER AVAILABILITY ANALYSIS (WAA) FOR APPLICATION #A030166 OF JAMES J. HILL III

1.0 INTRODUCTION

The purpose of this report is to summarize the results of the water availability analysis conducted for the subject application located within the Big Sur River watershed in Monterey County. The objectives of the analysis are as follows:

- To determine whether water is available for appropriation in accordance with California Water Code section 1275 (d); and

- To determine the impact of the applications/project on streamflow in order to evaluate the impacts to fishery resources as required by the California Environmental Quality Act (CEQA), the California Endangered Species Act (CESA), and the federal Endangered Species Act (ESA).

Figure 1 (attached) shows the location of the Big Sur River watershed, the project's point(s) of diversion (POD), and other features in the area.

2.0 PROJECT DESCRIPTION

The project is located in Monterey County approximately 1 1/2 miles south of Point Sur Lighthouse. The application seeks to continue existing, historic direct diversion, limited however to no more than 1615 acre-feet (AF) of water in any one year, is further limited to a 20 year running average of no more than 1,200 acre-feet per year(AFY), and will in no event exceed that quantity reasonably required for irrigation. Application # A030166 requests direct diversion for the purposes of continuing irrigation of established pastureland. Even though the applicant has been diverting a similar amount of water to the same lands for over a half century, the SWRQB recently reclassified the source of diversion from groundwater to river underflow triggering the need to establish a water right.

3.0 METHODS

For the purposes of this WAA, streamflow will be estimated using the historic streamflow data for USGS stream gauge #11143000 ("USGS Gauge"), which is located on the Big Sur River approximately 5 miles above the POD and has a continuous record of streamflow data back to 1950.

4.0 ANNUAL UNIMPAIRED FLOW
Annual unimpaired flow is the total volume of water, on average, that would flow past a particular point of interest (POI) on an annual basis if no diversions (impairments) were taking place in the watershed above that point.

The annual unimpaired flow above the POD is estimated to be 73,121 AFY [101 cfs] based on over 50 years of streamflow data for the USGS Gauge.

4.1 Data and Assumptions

The annual average stream flow for the USGS Gauge for the years of 1950 to 2004 equals approximately 101 cfs. Using this approach it is assumed that annual precipitation and basin return flow between the USGS Gauge and the POD more than offsets losses related to evapotranspiration (ET). Because of this assumption, water rights for POIs on tributaries to the Big Sur River were not considered in the CFII calculations presented in Section 7.0. It is also assumed that any loss in surface flow between the USGS gauge and the POD is roughly equivalent to the amount of underflow (in addition to the surface flow) available at the POD.

5.0 UNIMPAIRED FLOW DURING THE PROJECT'S DIVERSION SEASON
Unimpaired flow during the project's diversion season is the total volume of water, on average, that would flow past a selected POI on a seasonal basis if no diversions (impairments) were taking place in the watershed above that point. Flow is measured in units of acre-feet.

For the purposes of this WAA, to provide a conservative analysis, the historic average flow at the USGS Gauge was used for the typical El Sur Ranch irrigation season of April through October.

On a few occasions during the past half-century, El Sur Ranch has needed to divert water during months outside the typical irrigation season of April through October; hence the application is for a calendar year. However, during the vast majority of years, diversion did not occur between November and April. Therefore, the unimpaired flow estimate for the typical irrigation season is a better number for use in calculating the Cumulative Flow Impairment Index (Section 7.0).

5.1 Data and Assumptions

Using the historical flow data for the USGS Gauge, the average seasonal flow for April 1 to October 31 is approximately 45 cfs (19,012 AF based on a 213 day season from April 1 to October 31).

6.0 BYPASS FLOW

To assist applicants in estimating water availability for diversion while protecting flows needed for fishery protection, the SWRCB has published *Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-*

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California Coastal Streams, Appendix A (SWRCB, June 17, 2002) ("Guidelines"). The Guidelines "provide standard recommended protective terms and conditions to be followed **in the absence of site-specific, biological, and hydrologic assessments**. . . . Minimum bypass flows and cumulative maximum rates of diversion are recommended to ensure that streams are adequately protected from new **winter** diversions." (Guidelines, p. 1, emphasis added.) The applicant in this instance has submitted a compendium of Technical Reports including site-specific biological and hydrologic assessments at flows less than an average runoff year. Therefore the Guideline recommendations, which establish a "maximum cumulative volume guideline . . . for projects for which there has been insufficient site-specific, biological assessment of instream flow needs to protect fisheries" (Guidelines at 2), should not be considered definitive for purposes of establishing the availability of water for the proposed diversion, nor for establishing the bypass flows that are necessary.

In addition, the diversions for which a water right permit is sought have been conducted for over fifty years. Recent reports of the Department of Fish and Game (as described in the Biology Report submitted by the applicant in connection with ApplicationA030116) describe the steelhead fishery as healthy [Biology Report, pp. 21-1 to 2-3 (excerpt from Titus, R.G., D.C. Erdman and W.M. Snider, 2003. "History and status of steelhead in California Coastal drainages south of San Francisco Bay". In preparation)]. Over-summering survival and growth of steelhead were among the highest in California coastal streams. [Biology Report, pp. 5-3 to 5-4, 6-1, and Fig. 81, p. 8-52.]. The Hydrologic Report presents data substantiating the availability of flows during a low flow year. In fact, the report shows that flows below the POD were greater than flows above it due to the inflow of underflow into the river [Hydrogeology Report, Section 3.4.8.2, pp 3-16 to 3-17]. Temperatures remained suitable for steelhead, and stream continuity was never disrupted [Biology Report, p. 6-1]. In addition, because the POD is located near the terminus of the River, the majority of instream habitat is located well upstream of the POD, and therefore, will not be affected by diversions at the POD.

7.0 CUMULATIVE FLOW IMPAIRMENT INDEX

Pursuant to CESA and ESA (and potentially under CEQA), the Division is required to evaluate the cumulative impacts to the natural hydrology. The Cumulative Flow Impairment Index (**CFII**) is an index that is used to evaluate the cumulative flow impairment demand of all existing and pending projects in a watershed of interest. The CFII is a percentage obtained by dividing the **Demand** in acre-feet by the **Supply** in acre-feet at a specified **POI**[1], and for a specified time period, where:

> **Demand** is the "face" value entitlements of all existing[2] water rights, under all bases of right, above the POI in acre-feet, using the Division's Water Rights

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[1] Points of interest (POIs), are considered to be locations along the Big Sur River, below the USGS Gauge, that have existing or pending water rights listed in the Water Rights Information Management System (WRIMS).

[2] Pending water rights were not included in the primary CFII calculations. However, the impacts of pending water rights were calculated and addressed in footnotes 3 and 5.

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Information Management System (WRIMS) database (See Appendix A). For the purposes of this WAA the season of 1 April through 31 October is used to compute supply; and

Supply **is the seasonal average unimpaired flow above the POI in acre-feet.** For the purposes of this WAA the season of 1 April through 31 October is used to compute supply.

Based on the Division's Water Rights Information System Management (WRIMS) database, the total entitlements of approved water rights above the POD, for the period of 1 April to 31 October are estimated to be **2.9** for POI 3; **3.4** for POI 4; **39.2** for POI 6; and **4.4** for POI 7; etc. (See Appendix A). For the purposes of these calculations, it is assumed that each water right applicant has a single POI, and that each POI uses 1/365th of their maximum annual allotment per day.

For the sake of simplicity, it is assumed that each POI has as the same volume of unimpaired water available as the Applicant. As discussed in Section 5.0 above, the amount of available water for the season is estimated at 19,012 AF. The CFII values were estimated as follows:

Using the April Through October Average Flow Estimate for Supply and Demand
CFII @ POI 3 = (2.9 ÷ 19,012) x 100% = 0.015%;
CFII @ POI 4 = (3.4 ÷ 19,012) x 100% = 0.018%;
CFII @ POI 6 = (39.2 ÷ 19,012) x 100% = 0.21%;
CFII @ POI 7 = (4.4 ÷ 19,012) x 100% = 0.023%;

CFII Above POD = (49.9 ÷ 19,012) x 100% = 0.26%;

CFII @ POD = (942* ÷ 19,012) x 100% = 4.95%;
*Note: the 1615 AFY maximum diversion specified in the permit was prorated to the 213 day period of April through October.

Total CFII[3] = 5.22%

When computing the Supply, the Guidelines specify using the season of October 1 to March 31. However, to be conservative, in the CFII calculations presented above the Supply season was set to be the same as the irrigation season of April through October. Obviously, if the winter flows were considered, the CFII would be significantly lower, and well below 5%.[1]

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[3] Inclusion of 24.5 AF and 29.2 AF sought under pending water right applications at POI 1 and POI 2, respectively, increases the total CFII to just 5.5%

[1] The Guidelines specify that "When the CFII is between 5 and 10%, the Applicant must provide additional hydrologic analysis documenting the estimated effects of cumulative diversions on the stream hydrograph at the POI's during three representative normal and two representative dry years. If the natural hydrograph is appreciably impaired during the migratory and spawning period of anadromous salmonid species, additional site specific study may be warranted."

For example, using the entire year as the diversion season (i.e., January 1 to December 31), the CFII is as follows:

Using the Annual Average Flow Estimate for Supply and Demand

$$CFII @ POI\ 3 = (5 \div 73,121) \times 100\% = 0.007\%;$$
$$CFII @ POI\ 4 = (5.8 \div 73,121) \times 100\% = 0.008\%;$$
$$CFII @ POI\ 6 = (67.2 \div 73,121) \times 100\% = 0.092\%;$$
$$CFII @ POI\ 7 = (7.6 \div 73,121) \times 100\% = 0.01\%;$$

$$CFII\ Above\ POD = (85.6 \div 73,121) \times 100\% = 0.12\%;$$

$$CFII @ POD = (1615* \div 73,121) \times 100\% = 2.2\%;$$
*Note: the 1615 AFY maximum diversion specified in the permit was used.

Total CFII[5] = 2.3%

The Guidelines advise that "If the CFII is less than 5%, there is little chance of significant cumulative impacts due to the diversion and the project does not require additional studies to assess these impacts [to fish migration and spawning]." Nevertheless, extensive hydrologic and biologic studies were conducted during a low flow year and these studies showed that 1) river flow below the POD *exceeds* that upstream of the POD (ie. Bypass flows were protected) and 2) the fish population is large and healthy under the conditions of the historic diversions proposed to be continued under Application A030166. No trustee entity has provided any evidence of harm to trust values despite the ongoing diversion and manner of diversion for more than half a century. The data and history of the Big Sur River fishery, flows and diversions support the conclusion that water is available for the diversions sought by Application A030166.

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[5] Inclusion of 42 AF and 50 AF sought under pending water right applications at POI 1 and POI 2, respectively, increases the total CFII to just 2.5%

APPENDIX A
Demand above Point(s) of Interest for Application #A030166

Point of Interest ID	Water Right ID	Source	Season	Maximum Face Value Demand Amount by Direct Diversion or Storage	Adjustment to Maximum Face Value Demand Amount (Explain Reasons in Footnotes Below*) AFY
POI 1 (Pending)	A030946 Clear Ridge Mutual Water Company; Domestic, Irrigation, Fire Protection	Big Sur River Underflow (Stream Code: 330200000)	01/01 to 12/01	0.058 cfs and/or 42 acre-feet-year	24.5
POI 2 (Pending)	A031432 Calif. Dept. of Parks and Recreation; Domestic, Irrigation	Big Sur River (subterranean stream)	01/01 to 12/01	0.077 cfs and/or 50 acre-feet-year	29.2
POI 3	D030884R Ken W. McLeod; Domestic	Big Sur River	01/01 to 12/01	4500 gpd and/or 5 acre-feet-year	2.9
POI 4	D031117R Carolyn Motzel; Domestic	Big Sur River Underflow	01/01 to 12/01	4500 gpd and/or 5.8 acre-feet-year	3.4
POI 5	S014966 Robert Lockwood; Domestic, Fire Protection, Dust Control	Big Sur River	01/01 to 12/01	Null	Null
POI 6	S015407 Calif. Dept. of Parks and Recreation; Domestic, Recreational	Big Sur River	01/01 to 12/01	0.27 cfs and/or 67.2 acre-feet-year	39.2

POI 7	S015408 Calif. Dept. of Parks and Recreation; Domestic, Recreational	Big Sur River	01/01 to 12/01	0.05 cfs and/or 7.6 acre-feet-year	4.4
				Total Face Value Demand (Acre-Feet-Year) 177.6	**Total Adjusted Demand (Acre-Feet-Season* excluding pending permits)** 49.9

(*Prorated to 213 day season of 1 April to 31 October. Calculated by dividing annual demand by 365 days/year and multiplying by 213 days/season)

LEGEND

- PROJECT AREA
- SUB-WATERSHED
- LOWER WATERSHED
- UPPER WATERSHED
- WATERSHED BOUNDARY
- ▪ APPROXIMATE POI LOCATION
  FOR PENDING OR NULL WATER
  RIGHT (see Appendix A)
- ▪ APPROXIMATE POI LOCATION FOR APPROVED WATER
  RIGHT (see Appendix A)

POINT(S) OF
DIVERSION FOR EL
SUR RANCH

PROJECT
AREA
SUB-WATERSHED

THE POIs WITHIN
THE PROJECT
SUB-WATERSHED
ARE FOR CALIF.
DEPT. OF PARKS
AND REC.

USGS FLOW
GAUGE #11143000

LOWER
WATERSHED

UPPER
WATERSHED

Old Well

New Well

Profile Drawn

SGI
environmental

THE
SOURCE GROUP, Inc.

PROJECT NO.	DATE	DR. BY	APP. BY
01-ESR-001	10/24/05	ML/SMc	SMc

EL SUR RANCH
BIG SUR, CALIFORNIA

FIGURE 1
WATER AVAILABILITY ANALYSIS
POINTS OF INTEREST
APPLICATION #A030166