Response to Comment S2-46

The role of foresters and the practice of geology is discussed in Master Response 13.

the State of California as set forth in the Public Resources Code, Division 1, Chapter 2.5, Article 3. Under section 752, "scope of license and expertise," the code states that:

> "A professional forester is licensed to perform forestry services only in those areas of expertise in which the person is fully competent as a result of training or experience. In order for a professional forester to fulfill all of his or her responsibilities with regard to a particular activity on a site, if the expertise that is prudently required exceeds the expertise possessed by the professional forester in that regard, the professional forester may need to utilize the services of other qualified experts including but not limited to: archaeologists, botanists, civil engineers, ecologists, fisheries biologists, geologists, hydrologists, land surveyors, landscape architects, range scientists, soil scientists, or wildlife biologists..."

The practice of geology and licensing of Registered Geologists is regulated by the State as set forth under the Business and Professions Code, Geology and Geophysicists Act. Title 16, Professional and Vocational Regulations, Division 29, Article 1, Section 3003 (f)(2) states that:

> "The practice of geology or geophysics 'for others' includes but is not limited to the performance of geological or geophysical services by any individual, firm, partnership, corporation or other association or by the employees or staff members thereof, whether or not the principal business of such organization is the practice of geology or geophysics, when the geological or geophysical reports, documents or exhibits constituting the practice of geology or geophysics are disseminated or made available to the public or any individual or combination of individuals other than the employees or staff of such organization in such a manner that the public or said individual or combination of individuals may reasonably be expected to rely thereon or be affected thereby."

S2-46 The Simpson AHCP/CCAA appears to conflict with California's Public Resources Code and Business and Professions Code by allowing RPFs, under certain circumstances, to practice aspects of geology that exceeds their expertise, particularly as that practice relates to characterization, evaluation and mitigation of landslide hazards. Examples in the AHCP/CCAA where it appears to CGS, that the RPF would be conducting the practice of geology include:

a. *Evaluating stream bank stability (6.2.1.2.2, 6.2.1.4.2, 6.2.1.7.4, 6.2.1.2.13 and 6.2.1.4.9).*

   The AHCP/CCAA states that "no trees that contribute to maintaining bank stability" (6.2.1.2.2) will be harvested, and that downed wood could be salvaged if it is "not contributing to bank or slope stability" (6.2.1.2.13). Geologic experience and judgment are necessary for the evaluation of slope stability.

b. *Evaluating run-out potential of landslide debris within steep streamside slopes (6.2.2.1.3, 6.2.2.1.4, 6.3.2.3.1, and 6.3.2.3.3).*

Within the steep streamside slopes, Simpson proposes an inner and outer zone defined as RSMZ and SMZ. The width of the RSMZ is equal to the applicable RMZ, "except where a qualifying slope break exists within that distance the RSMZ may only extend to the slope break" (6.2.2.1.3). The qualifying slope break is defined as "an interruption of slope gradient of sufficient degree and scale to reasonably impede sediment delivery to watercourses from shallow landslides originating above the slope break" (6.2.2.1.3). This prescription calls for geologic experience and judgment in assessing relative landslide movement potential, i.e., the ability of site specific geologic materials to be transported downslope under different slope conditions.

c. *Evaluating stability and areal extent of headwall swales (6.2.2.2.1, 6.2.2.6, and 6.3.2.4.1).*

The AHCP/CCAA states that Simpson will identify all headwall swales using SHALSTAB "coupled with field observations and verification of characteristic slope attributes by an appropriately trained RPF or RG." "The boundaries of a SHALSTAB-identified headwall swale may be adjusted… by an appropriately trained RPF or RG" (6.2.2.2.1). Appendix B.3.2 defines headwall swales and states, "not all headwall swales have the same potential for failure" and that generally, the "risk of landsliding is greater… where past shallow landsliding in similar adjacent swales has occurred. Hence, the slide history of nearby headwall swales can be used to help identify unfailed high-risk swales." Geologic experience and judgment are necessary for evaluation and assessment of landslide history of headwall swales.

d. *Identification and relative activity of deep-seated landslides (6.2.2.3.1, and 6.2.2.6).*

The AHCP/CCAA states that an "RPF or RG, will identify all active deep-seated landslides within the proposed THP area…using published landslide maps, aerial photographs and field observations" (6.2.2.3.1). Using crown scarp characteristics that are to include displacement across ground cracks, and soil exposures, or using the convex geomorphology of a landslide toe, the RPF is to determine if the landslide moved in the past 50 to 100 years and provide default mitigation measures. Geologic experience and judgment are necessary to assess relative landslide movement potential, landslide age, and appropriate mitigation measures.

e. *Evaluating the relative activity of shallow rapid landslides (6.3.2.6).*

The AHCP/CCAA states that the RPF can apply conservation measures to "shallow rapid landslides that are field verified to be active, or which are likely to be reactivated by harvesting, and that have a reasonable potential to deliver sediment directly to a watercourse, and that are at least 200 square feet in plan view" (6.2.2.4, and 6.3.2.6). The default conservation measures are described in the Plan (6.2.2.4, and 6.3.2.6). Geologic experience and judgment are necessary for assessment of relative landslide activity, relative landslide

Response to Comment S2-47

No one signs the Plan, and the Plan does not have a list of preparers. However, Tim Best (Certified Engineering Geologist) and Matt O'Connor (California RG) were instrumental in the development of the conservation measures for unstable features. Sara Monteith (California RG) and Mike Pappalardo (Oregon RG) provided information in the development of the geology sections within AHCP/CCAA Section 4.

Response to Comment S2-48

Mr. Pappalardo prepared EIS Section 3.2. The List of Preparers neglected to include Ms. Sara Monteith, who collaborated with Mr. Pappalardo in the development of all of the text and maps included in EIS Section 3.2 and supervised and reviewed all of Mr. Pappalardo's work. The List of Preparers has been amended to include Ms. Monteith.

S2-46 movement potential, delivery potential, and appropriate mitigation measures.

11. Signature of Registered Professional in Charge

The Business and Professions Code, Geology and Geophysicists Act, Division 3, Chapter 12.5. Section 7835 states:

> "All geologic plans, specifications, reports or documents shall be prepared by a registered geologist, or registered certified specialty geologist, or by a subordinate employee under his direction. In addition, they shall be signed by such registered geologist, or registered certified specialty geologist or stamped with his seal, either of which shall indicate his responsibility for them."

S2-47 S2-48 The AHCP/CCAA document is not signed, or stamped, by a Registered Geologist licensed in the State of California. In addition, Chapter 5 of the EIS indicates that Mike Pappalardo of CH2M Hill is the geologist that prepared the report. However, it appears, based on our review of the Board of Geology and Geophysics website of licensed geologists, that Mr. Pappalardo is not licensed to practice geology in California.

If you have any questions, please do not hesitate to contact us.

This document was prepared by:

Original signed by
Burt C. Hardin, CEG 1946
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Eureka, California

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Original signed by
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Senior Engineering Geologist
Sacramento, California

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cc: Trinda L. Bedrossian, CGS

References Cited:

California Division of Mines and Geology Note 45 – Guidelines for engineering geologic reports for timber harvesting plans, revised 1999.

California Division of Mines and Geology Note 50 – Factors affecting landslides in forested terrain, revised 1997.

California Division of Mines and Geology Note 52 – Guidelines for geologic reports for regional-scale environmental and resource management planning, 2001.

Cruden, D.M., Varnes, D.J., 1996, Landslide types and processes, in Turner, K.A., and Schuster, R.L., editors, Landslides investigation and mitigation: Transportation Research Council Special Report 247, National Academy Press, Washington D.C., p36-75.

Dietrich, W.E., Real de Asua, R., Coyle, J., Orr, B., and Trso, M., 1998, A validation study of the shallow slope stability model, SHALSTAB, in forested lands of Northern California; unpublished report prepared for Louisiana-Pacific Corporation, Calpella, CA, p. 16.

Harden, D.R., Kelsey, H.M., Morrison, S.D., and Stephens, T.A., 1981, Geologic map of the Redwood Creek drainage basin, Humboldt County, California; U.S. Geological Survey, Water Resources Investigations / Open File Report WRI-OFR 81-496, scale 1:62,500.

Peterson, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkamper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California; Joint publication of the U.S. Geological Survey and the California Department of Conservation, Division of Mines and Geology, DMG Open-File Report 96-08, 33 pp., 2 appendices.

Toppozada, T., Borchardt, G., Haydon, W., Petersen, M., Olson, R., Lagorio, H., and Anvik, T., 1995, Planning scenario in Humboldt and Del Norte Counties, California for a great earthquake on the Cascadia Subduction Zone, California Department of Conservation, Division of Mines and Geology, Special Publication 115, 151 pp., 3 appendices.

Letter - S4. Signatory -CDFG.

Swift, Richard/SAC

From: JB [james.f.bond@noaa.gov]
Sent: November 26, 2002 2:55 PM
To: Swift, Richard/SAC; Garwin Yip
Subject: [Fwd: Errata Sheet for DFG Comments to Draft Simpson AHCP/CCAA]

Errata Sheet for November 19.d...

-------- Original Message --------
Subject: Errata Sheet for DFG Comments to Draft Simpson AHCP/CCAA
Date: Tue, 26 Nov 2002 14:20:33 -0800
From: "Mark Moore" <MMoore@dfg.ca.gov>
To: <james.f.bond@noaa.gov>, <Amedee_A_Brickey@r1.fws.gov>
CC: <tbedross@consrv.ca.gov>, "Deborah Dyer" <DDyer@dfg.ca.gov>,"Kenneth Moore" <KMoore@dfg.ca.gov>,"Mark Stopher" <MStopher@dfg.ca.gov>, <John_Marshall@fire.ca.gov>, <chris_heppe@nps.gov>, <jkolb@park.ca.gov>, <quarn@rb1.swrcb.ca.gov>,<newald@simpson.com>, <todell@simpson.com>

Please refer to the attached errata sheet when reviewing the Department of Fish and Game comments to the Draft Simpson AHCP/CCAA.

Response to Comment S4-1

Comments included in the errata sheet have been noted. However, without an explanation of the Department's intent behind the proposed strikeouts and formatting changes, the Services are unable to provide substantive responses.

S4-1

Errata Sheet for Department of Fish and Game (DFG) Comments to the Draft Simpson AHCP/CCAA

Please note the following:

Cover Letter:
Page three, line four: change "hydrologic plan" to "hydrographic planning".

Page four, line seven in the middle paragraph: add a comma after the word "watercourses".

Attachment 1:
Page 31, 6.2.3.1.5: The sentence on lines four and five of the bottom paragraph which reads "Low priority sites should be included in this prescription" should be highlighted in plain blue instead of black.

Page 46, 6.2.3.5.18: On line one highlight in **bold blue** the words "in lifts not to exceed one foot", and on line three add the word "techniques" in plain black text after "~~to minimize erosion using~~". On line four the word "**Techniques**" should be in plain black text.

Page 46, 6.2.3.5.19: On line two, add "~~outsloped~~" at the end of the phrase "~~use a combination of~~".

Page 48, 6.2.3.6.6: Under number 1, line five, highlight in **bold blue** the word "effectively".

Page 48, 6.2.3.6.6: Under number 3, the second sentence should read: "**At sites where seed and mulch alone may be ineffective at reducing erosion to the maximum extent practicable, additional erosion control materials will be applied** prior to the first winter period following installation."

Page 49, 6.2.3.6.8: On line one, the word "at" should be in **bold blue**. The sentence on lines five and six should read "**The remainder of the fill will be compacted** in one-foot lifts ~~and will compact fill faces~~ **to achieve at least 90% relative compaction throughout the fill including fill faces.**"

Page 50, 6.2.3.6.10: Under number 2, the word "or" on line one should be in **bold blue.**

Page 51, 6.2.3.6.14: On line four, the sentence should read "Ditch ~~drains~~ **relief culverts** will consist of culverts with a minimum size of 18 inches."

Page 52, 6.2.3.6.16: On line one, the words "relief culverts" should be in **bold blue.**

Page 62, 6.2.3.13.1: Under number 3, line eight, the phrase "[redacted] should be deleted.

Page 65, 6.2.3.15.2: The word fisheries should be deleted from the last sentence.

Page 73, 6.2.5: In the first full paragraph, delete the following sentence from lines five through eight: "So use of these baseline conditions as the only standard for measuring success would provide any response in the proposed plan if existing impacted conditions did not improve".

Letter - S5. Signatory -Calif. RWQCB - North Coast Region.

California Regional Water Quality Control Board

North Coast Region

William R. Massey, Chairman

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

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US Fish & Wildlife Service
Arcata, CA

November 19, 2002

Ms. Amedee Brickey
U.S. Fish and Wildlife Service
1655 Heindon Road
Arcata, CA 95521

Dear Ms. Brickey:

Subject: North Coast Region Water Quality Control Board Staff's Comments on Simpson Resource Company's Aquatic Habitat Conservation Plan

File: Simpson Resource Company Aquatic Habitat Conservation Plan

Thank you for the opportunity to provide comments on Simpson Resource Company's Aquatic Habitat Conservation Plan (AHCP) dated July 2002. North Coast Region Water Quality Control Board (Regional Water Board) staff's comments are provided with the intent of ensuring that the activities undertaken as part of an approved AHCP will also result in compliance with the Federal Clean Water Act, the California Porter-Cologne Water Quality Control Act, and the Water Quality Control Plan for the North Coast Region (Basin Plan). These comments are also intended to help ensure, as stated in the Executive Summary of the draft Environmental Impact Statement (page 2), that implementation of the provisions of the permits will ensure long term survival of the subject species *while allowing otherwise lawful activities* to continue (emphasis added).

At Simpson Resource Company's request, Regional Water Board staff also reviewed the proposed AHCP as a vehicle for compliance with Total Maximum Daily Loads (TMDLs) on Simpson's ownership. Some brief comments are included. A more through review and response will be sent to Simpson Resource Company under separate cover.

All of these issues (e.g compliance with other applicable laws and regulations, protection of all beneficial uses of water, addressing TMDLs) were identified in the public scoping process undertaken for the draft Environmental Impact Statement (DEIS).

"The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at: www.swrcb.ca.gov."

California Environmental Protection Agency

Recycled Paper

Letter - S5

Page 2

Response to Comment S5-1

The AHCP/CCAA Section 1.4 makes clear that the Plan provides an additional layer of requirements that supplement other applicable laws, both Federal and State. Plan approval and issuance of the Permits do not excuse Green Diamond from obligations independently imposed by other applicable legal regimes, such as laws governing water quality. (Regarding application of other laws, see responses to Comments G2-17, R1-2, R1-27, and R1-44, among others). Accordingly, no further clarification is necessary.

S5-1 In order to avoid potential future conflicts in resource management protection, Regional Water Board believes the proposed AHCP should be clarified to acknowledge that compliance with an approved AHCP will not in and of itself result in compliance with applicable water quality laws and in no way exempts the permit holder from compliance with these laws.

Comments and questions specific to the proposed AHCP and related documents are included as Enclosure A.

Sincerely,

Holly Lundborg

Holly A. Lundborg
Associate Engineering Geologist

HAL:tmk\simpson_ahcp_comment_letter.doc

Response to Comment S5-2

The Services do not agree that for the purposes of the Plan, aquatic invertebrates should be used as a criterion to implement Class II protection measures. However, we recognize that the use of aquatic invertebrates for classification of Class II watercourses for other purposes may need to be addressed outside the scope of the Plan.

Response to Comment S5-3

The Plan supplements other applicable legal requirements (Federal and State), including the CFPRs (AHCP/CCAA Section 1.4). Because Plan approval and issuance of the Permits do not excuse Green Diamond from other applicable requirements, Green Diamond would continue to be obligated to abide by them. See also Master Response 7, regarding the CFPRs.

Response to Comment S5-4

Green Diamond's site-specific data (see AHCP/CCAA Appendix C4) indicate that most Class III watercourses are stable and it is not necessary to prescribe additional retention to maintain the integrity of these channels. In Class III sites where potential instability exists, other "unstable slope" measures of the Plan may apply.

Response to Comment S5-5

AHCP/CCAA Section 6.2.1.7.2 requires retention of all hardwoods within the Equipment Exclusion Zone (EEZ) of a Tier

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

Enclosure A

This document is a compilation of the specific questions and comments developed by staff at the Regional Water Board. Introductions and other summaries are provided as appropriate.

Introduction (Reviewer 1)

This reviewer focused on aquatic and riparian aspects of the proposed AHCP.

1. Pages S-12 and 13. These pages include discussion on watercourse classification, but do not include criteria for identifying and determining Class II watercourses. The accompanying federal support document (EIS page 2-24) identifies presence of vertebrates as the criteria for Class II (CII) identification. CDF, DFG, and WQ recognize the presence of vertebrates and/or invertebrates as criteria for C II identification. The AHCP should identify all watercourses with aquatic insects and/or amphibians as C II watercourses and provide C II protection measures for them. S5-2

2. Pages S-12 and 6-69. Simpson (SRCO) has provided substantial evidence in the AHCP that documents the vital role that 1st Order streams have on the six species of concern (AHCP pg. A-22, A-29, 3-10, and 3-11, for example). However, it appears that SRCO is proposing less protection for these streams than is currently afforded by the Forest Practice Rules (FPRs). In addition, the current FPRs require special consideration for 100' and SRCO has only addressed 70' on these particular headwater streams. The AHCP should provide protection measures equal or greater than the current FPRs. S5-3

3. Page 6-12 includes a discussion regarding a slope based; two-tier approach for applying protection measures for C III watercourses. All channel zone trees are subject to harvest unless SRCO determines they are needed. This proposal is in direct conflict with FPR 14 CCR 916.9(e). The AHCP should specify that all channel zone trees, with the exception of site specific trees in the path of proposed roads, will be retained. If windthrow is an issue, then trees should be retained in clumps. S5-4 S5-5

4. Page S-13 presents proposed EEZ widths based on slope C III steams that will be less than the current FPRs for ELZs. The AHCP should provide EEZ widths of at least 25' wide for slopes less than 30% and at least 50' wide for slopes equal or greater than 30% to provide for additional sediment buffering of the Class III watercourses. S5-6

5. Page 2-9 discusses herbicide use, but does not provide justification for their use, nor propose any mitigation measures. The federal support document indicates that no impact to the environment is likely, and concludes SRCO can continue to use herbicides region wide (EIS 4-51). There is no evidence provided to support the

B Class III watercourse. Section 6.2.1.7.4 #2 requires retention of one conifer tree per 50 feet of stream length in the EEZ of a Tier B Class III watercourse. Trees left after the completion of harvesting operations under either one of these sections of the AHCP/CCAA could be subject to windthrow.

Anytime individual trees, or small groups of trees from a dense naturally or artificially regenerated timber stand are left by themselves without any protection from neighboring trees, they are subject to windthrow. The potential for an individual tree or small group of trees that originated from a dense to moderately dense stand blowing over in the first year or two after operations are completed is relatively high. The risk of windthrow to trees left over from an existing timber stand is an accepted occurrence that goes with any tree retention requirement. Accordingly, the Services believe that no change was necessary in response to this comment.

Response to Comment S5-6

See Master Response 7.

Response to Comment S5-7

Comments relating to herbicide use have been discussed in Master Response 4.

Response to Comment S5-8

See response to Comments G10-7, J1-45, and S5-3.

Response to Comment S5-9

The impact of timber harvest on suspended sediment/turbidity will be monitored as part of the Class III Sediment Monitoring (see AHCP/CCAA Section 6.3.5.3.2 and Appendix D2.3) and Road-related Turbidity Monitoring (see AHCP/CCAA Section 6.3.5.2.4 and Appendix D1.5). This monitoring will be done throughout the four experimental watersheds, which were selected to be representative of the range of geologic and physiographic conditions within the Plan Area. The Services believe that the proposed monitoring provides a substantial effort that will provide site-specific data on the impact of timber harvesting on suspended sediment and turbidity. Further, Plan approval and issuance of the Permits does not excuse Green Diamond from its obligation to comply with other applicable requirements, including water quality laws. See AHCP/CCAA Section 1.4.

Response to Comment S5-10

See response to Comment S5-9.

S5-7 conclusion that herbicide use by SRCO does not cause harm to the beneficial uses of water. We recommend that SRCO establish a water quality monitoring and response program as part of the AHCP to assess impacts associated with herbicide application and to identify and address adverse water quality impacts, if any, resulting from herbicide applications.

S5-8 6. Pages S-13 and 6-7 discuss RMZ protective measures for CI watercourses that contains a 30'-50' outer RMZ from the edge of a C I floodplain. The current FPR protection measures are much greater, requiring a WLPZ of at least 150' from the edge of the watercourse transition line and an additional 25'-50' SOZ (depending on slope) for evenaged units adjacent to watercourses. The AHCP should provide equal or greater protection measures than the current FPRs or clearly example while .

S5-9 7. Pages S-18 and 6-148 discuss proposed sediment monitoring sites. Considering the numerous streams that are sediment impaired within the SRCO properties, we believe that the proposed monitoring network is not adequate to properly assess water quality conditions and the potential impacts from harvest operations across the ownership. The AHCP should have a sufficient number of stations to provide representative data from the full range of conditions throughout the ownership.

S5-10 The proposed AHCP does not provide a sufficient number of sediment monitoring sites to properly evaluate additional impacts from proposed operations (AHCP pg. S-18 and pg. 6-148). In addition, the AHCP should contain a greater number of sediment monitoring sites to properly evaluate potential impacts from harvest operations.]

S5-11 8. The AHCP states that the Plan Area will not expand by more than 15% but then later states that the Plan Area may expand to more than 680,000 acres. The Plan Area is currently 416, 531 acres, per page 4 of the Implementation Agreement) but later identifies the Plan Area may expand to over 680,000 acres. The potential additional acreage (260,000+ acres) is clearly greater than 15%. Large areas with impaired watersheds that have not been evaluated or determined should not be allowed to be included in the proposed AHCP. The AHCP should not increase by more than 15% and should explicitly cite the acreage that could be included, which calculates out to approximately 479, 000 acres.

S5-12 9. The AHCP appears to suggest that the TMDL process should be substituted with risk assessments for road related sediment sources (EIS pg. 2-51). The TMDL monitoring process is an established sediment monitoring process that should be identified and included in the AHCP.

S5-13 10. EIS, page 4-6 mentions various factors that may have an impact on harvested areas, but does not assess the potential impacts which earthquakes may have on harvested areas. The AHCP includes information indicating that various earthquake faults are in close proximity to the covered lands. Seismic activity can play a significant role in slope stability. Therefore, we recommend that SRCO assess and present the potential impacts resulting from seismic events of various intensities, and propose appropriate

Response to Comment S5-11

As discussed in AHCP/CCAA Section 1.3.2.3, there are approximately 267,000 acres of other commercial timberlands in the 11 HPAs that could be added to the Plan Area. However, the Implementing Agreement limits expansion of the Plan Area to 15% of the initial Plan Area (approximately 62,479 acres).

Response to Comment S5-12

The Plan does not suggest that any other process or program should be substituted for the TMDL process. The Plan and its requirements, including its monitoring requirements, are supplemental to requirements imposed under Federal and State water quality laws. As described in AHCP/CCAA Section 4.3.6 and Table 4-3, the Plan takes account of the status of those waterbodies within the Plan Area that are listed as water quality impaired under the Clean Water Act. The Services have considered, but rejected, the suggestion that the TMDL monitoring process be identified and included in the Plan because AHCP/CCAA Section 1.4 makes clear that the Plan supplements, and does not replace, other applicable laws.

Response to Comment S5-13

AHCP/CCAA Section 6.2.9.3 discussed possible impacts of earthquakes of various magnitudes in the Plan Area.

Response to Comment S5-14

Plan enforceability has been discussed in Master Response 14.

Response to Comment S5-15

Rate of harvest has been discussed in Master Response 11.

Response to Comment S5-16

Plan enforceability has been discussed in Master Response 14 and adaptive management measures have been discussed in response to Comments C4-6, C4-29, G3-58, G3-59, G3-67, G3-72 through and including G3-77, G3-86, G5-2, G10-49, G10-53, G10-51, S1-14 and S5-32, among others.

Response to Comment S5-17

Green Diamond, with input from the Services, put tremendous effort and thought into developing a monitoring plan that will be sensitive to changes in key response variables and provide for quick corrective measures if a problem is detected. (See AHCP/CCAA Section 6.3.5 and Appendix D for details of the monitoring program.). The commenter states, in reference to using the extinction of a sub-population of torrent salamanders as a monitoring threshold: "If water quality is allowed to deteriorate to the point where a sub-population is rendered extinct, this will clearly violate the Basin Plan." Here, the commenter assumes that extinctions must be the result of a gradual deterioration of water quality. Torrent salamander sub-populations frequently occur in steep headwater areas that are naturally prone to landsliding or debris torrents. The only extinctions observed by Green Diamond biologists have been by a sudden and rapid debris flow (see

S5-13 protective measures in order to prevent or minimize potential adverse impacts to water quality resulting from seismic events.

11. IA, page 15 indicates that no monetary damages will be levied against SRCO if they do not comply with the proposed AHCP. Similarly, the proposed AHCP does not contain enforceable language to ensure that SRCO will comply with all of the goals outlined for the Plan Area. Rather, the AHCP uses words like "attempt," "intend," "if necessary," "when needed," etc.

S5-14 The net effect is that there is no apparent accountability if adverse impacts occur in the watersheds. The AHCP and IA should clearly outline the requirements in which SRCO must comply with, frame them in enforceable language, and provide penalties for non-compliance.

12. Page 2-7 indicates that SRCO will continue to conduct harvest at similar rates and following similar patterns as have been implemented in the past. Essentially, entire watersheds can be clearcut within a 20-year timeframe. There is substantial evidence that indicates that this concentrated level of harvest is not biologically sound for the North Coast. We believe that the AHCP should consider the rates and methods of harvest applied within the covered area and impose limits or requirements as necessary to ensure that the aquatic habitat is protected.

S5-15

13. Pages C-112 through C-132 present water quality monitoring data, including temperature data. According to the presented information, it appears that the Maximum Weekly Average Temperature (MWAT) has exceeded 17.4 C at a number of the sampling locations. The amphibians listed in the six species of concern have a MWAT threshold of approximately 15 C. However, the AHCP does not indicate an intent nor propose any protective measures to address and correct sites with elevated temperatures. The AHCP should contain enforceable language that will ensure SRCO will evaluate possible causes for the elevated temperatures and will change management practices, as appropriate, if evidence links the increase to harvest and/or related activities.

S5-16

14. Page 6-53 proposes "yellow-light" and "red-light" thresholds. The thresholds parameters established are inadequate and will allow Basin Plan violations. For example, the yellow light threshold for Southern Torrent Salamanders is the complete extinction of a sub-population. If water quality is allowed to deteriorate to the point where a sub-population is rendered extinct, this will clearly violate the Basin Plan. In addition, if a threshold is exceeded, it is not clear that SRCO will be required to make any changes to management practices in order to correct the problems. The AHCP thresholds should be more sensitive, in order to allow for early detection of a problem, and the AHCP should require that SRCO be required to implement appropriate measures to correct a problem as soon as it is detected.

S5-17

S5-18 15. Pages 6-170 and 6-171 discusses an "Adaptive Management Reserve Account" and proposes that it begin with an opening balance of 1,550 FSA. The Reserve Account

AHCP/CCAA Appendix D, section D1.6). Accordingly, the Services believe that the Plan thresholds are sufficiently sensitive to allow for early detection of any problem.

Response to Comment S5-18

The Services have found that the AMRA (see Master Response 15) is adequate for the purposes provided in the Plan and that the Plan meets the ESA approval criteria discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1 and Master Response 8. Green Diamond will remain subject to all applicable requirements of other laws, including laws governing water quality and forestry (see generally the response to Comment T1-1 and the responses to Comments cited therein). Accordingly, the AMRA will be retained in the Plan.

Response to Comment S5-19

The AHCP/CCAA Section 6.2.3.1 provides the system for prioritizing road repairs and related sediment control. The estimated steelhead spawning population provided for the Eel River includes the entire Eel River watershed (approximately 2,360,000 acres) not the Eel River HPA. The Initial Plan Area within the Eel River encompasses only the lower-most portion of the Eel River system and includes approximately 7,933 acres (0.3 percentage of the entire drainage). In addition, the Plan covers steelhead and five other aquatic species that will receive benefits from the road plan. Furthermore, as the Plan covers six cold water adapted species, the focus was to use ranking criteria based on and protective of all of those species, not just a single species or a sub-set of the covered species. The AHCP/CCAA Section 6.3.3.2.2 provides a clear explanation and justification for prioritizing the Road Work Units (RWUs). As stated in that section, the prioritization is based on multiple biological, geomorphic and road-related management criteria. These included geomorphic criteria such as stream density, road-management criteria such as road density, and biological criteria such as species occurrence, and habitat quality. Therefore, the Services believe that the road repair priorities and the criteria for determining them in the Plan are appropriate. As shown on AHCP/CCAA Table 6-11, the RWU in the Eel and Van Duzen Rivers ranked 22nd out of the 28 sub-watershed RWU's in regards to prioritization.

Response to Comment S5-20

The Services agree that LWD recruitment is important and, as they have been discussed in AHCP/CCAA Section 6.2.1, the Services

S5-18 will allow SRCO to conduct high impact operations that degrade the environment without immediate corrective action. The Plan Area covers watersheds that are already impaired and should not be subjected to additional management-related impacts. If instituted with an opening credit, this reserve account will allow further impacts to occur in already impaired watersheds. Therefore, we recommend that the Adaptive Management Reserve Account be removed from the AHCP.

S5-19 16. Page A-18 indicates that the Eel River system has the highest estimated population of spawning steelhead salmon in the region, yet this area is identified as a low priority for road repairs and decommissioning. We recommend that the AHCP clearly explain and justify the criteria for determining priorities for road repairs and other mitigation work, and demonstrate that priorities are appropriate for the habitat conditions.

S5-20 17. Pages C-35 through C-77 discuss large woody debris (LWD) data collected by SRCO, and identify streams that clearly have insufficient amounts of LWD. However, the AHCP does not propose any measures to address these deficiencies. The AHCP should include enforceable language that will ensure management practices are modified in areas that do not contain adequate amounts of instream LWD.

S5-21 18. Page C-85 discusses protection measures for C III watercourses. It appears that these measures were based on very limited data. Greater protection measures may be warranted, based on the data that SRCO has obtained. For example, the AHCP (pages C-101 and C-102) report significant post-treatment impacts relating to active channel width, bank slope, and percent of exposed active channel. We recommend that the AHCP clearly explain and justify the criteria for developing protective measures for watercourses and demonstrate that those measures are appropriate for the habitat conditions

S5-22 19. The AHCP discusses the transportability of LWD in C III watercourses. SRCO states that LWD blows out of C III watercourses, yet on page C-103, states that LWD does not appear to be transported in C III watercourses. We recommend that statements regarding the transportability of LWD in CIII watercourses be modified as appropriate to be consistent with each other and to accurately reflect the conditions observed or measured in the field.

S5-23 20. Pages C-111 and C-135 discuss temperature monitoring, and indicate that SRCO is proposing to substitute the standard MWAT method with the 7DMAVG and the 7DMMX. The proposed method does not yield information that can be compared to the MWAT to determine whether the MWAT has been exceeded. The MWAT standard that has been established through numerous biological studies and the 7DMMX may be considered an invalid substitute for MWAT data. We recommend that SRCO continue to measure and report the MWAT for the streams and creeks to be monitored.

believe the provisions for LWD recruitment are adequate. See Master Response 3, regarding cumulative effects. As discussed in Master Response 14, the Services believe that the Plan, as written, provides satisfactory mechanisms for any necessary enforcement.

Response to Comment S5-21

This comment is based on the commenter's interpretation of data from the retrospective Class III study in which the commenter found "significant post-treatment impacts." To the contrary, the report states that there were no significant post-treatment impacts (see Appendix C4.3.1).

Response to Comment S5-22

Because the commenter does not provide the locations in the document for the purported inconsistencies on the transportability of LWD in Class III watercourses, the Services are unable to provide a specific substantive response to the comment. However, more generally, the literature on the subject suggests, and Green Diamond's observations are consistent with the observation, that LWD has very limited transportability in Class III watercourses. The exception is in connection with debris flow events when LWD can move very rapidly and sometimes over considerable distances. The Services believe that the treatment of LWD in the Plan is accurate and appropriate.

Response to Comment S5-23

The MWAT value that the commenter refers to is identical to the 7DMAVG that Green Diamond calculates for all its temperature profiles. The MWAT is found by calculating the mathematical mean of multiple, equally spaced, daily temperatures recorded over a 7-day consecutive period. The MWAT is the highest value calculated for all possible 7-day periods over the summer. The upper temperature threshold MWAT value for a particular species was a derived value using the "physiological optimum temperature" (OT) and the "upper ultimate incipient lethal temperature" (UUILT) for that species. To avoid confusion between the field measured MWAT and the derived upper temperature threshold MWAT for a particular species, Green Diamond uses a 7DMAVG metric to reflect the highest average temperature during a seven-day period.

The use of a single temperature measurement such as MWAT is convenient from a monitoring and regulatory standpoint, but oversimplifies the complex interactions between water temperature regimes and fish health which are affected by the duration of peak temperatures, the range of daily temperature fluctuations, and the adaptation of local fish populations. For this reason, Green Diamond uses a variety of metrics with which to evaluate water temperatures.

Response to Comment S5-24

The Services believe that the Plan presents and is supported by the best scientific and commercial data available, including data relating to the issue of potential effects on the Covered Species associated with altered temperature. See AHCP/CCAA Sections 5.5.2 and 7.2.5 and AHCP/CCAA Appendix E, Section E.3.5.

Response to Comment S5-25

The commenter may have misinterpreted the information referenced on page 4-109 of the AHCP/CCAA. It states that the significant number of streams known to support tailed frogs is an indication that streams in this region are likely to be in good condition. The information presented in AHCP/CCAA Section 4 represents the best available data for the Plan Area. The commenter seems to suggest that the applicant should gather additional background data before the Services approve the Plan. As noted in Master Response 1, Green Diamond has gathered data for almost 10 years prior to the completion of this Plan. The Services believe this data is sufficient for the purposes of approving the Plan and issuing the Permits.

Response to Comment S5-26

The commenter appears to have misinterpreted the data presented in AHCP/CCAA Table C11-1. The perception of an increase in total numbers of salamanders is erroneous. Monitoring has occurred since 1998. During the period from 1998 through 2000, total numbers of salamanders have increased over those years. However this information is biologically meaningless because the

S5-24

21. Page C-152 provides data indicating that stream temperatures post-harvest have been elevated from 0.5 C to 1.4 C at various monitoring locations. SRCO states that these elevated temperatures will not result in a biological impact on the Covered Species but fails to provide any scientific data to support this assertion. We recommend that discussions regarding the various expected, potential, or actual biological effects of management activities are supported with field data or other scientifically information.

S5-25

22. SRCO discusses the methods used to assess the overall health of various covered species in the AHCP. Page 4-109 reports that the presence of covered amphibians in a given sampling area was sufficient evidence to report "good" overall health in the sampled watershed or watercourse. Actual population estimates, however, are minimal and/or not provided. Thus, the actual health of the covered species may be considerably less than anticipated. In addition, population abundance is highly variable, so numerous sites should be counted to obtain a more reliable and representative population status before developing a long-term management strategy designed to protect and/or improve habitat for the covered species.

S5-26

23. Page C-242 reports torrent salamander populations, and indicates that population numbers, though low, have increased each year (SINCE?). This increase seems to coincide with the increasing period of time since harvest occurred in the vicinity of population monitoring sites. At this time, given the low number of monitoring sites, it is difficult to know whether this is a reliable trend and/or whether population information obtained is reliable and representative for the varying conditions throughout the ownership. Therefore, we recommend that sufficient sites be established to ensure that data is representative of site conditions and that monitoring and data evaluation include parameters related to harvest activities in the vicinity of known populations of torrent salamanders.

S5-27

S5-28

24. Page D-24 through 26 discusses a road-related turbidity monitoring program. A Quality Control/Quality Assurance Plan needs to be included in all monitoring program to ensure repeatably and statisical validity. Redwood Science Lab protocols should be included in the plan.

S5-29

25. Page D-24 through 26 discusses a road-related turbidity monitoring program that does not appear to account for mass wasting events associated with roads and culverts. Yet the AHCP reports that mass wasting events account for the majority of suspended sediment that enters the nearby watercourses. Therefore, we recommend that the monitoring program be revised to include monitoring for mass wasting events associated with roads and culverts.

S5-30

26. Page D-39 discusses Response Monitoring Projects and proposes timeframes for responses triggered when various thresholds are exceeded. The timeframes for triggering various thresholds covers three years and requires that the threshold has been exceeded repeatedly before a response is triggered. We believe that the proposed timeframes for response are unacceptable, as they will allow Basin Plan

total number of monitoring sites also have increased each year since monitoring began. See response to Comment S5-27.

Response to Comment S5-27

The commenter appears to have misinterpreted the data provided in AHCP/CCAA Section C-11 (page C-242). The data listed is just preliminary numbers from the torrent salamander monitoring and there is no indication of an increasing (or decreasing) trend in salamander numbers. The Services presume that the commenter was confused by the increase in the total number of salamanders captured each year. However, this was a function of the increasing number of sites that were monitored each year. Trends can only be established by looking at the number of salamanders at individual sites over an extended period of time (i.e. 5-10 years).

The commenter also apparently believes that more monitoring sites are necessary and that data need to be collected on harvesting activities near the monitoring sites. The commenter is directed to the monitoring protocol shown in AHCP/CCAA Appendix D1.6 for an overview of the specific details of the headwaters monitoring program. Following Plan approval, more sites will be added and harvesting activity adjacent to monitoring sites will be quantified. See AHCP/CCAA Appendix D.1.6.3

Response to Comment S5-28

The monitoring protocols adopted in the Plan have been thoroughly reviewed by local and regional experts including several individuals at the Redwood Sciences Lab (see Master Response 1). However, the Services do not agree that providing a formal QC/QA plan insures repeatability and statistical validity. Instead, the Services believe the most critical factor is the study design relative to the monitoring objectives. Evidence for this is provided by looking at the requirements for scientific study proposals that lead to publications in peer-reviewed scientific journals. With possibly a few minor exceptions, formal QC/QA plans are not required for these proposals, but a careful description of the objectives and study design are always an essential part of a study proposal. QC/QA plans are primarily related to insuring compliance to monitoring orders, and, given that an HCP/CCAA is a voluntary agreement between an applicant and the Services, a formal QC/QA plan is not appropriate.

Response to Comment S5-29

Mass wasting will be monitored under the Mass Wasting Assessment (see AHCP/CCAA Appendix D, Section D.3.5).

Response to Comment S5-30

The commenter appears to misunderstand the intent of Response Monitoring projects. The reason that certain types of monitoring projects were termed “Response Monitoring” (AHCP/CCAA Section 6.2.5.2) rather than “Rapid Response Monitoring” (AHCP/CCAA Section 6.2.5.1) was because changes in the response variables in question could not be quantified in less than 2-3 years. For example, there is likely to be a time lag of several years between when excess coarse sediment enters a watercourse and when it can be detected as an “exceedance” in the thalweg of a given monitored channel reach. Therefore, the exceedance will be reported as soon as it is documented, but this will typically require several years.

Given this limitation, one might question the value of such monitoring projects. However, the monitoring program needs to be considered as a whole, where the Rapid Response Monitoring projects were designed to measure response variables that respond quickly to changes and therefore can trigger rapid corrective action. Response monitoring is designed to supplement rapid response monitoring and to insure that the long-term trends are consistent with the data being gathered through the rapid response monitoring projects.

Response to Comment S5-31

The timetable for implementation of the monitoring projects is contained in the main body of the AHCP/CCAA (see AHCP/CCAA Section 6.3.5).

Response to Comment S5-32

The Plan's adaptive management program is set forth in AHCP/CCAA Section 6.2.6 and, as the comment suggests, is intended to address detectable changes in biological conditions. Regarding adaptive management, see responses to Comments C4-6, C4-29, G3-58, G3-59, G3-67, G3-72 through and including G3-77, G3-86, G5-2, G10-15, G10-49, G10-53, G10-51, S1-14 and S5-35, among others. Any resulting adjustment to the Operating Conservation Program would be expected to improve conditions for the covered species and their habitats.

Response to Comment S5-33

Disturbance index and rate of harvest have been discussed in Master Response 11. Further, the selection of specific prescriptions, including whether they limit the rate of harvest, is a matter of the Permit applicant's discretion (HCP Handbook at 3-19). The Services' role in designing the conservation program is to "be prepared to advise" during the development of the Plan and to judge its consistency with the ESA approval criteria once the application is complete (HCP Handbook at 3-6 and 3-7). The ESA does not require that any particular measure be adopted or imposed, but only that its criteria for Permit issuance be met.

S5-30 violations and impacts to Beneficial Uses to continue for several years before being corrected. Response should be triggered as soon as an exceedence is identified.

27. Pages D-54 and D-55 discuss the goals and objectives of Long-Term Trend Monitoring/Research projects. However, the AHCP lacks an enforceable timetable and does not provide a response mechanism to correct problems identified in the field. The AHCP should include a timetable for establishment and implementation of the monitoring projects. In addition, the AHCP should require that SRCO implement appropriate adaptive management measures when a problem is detected so as to correct the problem as well as to prevent problems from occurring in similar situations in the future. S5-31 S5-32

28. Pages F-16 and F-17 indicate that the rate of sediment delivery from clearcuts units is significantly higher than that from background. In the proposed AHCP, the clearcut harvest ratios are significantly higher than the background (AHCP pg. F-16 to F-17). The high level of water quality impacts associated with clearcutting harvest practices indicates the need for modifications to existing practices and protective measures. Additional protective measures such as increased time and spacing between operations in a given watershed; implementation of lower impact harvest practices, such as un-evenaged management; and increased buffer widths along WLPZs, should be provided. S5-33

29. Page 2-6 discusses "primary exception areas" to clearcutting. These areas should include areas where clearcutting is likely to cause degradation of water quality and beneficial uses. S5-34

30. Page 4-24 indicates that the SRCO's "red-light thresholds" for temperature have been exceeded 11 times in 5 different watersheds, yet there is no discussion regarding possible management changes to address the problem and the AHCP does not appear to provide enforceable language that will ensure that additional protection measures will be implemented if/when red-light thresholds are exceeded in the future. We recommend that the AHCP be modified to specify, in enforceable language, that SRCO will modify management practices and/or incorporate additional measures as appropriate to address problems identified when red-light thresholds are exceeded. In addition, SRCO should conduct follow-up monitoring to ensure that these changes or additional measures are working, and continue to modify practices and/protective measures until the problem is fully corrected. S5-35 S5-36

31. Page 4-29 indicates that there have been significant declines in the population of juvenile Coho Salmon in the South Fork Winchuck River and in Wilson Creek between 1995 and 2000. However, there is no information regarding possible causes of this decline or any discussion about management changes made or proposed to be made in order to address the population decrease and the AHCP does not appear to provide enforceable language that will ensure that SRCO will address the problem. What caused the dramatic decline? What types of land management activities occurred in these watersheds during the period prior to the population decreases? S5-37

Issuance criteria have been discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1 and Master Response 8.

Response to Comment S5-34

Comment noted, but no change has been made as a result. The list of four exceptions presented in AHCP/CCAA Section 2.4 includes all of the categories of examples that Green Diamond believes exist within the Plan Area.

Response to Comment S5-35

Specific management actions were not proposed to address the red light threshold exceedances. However, changes in the Operating Conservation Plan could result when these thresholds are exceeded, through the process described in AHCP/CCAA section 6.2.6.1.2, within the limits of the balance of the AMRA. The water temperature data provided in AHCP/CCAA Section 4.3.1.1 are used to describe the existing environmental baseline and are intended to provide a general description of current conditions in the Plan Area. See Master Response 1. As indicated in AHCP/CCAA Section 6.2.5.5, each monitoring project/program will have a red light threshold, which will trigger a certain level of review and response. Red light review and response have been discussed in AHCP/CCAA Section 6.2.6.1.2. As discussed in Master Response 14, the Services believe the Plan, including its monitoring and adaptive management provisions, is fully enforceable.

Response to Comment S5-36

Details of the monitoring program and how exceedences to monitoring thresholds will be handled is found in AHCP/CCAA Section 6.3.5 and Appendix D. Green Diamond is committed to conducting follow-up monitoring as a feed-back loop to ensure that changes or additional measures as implemented are working. Green Diamond has expressed its commitment to modifying practices and/or protective measures, within the limits of the balance of the AMRA if problems are not resolved.

Response to Comment S5-37

The commenter made the assumption that there were “significant declines” in juvenile coho salmon based on population estimates from South Fork Winchuck River and Wilson Creek from 1995-2000. The data presented indicate a decrease in juvenile numbers for these two streams during this time interval, but the data does not support a biologically or statistically significant decline. For this same time period, there was a general increase in juvenile steelhead in South Fork Winchuck River, but it would be equally inappropriate to describe this as a “significant increase.” Considering the data and time interval sampled, all that can be concluded is that, as indicated in the Plan, there was significant annual variability in juvenile populations of both coho salmon and steelhead. To further support this conclusion, the Services note that data collected since the completion of the draft Plan indicate that there were record high numbers of juvenile coho salmon in both of these streams in 2002.

The commenter also requested information on the possible causes of the “dramatic decline.” The cause or causes for the decrease in juvenile coho salmon from 1995-2000 is unknown. The estuaries of both of these streams are typically blocked during low flows, and in years with little fall or early winter rains, adult coho salmon would not be able to access the streams to spawn. This explanation is consistent with the higher number of juvenile steelhead in the same streams, because steelhead run later in the winter when the flows would be more likely to allow access for spawning. This time period also corresponded with unusually poor ocean conditions, which was at least partially responsible for low escapement of coho salmon. However, this explanation is not consistent with an increasing number of steelhead. In summary, without additional information on adult escapement during the time of interest, the Services can only speculate as to causes for run sizes.

Response to Comment S5-38

Green Diamond's monitoring and adaptive management plan includes a mechanism to modify management practices if negative changes in selected response variables are likely to be caused by management activities (see AHCP/CCAA Section 6.3.5 and Appendix D). However, anadromous salmonid numbers, whether adult or juvenile, were not selected as a response variable for adaptive management, because of the complexity of their life cycle and the virtual impossibility of knowing with certainty the causes of short-term population fluctuations. Given the lack of a cause and effect relationship as described in response to Comment S5-37, it would be no more appropriate for Green Diamond to take corrective action during a short-term downward cycle in juvenile numbers than it would be to immediately reduce protective measures during the most recent increase in juvenile numbers.

Response to Comment S5-39

The spawning habitat of Chinook salmon has been well documented and it does not include the very small tributaries that are common throughout the Humboldt Bay HPA. Therefore, this statement prefaced with a "probably" is in fact a reasonable conclusion based on a tremendous amount of scientific data reported for this area. Accordingly, no change has been made in response to this comment.

Response to Comment S5-40

It is true that the mass wasting assessment will compare recently harvested areas to unharvested stands that have some level of past

S5-37 Was there any change in the type(s) or intensity(ies) of land management activities in these watersheds corresponding with the decreases in population? The AHCP should outline steps that will be taken by SRCO to determine the cause of the population decline.

S5-38 The AHCP should include an action plan for SRCO to modify management practices, as appropriate, if evidence links the decline to harvest and/or related activity.

S5-39 32. Page 4-165 notes that Humboldt Bay was probably never a significant producer of Chinook Salmon due to the size of the drainages and rivers, but does not provide any scientific data to support this claim. Such statements regarding species populations (whether historically or present) should only be presented when there is a considerable amount of data to support the conclusion.

S5-40 33. Page 6-5 proposes to use the volume of sediment delivery from clearcut areas as the baseline against which future delivery will be assessed, and suggests reducing delivery by 70% from this baseline. Comparing two areas that have been influenced by management practices will dilute the true effects management activity is having on the area. The baseline against which management related landslide sediment delivery should be measured is background. The HCP does not propose any identification of or comparison to background rates in any HPA.

S5-41 34. Page 6-55 states that if a "red-light threshold" is exceeded, SRCO will notify the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) within 30 days of identification of an exceedence. It is likely that an exceedence of a red-light threshold will also signal a Basin Plan violation, possibly a significant or substantial one (note our comments regarding page 6-53). Therefore, we recommend that the AHCP specify that SRCO will also notify the Regional Water Board in the event of a red-light threshold exceedence.

S5-42 35. Page 6-167 outlines monitoring objectives for estimating over winter survival of juvenile Coho. While population estimates are useful information, SRCO should also evaluate population trends and the various factors that influence them.

S5-43 We recommend that the evaluations of population trends also consider past and present timber harvest and other land management activities occurring in the watersheds, in order to identify links, if any, between operations and any population fluctuations.

Introduction (Reviewer 2)

S5-44 36. A number of terms included in the glossaries in the DEIS and the AHCP are in conflict with one and other(e.g. Class I watercourse, Class II watercourse, floodplain). Or contain incorrect definitions (e.g. Fluvial is defined in the DEIS as "fish stocks that migrate between small stream and large rivers). The glossaries should be revised to contain consistent definitions between the two documents and use definitions that are consistent with common usage.

management activities. The commenter suggests the comparisons should be made to "background," which the Services presume means sediment delivery rates prior to any management activities. However, for the reasons discussed in Master Response 1, for the purposes of NEPA, the most appropriate comparison is between the No Action Alternative and action alternatives.

Response to Comment S5-41

As AHCP/CCAA Section 1.4 makes clear, the Plan provides an additional, and independent, layer of requirements that supplement other applicable laws, both Federal and State, including laws the govern water quality. If a condition or occurrence in the Plan Area would require Green Diamond to contact the appropriate Regional Water Quality Control Board, then Green Diamond would be required to do so under the water quality laws, regardless of Green Diamond's requirements under the Plan. Therefore, there is no need to include the suggested additional notification requirement in the Plan. Regarding the applicability of water quality laws under the Plan, see also responses to Comments R1-27, S5-1 and S5-48, among others.

Response to Comment S5-42

The Services agree. AHCP/CCAA Section 6.3.5.4.8, regarding out-migrant trapping, states that Green Diamond will "look for long term trends in any or all of these variables."

Response to Comment S5-43

The Services agree. See AHCP/CCAA Appendix D-3.9 Outmigrant Trapping. It must be pointed out that the discussion of monitoring objectives does not specifically address timber harvesting, but timber harvesting is included within the monitoring-based objective of looking for correlations between over-winter survival and total fish production, and "habitat features or conditions."

Response to Comment S5-44

Numerous changes to AHCP/CCAA and EIS glossary definitions have been made pursuant to suggestions made by the commenter and others. See responses to Comments S1-103 through S1-169 above.

Response to Comment S5-45

A definition of "stream order" has been added to EIS Chapter 7 (Glossary) and AHCP/CCAA Section 10.2, as follows:

"*A number from 1 to 6 or higher, ranked from headwaters to river terminus, that designates the relative position of a stream or stream segment in a drainage basin. First-order streams have no tributaries; the confluence of two first-order streams produces a second-order stream; the confluence of two second-order streams produces a third-order stream; etc. However, if a first-order stream joins a second-order stream, the latter remains a second-order stream. It is not until one stream combines with another stream of the same order that the resulting stream increases by an order. Also see Watercourse Order.*"

Response to Comment S5-46

The road assessment for the entire ownership is intended to occur only once during the term of the Permits, although there may be some areas that will be reassessed. Some reassessments may occur on some roads that were included in refining the estimate for the five-year assessment of future sediment yield (AHCP/CCAA Section 6.2.3.2.2). A stratified random sampling approach will be utilized to assess 15-20 percent of the roads within all Road Work Units that have not yet been assessed. Some of the road inventories from these area may be outdated by the time those roads are treated. Green Diamond has stated that that its intent is not to conduct field inventories too far ahead of implementation. The actual time period is dependent on the weather conditions and resulting storms since the data were collected. However once the roads are assessed and treated, Green Diamond will be required to

S5-45 37. Page S-12 Table S-3, refers to 1st order Class II watercourses, yet neither of the glossaries include a definition of order. Since this will be the basis for the application of prescriptions, the phrase should be defined in clear and enforceable terms.

S5-46 38. Page S-14 through S-17 , refers to road related sediment source assessment and prioritization scheme. How often under the 50 year permit will an ownership wider assessment and priority be required?

S5-47 39. Page S-15 refers to a 2.5 million dollar road improvement program. Is this upgrade in addition to the site specific improvements that will be required under the THP review process?

S5-48 40. Page S-15 refers to treating high and moderate site over the life of the permit, this practice is not in conformance with the requirements contained in the Garcia River Sediment TMDL Implementation Plan which requires correction or mitigations of all controllable sediment delivery sites.

Introduction (Reviewer 3)

Regional Water Quality Control Board staff have reviewed Simpson Resource Company's (Simpson) proposed Aquatic Habitat Conservation Plan (AHCP). The focus of this review has been on geologic and road construction issues, but some comments are also included on riparian issues. The comments are mostly specific to Section 6.2 of the AHCP. Section 6.2 is the Operating Conservation Program that specifies conservation measures that Simpson will undertake within the Plan Area during the term of the AHCP. This review is organized into three categories. These are: 1) areas where the AHCP does not comply with existing Forest Practice Rules (FPRs); 2) unenforceable language in the AHCP; and 3) other significant issues. Comments are in no particular order and do not address all of the issues.

FOREST PRACTICE RULE REQUIREMENTS

The threatened and impaired (T&I) rules will not be in effect if the AHCP is adopted. This is specified in 14 CCR 916.9(x). This review compared the AHCP with the FPRs and specifically the T&I rules.

41. Deep-Seated Landslides
(Page 6-89, Section 6.3.2.5.1) In the AHCP, deep-seated landslides must exhibit either of the following two criteria for the Plan to apply:
    1. A scarp or ground crack that exhibits at least 3 inches of horizontal displacement or at least six inches of vertical displacement that typically exposes bare mineral soil, but that may be partially revegetated, and where field observations clearly indicate that the movement occurred within approximately the past 50 to 100 years, or
    2. A convex, lobate landslide toe that exhibits evidence of activity within approximately the past 50 to 100 years.

maintain the roads, except for decommissioned roads, according to the Routine Road Maintenance and Inspection Plan (AHCP/CCAA Section 6.2.3.9).

Response to Comment S5-47

As stated in AHCP/CCAA Section 6.2.3.2.1 #2, “All funds provided by Green Diamond to treat high and moderate sites during the acceleration period, including high and moderate sites on roads appurtenant to THPs, will be counted toward the $2.5 million per year commitment.” See EIS Section 2.2.1.3 (Road and Landing Construction, Reconstruction, and Maintenance). Green Diamond has estimated that $1 million of the $2.5 million per year commitment is related to THPs roads. See also responses to Comment J1-66 and Comment G10-52.

Response to Comment S5-48

AHCP/CCAA Section 1.4 states that the Plan provides an additional layer of requirements that supplement other applicable laws, both Federal and State, including water quality laws. However, the Garcia River Sediment TMDL Implementation Plan is not applicable in the Plan Area. The Plan Area includes commercial timberlands in Del Norte County and Humboldt County (see AHCP Section 1.3.2.2), but does not include lands in Mendocino County, where the Garcia River watershed is located.

Response to Comment S5-49

AHCP/CCAA Section 1.4 states that the Plan provides an additional layer of requirements that supplement other applicable laws, both Federal and State, including the CFPRs. Plan approval and issuance of the Permits would not excuse Green Diamond from its obligation to comply with applicable landslide provisions of the CFPRs. The CFPRs have been discussed in Master Response 7 and applicability of them in the Plan Area also has been discussed in response to Comments G4-27, G4-28, G10-7, R1-49, R1-70, S1-3, S1-47 and S5- 3, among others. Further, the ESA does not require that Plan provide for a measure-by-measure comparison. The ESA requires only that the Operating Conservation Program meet the Permit approval criteria, which are discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1 and Master Response 8. The Services believe this Plan meets these criteria.

Response to Comment S5-50

The procedure proposed in the Plan does account for debris and sediment loads. See response to comment R1-99.

Response to Comment S5-51

As AHCP/CCAA Section 1.4 makes clear, the Plan provides an additional layer of requirements that supplement other applicable laws, both Federal and State, including the CFPRs. Plan approval and issuance of the Permits would not excuse Green Diamond from its obligation to comply with applicable road construction standards set forth in the CFPRs or water quality laws. The CFPRs have been discussed in Master Response 7. Applicability of the

Where the first criterion is exhibited, the AHCP proposes that there will be no harvesting within 25 feet upslope from the identified active scarp or active ground crack. Where the second criterion is exhibited, the AHCP proposes that there will be no harvesting on the toe and no harvesting within 25 feet upslope from the inflection point of the active convex, lobate landslide toe.

Under the prescription proposed above, there does not appear to be any limitations in the AHCP regarding road construction or silviculture within the central portion of the deep-seated landslide. Section 14 CCR 914.2(d) specifies that heavy equipment shall not operate on unstable areas. The default prescription for deep-seated landslides in the proposed Simpson AHCP appears to be less protective that the FPRs. S5-49

42. Drainage Structures

(Page 6-108, Section 6.3.3.6.5, Item 2) All new watercourse-crossing culverts will be designed to handle a 100-year return interval flow event. Culverts will be sized to pass the 100-year flow event without overtopping (headwater depth to culvert diameter ratio = 1.0).

14 CCR 923.3(e) specifies that all permanent watercourse crossings that are constructed on reconstructed shall accommodate the estimated 100-year flood flow, <u>including debris and sediment loads</u>. The culvert size design in the proposed Simpson AHCP does not include a provision to account for debris and sediment loads. S5-50

43. Bench Construction

(Page 6-29, Section 6.2.3.5.17) On side slopes greater than 50%, where the length of the road section is greater than 100 feet, Simpson will construct fills greater than four feet in vertical height at the outside shoulder of the road on a bench that is excavated at the proposed toe of the fill and is wide enough to compact the first lift and subsequent lifts in approximately one-foot intervals from the toe to the finished grade.

14 CCR Section 923.2(b) specifies that where a road section is greater than 100 feet and crosses slopes greater than 65%, placement of fill is prohibited. The new road construction standards in the proposed Simpson AHCP appear to be less protective than the FPRs. If this alternative practice is included in the the final AHCP, a provision to require the on-site review by a licensed engineer or geologist (or both) shall be included as an enforceable standard protection to the beneficial uses of water. S5-51

44. Erosion Control

(Page 6-24, Section 6.2.3.3.5) Simpson will perform seeding, mulching and planting, and installation of energy dissipation (rock armor or woody debris)

CFPRs in the Plan Area has been discussed in response to Comments G4-27, G4-28, R1-49, R1-70, S1-3, S1-47, S5- 3 and S5-49. Applicability of laws governing water quality have been discussed in response to Comments R1-27, S5-1, S5-41 and S5-48. Further, the ESA does not require that the Plan provide for a measure-by-measure comparison. The ESA requires only that the Operating Conservation Program meet the ESA's Permit issuance criteria, which are discussed in EIS Section 1.3, AHCP/CCAA Section 1.4.1, and Master Response 8. The Services believe this Plan meets these criteria.

Response to Comment S5-52

This comment has been addressed in response to Comments G10-7 and S1-3. The Services agree that the application of mitigation measures should be tied to resource impacts and believe that the Plan's measures on this subject meet this objective.

Response to Comment S5-53

The commenter appears to have misinterpreted AHCP/CCAA Section 6.2.1.1. Please see AHCP/CCAA Section 6.3.1.4.1 for clarification and the rationale for flood plain protection measures. The RMZ protection is not limited to the first 150 feet of a floodplain, but is extended to cover the entire floodplain with an additional 30-50 feet (depending on slope) beyond the outer limit of the flood plain.

Response to Comment S5-54

See Master Response 7 regarding the relationship between the Operating Conservation Program and the CFPRs. See Master Response 18 regarding riparian widths, which discusses site-specific conditions and the protections afforded by the Plan's conservation measures.

Response to Comment S5-55

The Services believe the commenter is correct. An EEZ with exceptions for certain equipment operations makes the zone effectively an ELZ. However, the Services believe that this is a matter of semantics (either way, the covered activities that may be

when determined necessary by qualified and trained personnel for additional erosion control on the decommissioned roads.

S5-52 14 CCR 916.7 and 916.9(n)(3) describes specific erosion control treatments for disturbed areas and watercourse crossings. The erosion control language in the proposed Simpson AHCP appears to be less protective than the FPRs. The application of the mitigation measures should be tied to resource impacts (e.g. sediment delivery to watercourses).

45. Class I RMZ Width

(Page 6-7, Section 6.2.1.1) Simpson will apply a riparian management zone (RMZ) of at least 150 feet (slope distance) on each bank of Class I watercourses. The width will be measured from the watercourse transition line or from the outer Channel Migration Zone (CMZ) edge where applicable.

S5-53 There is no provision of a special operating zone (SOZ) in evenaged management units as required in 14 CCR 916.9(c). Within the SOZ, all hardwoods and understory and midcanopy conifers are retained, and fire and equipment excluded. The RMZs should be measured from the outer edge of the floodplains and not be limited to the first 150 feet of the floodplain. The distance upslope of the outer edge of the floodplain should be at least as wide as the default Class I width.

46. Class II RMZ Width

Page 6-10, Section 6.2.1.3) Simpson will establish an RMZ of at least 70 to 100 feet on each bank of all Class II watercourses.

S5-54 RMZ widths of less than 100 feet is not consistent with the intent language of 14 CCR 916.9(c) which specifies that any timber operation within 100 feet of any class II watercourse or lake transition line shall have protection, maintenance, or restoration of the beneficial uses of water or the populations and habitat of anadromous salmonids or listed aquatic or riparian-associated species as significant objectives. For slopes over 30% and 50%, the existing FPRs provide WLPZ widths of 75 feet and 100 feet, respectively. Recommend establishing a 30-foot SOZ for all Class II watercourses with a 70-foot RMZ.

47. Equipment Exclusion Zone

(Page 6-12, Section 6.2.1.6.1) Simpson will establish a 30-foot EEZ (exceptions for the EEZ include watercourse crossings and existing roads). Existing FPRs require a 50-foot ELZ for slopes above 30%. The proposed EEZ is not actually an EEZ but an ELZ, because it does not prohibit roads or watercourse crossings within the zone. Allowing the use of heavy equipment within an EEZ is in direct conflict with the existing FPR definition. This use is also in conflict with the definition provided in the DEIS glossary (page 7-4).

S5-55

S5-56

S5-57 Inconsistent use of commonly used terms will made the AHCP difficult to interpret and enforce. The AHCP should be revised to use the same definition

conducted in EEZs are specifically stated in AHCP/CCAA Section 6.2.1.6.1 and 6.2.1.7.1). Green Diamond has elected not to change this language in the Plan, and the Services have made no change to the glossary of the EIS.

Response to Comment S5-56

The Plan refers to protection zones along Class III watercourses as EEZs and allows specific exceptions, which are stated. Class I and II RMZs are EEZs for equipment operations with similar exceptions, which are found in AHCP/CCAA Sections 6.2.1.2.8 and 6.2.1.4.5. The Services agree with the commenter in that the term EEZ, as used in the Plan, should be ELZ, and is in conflict with the existing CFPR definition. However, there is no functional difference between EEZs with exceptions and ELZs, as applied on the ground. See response to Comment S5-55.

Response to Comment S5-57

Comment noted. The definition of EEZ is spelled out clearly in the Plan glossary and will be the operative definition in the Plan.

S5-57

and meaning for commonly used terms in current regulation (i.e. FPR definition of EEZ)

UNENFORCEABLE LANGUAGE

S5-58

48. Erosion Control

(Page 6-24, Section 6.2.3.3.5) Simpson will perform seeding, mulching and planting, and installation of energy dissipation (rock armor or woody debris) when determined necessary by qualified and trained personnel for additional erosion control on the decommissioned roads.

This language should be revised to tie the potential impact and mitigation effort to a resource at risk (E.G. sediment delivery to watercourses). suggested language could include "whenever sediment from decommissioned roads may reach watercourses or hydrologically connected drainage facilities."

49. Road Maintenance

DFG has provided many comments on the AHCP regarding other language changes to Section 6.2, to make the Operating Conservation Program more enforceable. Regional Water Board staff concurs and supports their comments.

OTHER SIGNIFICANT ISSUES

S5-59

50. Nothing in the AHCP absolves Simpson of compliance with State laws and regulations including the FPRs and TMDLs. There is no language in the AHCP regarding compliance with State laws.

S5-60

Redwood National Park – "The AHCP and EIS do not describe the Plan's relationship with applicable federal and state laws. For example, it does not describe its relation with FPRs. Water Quality Basin Plans, U.S. EPA TMDLs and state efforts such as the North Coast Watershed Assessment Program and their findings. It is impossible to assess the appropriateness of default prescriptions, and definitions in the glossary without a clear description of these relationships."

51. Implementation Plan (Page 6-22, Section 6.2.3.2)

(Section 6.2.3.2.3) Implementation of road treatment sites identified as "high" or "moderate" priority of all sites will be carried out during the term of the Permits.

(Section 6.2.3.2.1.1) Simpson will provide for an average of $2.5 million per year for the first 15 years of the Permits' 50-year term to implement the treatment of high and moderate priority sediment sites identified in the implementation plan, for a total of 37.5 million (unless the acceleration period is adjusted as provided in 6.2.3.2.3).

Response to Comment S5-58

The erosion control measures proposed in the Plan are designed to minimize erosion and prevent sediment from entering watercourses. AHCP/CCAA Section 6.2.3.3.5 has been revised as follows:

"Green Diamond will perform erosion control (e.g., seeding, mulching and planting, and installation of energy dissipation such as (rock armor or woody debris) as needed to minimize potential sediment delivery ~~when determined necessary by qualified and trained personnel for additional control erosion on the decommissioned roads~~."

Response to Comment S5-59

AHCP/CCAA Section 1.4 makes clear that the Plan approval and issuance of the Permits do not excuse Green Diamond from any obligation to comply with other applicable requirements, including Federal and State law. Indeed, approval of an ITP/ESP is incidental to "otherwise lawful activities." Instead, the Plan provides an additional layer of requirements that supplement such requirements. Because the Services believe that AHCP/CCAA Section 1.4 makes this clear, no revision has been made. See also, for example, responses to Comments G2-17 (CEQA), S1-51 (CFPRs and water quality), S6-3 (California ESA), T1-1 (other provisions of the Federal ESA) and R1-44 (all applicable State and Federal laws).

Response to Comment S5-60

See response to Comment S5-59.

Response to Comment S5-61

The Services emphasize that, as discussed in Master Response 12, biological goals and objectives, including the sediment objective, are not themselves enforceable. Instead, it is the Operating Conservation Program (AHCP/CCAA Section 6.2) that includes the enforceable provisions in the Plan. In that regard, as discussed in IA paragraph 7, Green Diamond has entered an enforceable agreement warranting that it has, and will spend, such funds as may be necessary to fulfill its obligations under the Operating Conservation Program.

Response to Comment S5-62

Yes, AHCP/CCAA Section 6.2.3.2.1 #2 states that funds provided by Green Diamond to treat high and moderate sites during the acceleration period, including high and moderate sites on roads appurtenant to THPs, will count toward the $2.5 million per year commitment. Green Diamond estimates that approximately $1 million of the $2.5 million per year, will be used to treat roads associated with THPs.

Response to Comment S5-63

The commenter is correct, no additional money will be allocated for acres added to the Plan Area. The $37.5 million commitment is to accelerate road work within the first 15 years of the Permits. However, Green Diamond has committed to treat all high- to moderate risk sites within the Plan Area, including lands added to the Plan Area, by the end of the term of the Permits.

There are many issues around the implementation plan. These issues include:

S5-61 1. Whether there is enough money to accomplish the sediment objective.

S5-62 2. Whether money spent on road and watercourse crossing improvements completed as a part of a THP can be applied towards the $2.5 million per year allocated.

S5-63 3. It does not appear that the amount allocated would change should Simpson acquire more acreage.

52. Sediment Objective

(Page 6-5, Section 6.1.2.2.4) The biological objective for reducing sediment delivery into watercourses is based on two targets:

S5-64

1. Treat high or moderate priority sites (classified in terms of likelihood to deliver sediment to Plan Area watercourses), to reduce the amount of road-related sediment at such sites by more than 46% (change high and moderate potential delivery sites to low potential delivery sites) within the first 15 years of the permits, and the remaining percentage over the last 35 years of the Permits.
2. Achieve a 70% reduction in sediment delivery from management-related landslides in harvested steep streamside slopes compared to delivery volumes from appropriate reference areas within clearcut stands.

It is not clear at this time if any of these actions would achieve compliance with TMDLs.

53. Inconclusive Data to Support Conclusions of the AHCP

S5-65 CGS - "Silvicultural prescriptions and other mitigations that are based on geology and are designed to reduce landsliding and sediment delivery should be based on site specific geologic recommendations, not landscape wide default prescriptions."

S5-66 Redwood National Park – "The AHCP proposes default prescriptions for RMZ, RSMZs, SMZs and more, but lacks the data, assessments and discussions that support the proposed prescriptions. Thus, it is impossible to assess the effectiveness of the proposed prescriptions without this information. Initial default prescriptions should assume a more conservative approach until such time that Simpson can demonstrate, through peer reviewed studies, that less conservative measures would be effective."

54. Mitigation Bank

S5-67 There is a mitigation bank that starts out with 1,550 acres on deposit. Mitigation credits and debits are dependent on the results of studies. For example, if the streamside management zone study shows that a wider streamside zone is warranted, the amount of acreage associated with the wider zone would be deducted from the mitigation bank. The 1,550 acres is an arbitrary amount and could be very easily used up on necessary mitigations.

Response to Comment S5-64

Plan objectives, together with Plan goals, guided the development of the Operating Conservation Program, the implementation of which will result in improvements for the Covered Species and their habitats, including in areas where waters are impaired. Refer to Master Response 3 and, generally, the response to Comment G6-42. However, as indicated in AHCP/CCAA Section 1.4, the AHCP/CCAA and water quality laws represent independent obligations for Green Diamond. Compliance with the Plan would not excuse Green Diamond from the obligation to comply with water quality laws. Although the ESA generally requires permits to be issued for take that is incidental to otherwise lawful activities, an ITP does not specify each applicable law with which an applicant must comply. Applicability of water quality laws also has been discussed in response to Comments R1-27, S5-1, S5-41 and S5-48, among others.

Response to Comment S5-65

The Services understand the commenter's concern. However, without default prescriptions, the Services would not be able to analyze the effects of the measures within the Operating Conservation Program. The effectiveness of the unstable slope measures will be monitored through the SSS monitoring program.

Response to Comment S5-66

The conservation measures for RSMZs and SMZs, including the initial default prescriptions, are based on empirical data collected from within the Plan Area. See the response to Comment S2-19.

Response to Comment S5-67

The AMRA, including how it is funded, its opening balance and how it may change, and how it would be used under the Plan to benefit the covered species and their habitats, is discussed in AHCP/CCAA Sections 6.2.6.3 and 6.3.6.2, as well as in Master Response 15. The Services have found that the AMRA is adequate for the purposes provided in the Plan.

Response to Comment S5-68

Cumulative effects have been discussed in Master Response 3.

Response to Comment S5-69

Green Diamond's commitments under the Plan will remain regardless of the size of the Plan Area. In addition, the balance in the AMRA will change proportionally with the addition and/or deletion of lands. See AHCP/CCAA section 6.3.6.2 and Master Response 15.

Response to Comment S5-70

A surface observational qualitative approach to address hillslope stability issues defines the current standard of practice for management of both relatively stable and less stable terrain in forest management, as described in responses to Comments S5-101 and S5-109. The Plan is not intended to establish new methods of practice with respect to managing unstable areas, but rather to use existing methods in the context of specific criteria to help identify slopes in the MWPZs (see AHCP/CCAA Section 6.3.2.2.2) with a relatively high potential to fail and deliver sediment to the stream network. See AHCP/CCAA Section 6.2.2.1, regarding SSS, and AHCP/CCAA Section 6.2.2.2, regarding Headwall Swales.

55. Cumulative Watershed Effects

S5-68 Redwood National Park – "There is no discussion or recognition that cumulative watershed effects that might exist in the Plan Area from past forest practices. Without such an evaluation and discussion, it is impossible to assess whether the proposed default prescriptions for conifer retention along stream is appropriate."

56. New Acreage

S5-69 It is likely that Simpson will acquire additional property over the 50-year term of the AHCP. There do not appear to be any provisions for increasing the amount of money available to mitigate problems on this new land. There is also no provision for increasing the amount of acres in deposit in the mitigation bank.

Introduction (Reviewer 4)

Regional Water Quality Control Board (Regional Board) staff have reviewed Simpson's proposed Habitat Conservation Plan (HCP). This reviewer focused on hillslope components of the HCP as listed in the HCP's table of contents, including the summary on slope stability, Sections 4.2, 4.4.1.3-4.4.11.3, 6.2.2, 6.2.9.6, 6.3.2, 6.3.9.3, 6.3.9.6, and Appendix B.

This memorandum contains a Reviewer's Summary, Background Information, General and Specific Comments on the hillslope component of the HCP, References Cited, and an attachment. The Reviewer's Summary provides an overall impression of the HCP hillslope component. Background Information is a compilation of data from the HCP and other sources regarding hillslope stability evaluations. The General Comments focus on hillslope issues more global to the HCP while Specific Comments focus on specific portions of the HCP. References and Attachment A are provided as backup material to support various comments provided herein and to assist in improving the HCP hillslope component.

REVIEWER'S SUMMARY

S5-70 The HCP hillslope components suggest that Simpson is proposing to use a surface observational qualitative approach to address hillslope issues. It does not appear that hillslopes have been or will be adequately defined either temporally or spatially to justify using this approach alone or applying the proposed hillslope prescriptions. History has shown that the surface observational approach alone is inadequate to protect water quality. This is made evident by the fact most watercourses in the North Coast Region are listed as sediment impaired on the Clean Water Act (CWA) Section 303(d) list, many reportedly due to excessive sediment discharges associated with land management activities. Information provided in the HCP confirms that historical application of surface observational methods used on Simpson's lands to evaluate the potential effects of land management activities on slope stability have often proven unsuccessful.

Response to Comment S5-71

The Plan's slope stability conservation measures are intended to minimize management-related sediment discharges to the watercourse network, seeps and springs from landslides. However, the Services disagree that there is only one formula to accomplish this goal. Green Diamond preferred a landscape approach to hillslope stability conservation measures for the purpose of evaluating the cost of the conservation measures in the Plan. Further, combining the evaluations of effectiveness and cost allows for a comparison of cost effectiveness of the various conservation measures with one another based on Green Diamond's modeling efforts for pre-Plan conditions and post-Plan projected conditions, which are summarized for the pilot watersheds in AHCP/CCAA Appendix F, Tables F3-3, F3-4, and F3-5, and for the entire Plan Area in table F3-8. See response to Comment S5-77 and Master Response 16.

Response to Comment S5-72

AHCP/CCAA Section 1.4 makes clear that all requirements of other applicable laws, including laws governing water quality, will remain in effect during Plan implementation. Plan requirements are supplemental to requirements imposed by other legal regimes such as the water quality control laws. Applicability of water quality laws under the Plan also has been discussed in response to Comments R1-27, S5-1, S5-41, S5-48, and S5-64, among others.

S5-71 We advocate an approach that focuses on protecting resources by preventing controllable management discharges, in this case management-related hillslope failures. This approach must be based on 1) adequate and comprehensive landslide inventories, 2) identification and linkage of causal mechanism(s) to hillslope failures, 3) characterization of primary factors (e.g. geology, groundwater, soil thickness, material strength, slope magnitude and topographic shape, rainfall and catchment area size draining to a hillslope, etc,) controlling hillslope stability, 4) identification and analysis of condition of downslope receptors, 5) analysis of landslide hazard rating and consequences to determine risk to potential receptors, 6) predictive modeling (pre and post-project) proposed projects under acknowledged hill slope-failure triggering conditions, 7) development and use of a definitive and comprehensive feed-back loop so that outcomes (positive and negative) from all project specific work can be continually applied to proposed prescriptions and those prescriptions can be modified and/or replaced as necessary, and 8) use of a diversified multi-agency team of trained and licensed individuals (licensed geologists, geotechnical engineers, biologists, etc.) in order to maintain compliance with requirements of both the California Business and Professions Code and other regulatory and statutes. Information regarding risk assessments for landslide evaluation can be found in *Landslide Risk Management* (Fell and Hartford, 1997) and in *Transportation and Research Board Special Publication 247* (1996).

The proposed HCP entirely lacks or is deficient in almost every one of the elements discussed above, each of which is essential in order to adequately protect downslope receptors by preventing controllable hillslope management-related discharges. These deficiencies may have occurred, in part, because of a lack of existing data, because existing data are of varying levels of quality, or because historical project-specific data have not been integrated into the overall data set. We assume that there must be some historical project-specific data available because the HCP indicates that all lands contained within the HCP area have had at least one cycle of harvesting. Historic data can prove to be invaluable to assist in evaluating potential hillslope responses to different types and intensities of land management activities when subjected to triggering events such as precipitation or seismic events.

S5-72 The proposed HCP does not acknowledge the need to comply with the Regional Board's regulatory mandates, namely the Water Quality Control Plan for the North Coast Region (Basin Plan), the Porter-Cologne Water Quality Control Act, the CWA, and existing or pending Total Maximum Daily Load (TMDL) requirements for various 303(d)-listed streams in the North Coast Region. As readers of this memorandum may be aware, Regional Board staff are in the process of developing TMDLs for a number of watersheds which overlap with areas covered by the HCP. Staff from the California Geological Survey (CGS) are also participating and providing input in the hillslope components of these TMDLs, and have recommended that Regional Board staff follow the guidelines

S5-73 provided in *Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Landslides in California* (June 2002). These guidelines may prove useful to Simpson in developing a hillslope strategy which minimizes management-related hillslope discharges to watercourses, and which is consistent with the hillslope provisions likely to be developed under the TMDL.

Response to Comment S5-73

Because obligations imposed under the Plan are supplemental to Green Diamond's other legal obligations, issuance of the Permits would not excuse Green Diamond from any obligation to comply with applicable TMDLs as they are developed in the Plan Area.

Response to Comment S5-74

Receipt of the *Jahnsian Steps* is acknowledged, thank you.

Response to Comment S5-75

Because it is not clear to what table the comment refers, the Services are unable to provide a substantive response.

Response to Comment S5-76

To the Services' knowledge, subsurface exploration, either direct or indirect, generally exceeds the standard of practice for evaluating slope stability for forest management. The practical reasons for this include the prohibitively high level of difficulty, cost, time required for work, locally unacceptable site disturbance, and questionable reliability of results associated with using such methods in the forested Franciscan complex terrain of the Plan Area. Quantitative slope stability analysis and landslide prediction also generally exceed the standards of practice for registered California professionals in forest management. Instead, California Registered Professional Foresters (RPFs)are obligated to disclose existing unstable areas in THPs and appropriately mitigate the effects of forest management to non-significance on those areas. The obligation of California Registered Geologists working in forest management (with respect to slope stability characterizations) is held to the State and local standards of practice for geologists. Currently, the primary components of the geological standards of practice for forest management of unstable areas include a map and literature review, land-use review and geomorphic interpretation based on historical aerial photograph review and field reconnaissance, appropriate discussion and development of conclusions and recommendations relevant to

S5-74 Finally, we have provided (*The Jahnsian Steps to Geologic Safety: The Engineering Geology Approach* [1992]) in Attachment A to assist Simpson in developing a HCP hillslope component to protect downslope receptors from unsafe geologic hazard areas. CGS distributed this document at the Association of Engineering Geologists-workshop on *Engineering Geology for Timber Harvesting, Wildland Management, and Watershed Restoration* (2002). Please note that a risk analysis as described in Attachment A would use water quality as a potential receptor and would likely enable Simpson to develop a hillslope strategy which should meet the Regional Board's regulatory mandates.

Background

S5-75 Table 1 of the Draft HCP presents a summary of background hillslope data and landslide/ water quality issues for each of the 11 Habitat Protection Areas. A review of this tabulated data shows that there are significant data gaps in the landslide inventory. Specifically, information regarding landslide locations and timing and the types of land management activities and other factors which may have played a part in landslide occurrence is not provided, it is not clear whether or how much of this data is available, and it is not clear how reliable the presented information is.

S5-76 In addition, the HCP appears to primarily propose relating on some air-photo-based landslide inventories to some geology type(s), some landform types, and some slope angle magnitudes, omitting soil types, soil thicknesses, material strength characteristics, and groundwater conditions. Essentially, the HCP does not propose to characterize the subsurface for hillslope evaluations, so is very limited in a predictive capability and protective capacity for downslope receptors.

Therefore, we provide the following discussion as background information for developing HCP hillslope protection measures.

Data Quality Objectives

S5-77 An HCP must adequately define the population of hillslope failures that are affected by controllable land management activities so as to enable development of appropriately protective prescriptions. At a regional scale, HCP hillslope evaluations are usually based on available data while acknowledging the type and quality of the available data. When there are gaps in the data, or data quality is questionable, then prescriptions must be more conservative, especially in cases where water quality or beneficial uses are already impaired. The Basin Plan is quite explicit in stating that additional controllable discharges to water quality receptors should not occur if the receptor is already impacted.

S5-78 Prior to conducting any data collection or compilation exercise, it is useful to determine what the desired end result is and to identify the necessary level of data quality to achieve this result. This is usually done by defining Data Quality Objectives (DQOs) at the planning stage of a project. DQOs for hillslope failure inventories and characterization dictate the scale, survey intensity levels, performance criteria, and ultimately methods that are applied to inventory the measured total population of hillslope failures. The draft

timber harvest and related operations and slope stability presented in a signed report. However, if standards of practice change during the term of the Permits, any RG reviewing forest management activities in the Plan Area will be expected to meet these standards.

Response to Comment S5-77

Hillslope stability data collection methods, limitations and the assumptions used in this approach are discussed in AHCP/CCAA Section 6.3.2 and Appendix F. The AHCP/CCAA acknowledges in Section 5 and Appendix F that forest management can affect hillslope stability through altered root reinforcement, altered hydrology and road grading. The Plan attempts to address these possible affects through prescriptions that focus on areas with both a relatively high potential for failure and a reasonable potential to deliver sediment to the watercourse network. See the response to Comment S2-19 regarding development of the SSS conservation measures.

The Services agree that it is important to the identification of appropriate conservation measures to understand how affected watersheds have responded to timber harvesting and road construction, and believe that Green Diamond's pilot study approach satisfies data quality objectives. The mass wasting pilot study integrates some empirical geologic data into the Plan and, at the same time, allows Green Diamond to evaluate the applicability of mass wasting inventories to watershed management. Green Diamond's mass wasting pilot study estimates future long-term sediment delivery based on data from two extensive sediment delivery studies that were assembled and tested using standard approaches. Green Diamond estimated future long-term delivery volumes of sediment to watercourses from landslides and roads within the Plan Area. Findings from these watersheds, combined with information from professional and academic studies, were used to extrapolate long-term sediment delivery predictions to other watersheds that share similar geomorphic characteristics within the Plan Area. Relevant geomorphic characteristics are set forth in AHCP/CCAA Section 4.4.

Regarding sediment delivery estimates from shallow landslides, Green Diamond supplemented landslide data from Hunter Creek, Little River and Salmon Creek with preliminary data from Tectah Creek and Ryan Creek. Deep-seated landslides, sediment delivery information was obtained from Hunter Creek, Little River, Salmon Creek, as well as the upper Mad River. See AHCP/CCAA Appendix F1 (Assessment of Long-term Landslide Sediment Delivery under Existing and Proposed Plan Conditions). These mass wasting inventories were assembled using a standard approach: mapping landslides from historical photographs; establishing slide ages by photograph date; recording data on slide type, estimated size (ft^2), estimated depth (ft), sediment delivery ratio, slope form, topographic position, association with graded areas (roads, landings etc.), and extent of harvest (clear-cut, partial cut, forested). Some field verification of the mapped landslides occurred in all sampled watersheds except Ryan Creek. Acquiring these data on landslide attributes, even with all the uncertainty and variation inherent to this information, provided a better starting point for predicting long term sediment delivery than would have been possible absent these data. Empirical information collected within the Plan Area represents the best available data regarding the response of Plan Area watersheds to timber harvesting practices and road building.

The data from the pilot studies was only summarized in the Plan, although the data has been submitted to the Services. These data were used to construct a simple, conceptual model that employed a Monte Carlo simulation to estimate the average long term delivery of sediment to watercourses within the Plan Area, and represent a beginning by Green Diamond to explore the utility of mass wasting assessment as a fundamental input for understanding watershed processes within the Plan Area. See AHCP/CCAA Appendix F3 (Plan Area Sediment Delivery Estimates: A Model and Results). Green Diamond has committed in the Operating Conservation Program (AHCP/CCAA Section 6.2.5.3.4) to conduct a mass wasting assessment patterned on the approach used in these pilot inventories. The timeline for this work is seven years for a preliminary effort, and 20 years for completion of the final work. The preliminary and final MWA will be conducted as described in AHCP/CCAA Appendix D.3.5.

Response to Comment S5-78

Hillslope stability data collection for the pilot watersheds was guided by project planning and data quality objectives. By agreement with the Services, the data quality objectives for the SSS Pilot Study (see response to Comment S2-19) included selecting sample areas with a relatively high concentration of landslide activity in order to acquire a substantial data set quickly that would provide a representation of landslide occurrences and related sediment delivery from SSS areas. Accurately estimating landslide and sediment delivery volume based on field observations, and accurately measuring landslide crown distances from the watercourses were other data quality objectives. Further, an important data quality objective for all the pilot hillslope stability work and related sediment modeling included using a significant sample area compared to the size of the Plan Area. To that end, the pilot hillslope stability work evaluated approximately 45,000 acres, or slightly greater than 10 percent of the Plan Area. See the response to Comment S5-77 regarding the mass wasting assessment pilot study. Data quality objectives will be similarly incorporated in future hillslope stability work required by the Plan.

Response to Comment S5-79

The SSS delineation study and SSS assessment will utilize both aerial photograph review and ground-based reconnaissance to develop the necessary landslide inventories and associated data for the purposes of the individual studies, as described in AHCP/CCAA Appendix D, Sections D.3.3 and D.3.4. The mass wasting assessment will rely in part on data collected from these two studies, but will also incorporate field information gathered from 20 years worth of field experience from across the Plan Area.

Response to Comment S5-80

Green Diamond's slope stability work under the AHCP relies upon both aerial photograph interpretation and field reconnaissance to identify and map landslides for inventory and analysis purposes. The slope stability conservation measures focus on existing landslides and selected areas with a relatively high potential for slope failure and for sediment delivery to the aquatic network. These slope stability prescriptions are clearly directed at well-defined MWPZs, as described in AHCP/CCAA Section 6.3.2.2.2. Green Diamond's sediment modeling, as presented in AHCP/CCAA Appendix F, Tables F3-3, F3-4, and F3-5, shows that these areas are the source of the majority of the management-related landslide sediment delivery. Table F3-8 shows Green Diamond's sediment modeling of the conservation measures for the various MWPZs under pre-Plan and projected post-Plan conditions for the entire Plan Area. The Services believe that this approach is likely to result in a reasonably accurate landslide inventory and, that a deterministic approach to managing hillslope stability would provide additional benefit on a site-specific basis. However, the ESA requires only that the Operating Conservation

S5-78 HCP does not acknowledge any defined DQOs for hillslope evaluations nor does it evaluate existing data in terms of DQO magnitude.

Landslide Inventory

S5-79 Once the Data Quality Objectives for the hillslope failure inventory have been defined, methods to collect the data necessary to achieve the necessary level of quality must be considered.

Published scientific literature and practical experience indicate that different inventory methods will yield different landslide populations and distributions. The scientific literature discusses the significant limitations of relying solely on aerial photograph review to identify landslide locations, types, age, and amount of sediment delivered. These limitations include: 1) incomplete spatial and temporal coverage; 2) difficulty identifying landslides obscured by vegetation, due to rapid regrowth rates; 3) difficulty identifying landslides due to sun shadow effects; and 4) difficulty discerning or recognizing landslides due to scale limitations (*Oregon Department of Forestry Storm Impacts and Landslides of 1996: Final Report* [1999]).

In order to develop a representative and reliable landslide inventory, it is necessary use a combination of aerial photograph review and ground-based reconnaissance (at the appropriate terrain survey intensity level [TSIL]), rather than relying only on aerial photograph review. A discussion on TSILs is found in *Terrain Stability Mapping in British Columbia*, 1996.

Landslide Characteristics and Associative Factors

S5-80 In order to develop hillslope prescriptions that reduce or minimize the potential for land management-related hillslope failures, it is essential to develop a landslide inventory that accurately identifies the presence and locations of landslides. It is also essential that natural vs. land management-related landslides be differentiated, and associative factors be identified. Therefore, for each landslide, it is necessary to determine landscape characteristics including geology type(s), geomorphology type(s), slope angle and aspect, soil types and thickness, material strength, and groundwater conditions; land management history in the vicinity of the landslide; and landslide timing. In addition, volume(s) and timing(s) of sediment delivery must be determined for each landslide. This information allows the use of spatial tools, such as GIS, to correlate landslides with geology, landform, etc. and to develop landslide hazard maps. In addition, this information can be used in various models to assist in assessing landslide susceptibility and in predicting the probability for a landslide to occur in a given area when subjected to various land management activities.

S5-81 To further characterize the landscape and to more definitively predict the combinations of land features and land management activities which will result in landsliding, deterministic methods, based on subsurface investigations, material strength determinations, and groundwater level estimates, may be applied.

Program meets the Permit issuance criteria (which are discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1, and Master Response 8). The Services believe this Plan meets these criteria.

Response to Comment S5-81

Based on discussions with California Geological Survey (CGS) staff during March 2003, the Services understand that CGS recommended that Regional Water Quality Control Board staff review the procedures outlined in *Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Landslides in California* (June 2002) (SP117) and the referenced Southern California Earthquake Center (SCEC) recommendations for implementation of SP117 so that they might better understand the inherent complexities and limitations of using quantitative methods for regional hillslope stability analysis. (CGS Staff, Pers. Comm., March 2003). Review of those documents and the standards of practice described therein reveals their primary use is for buildings and construction projects associated with human occupancy. The methods described by those documents are impractical for regional forest management purposes for numerous reasons, including limited access of heavy equipment to critical sites, unacceptable levels of site disturbance in sensitive areas such as riparian zones, as well as prohibitive cost and limited utility of results for regional planning purposes.

Response to Comment S5-82

The Services concur that depth to slide plane does not necessarily dictate which landslides are affected by land management activities. However, for reasons related to operability by RPFs, landslides are differentiated in the Plan primarily by size and corresponding depth as shallow or deep rather than by type of failure or mode of movement, which more commonly requires substantive geologic interpretation that is less likely within most RPFs' realm of expertise. Therefore, while this recommendation would likely provide an acceptable method of presentation, the approach set forth in the Plan also is reasonable. Accordingly, no change has been made in response to this comment.

S5-81

Recently, CGS has recommended that RWQCB staff apply *Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Landslides in California* (June 2002) for the hillslope component of TMDLs. These procedures are consistent with the procedures that RWQCB staff are applying to the TMDLs, and RWQCB staff recommend that Simpson also apply these procedures to the HCP hillslope component of the HCP. This will help to ensure that consistent methods are applied to lands where the HCP and TMDL processes overlap and to increase the likelihood that HCP hillslope prescriptions are compatible with the TMDLs.

The recommended procedures document includes specific Factor of Safety thresholds for hillslope evaluations, and recommend applying multiple methods for hillslope evaluations, including deterministic methods. Koler (1998) discusses deterministic and probabilistic methods for evaluating hillslope stability in forested terrain.

Landslide Categorization

S5-82

Currently, landslides are categorized in the HCP as shallow-seated and deep-seated. It should be recognized that these shallow-seated and deep-seated landslide types are just categories and are not functional with respect to interactions with land management activities. Depth to slide plane does not necessarily in and of itself dictate which landslides are affected by land management activities. Other factors such as primary and secondary material permeability, upslope catchment area size and vegetal coverage, and adjacent land management magnitude have significant bearing on whether any hillslope can be affected by land management activities. Therefore, we recommend that the HCP present landslides in a fashion which more clearly indicates their various individual characteristics and associative factors, including their associations with land management activities.

Response to Comment S5-83

The Services believe that it is appropriate for the descriptive and technical terminology used in the Plan to be based primarily on California standards since the Plan is proposed for lands within the State of California. In addition, due to differences in geologic setting, the landforms in British Columbia are different from those in the Plan Area. Accordingly, the British Columbia terrain classification system was not proposed for use in the Plan.

The Plan cannot realistically address all landforms or slope shapes and the intersection of those landforms with the various forest stand characteristics and silviculture methods, as described in the response to Comment S5-102. Further, it is unnecessary to include such a complex matrix of possible natural conditions and operational situations. Instead, the Services believe that the watercourse-centered perspective adopted for the Plan's conservation measures appropriately emphasizes protection to the six aquatic covered species. On that basis, existing landslides with a reasonable potential to deliver sediment to the watercourse network, seeps and springs, and steep streamside slopes and headwall swales with a relatively high probability of sediment delivery to these aquatic resources were selected to trigger specific conservation measures, as described in AHCP/CCAA Section 6.3. In addition, conservation measures were developed from a watercourse-centered perspective to emphasize watercourse protection. The natural sensitivity of the landscape in the different HPAs to landslide processes is honored to some degree through the variability in the critical slope gradient and distance thresholds for SSS. Otherwise, the presence and abundance of existing landslides and headwall swale landforms, which is a function of natural landscape variability, will determine the use of the Plan's

Comments

The following comments are composed of general comments pertaining to the HCP hillslope component in general and specific comments that focus on specifically identified parts of the HCP.

General Comments

S5-83 57. The HCP appears to focus on two or three types of landforms, while omitting landforms such as breaks-in-slope, planar slopes, concave, convex, etc. This limitation is further complicated by the fact that there is no unified morphologic landform classification system. The HCP does not indicate whether landform maps have been prepared, or at what scale, for any HPA. Appendix B of the HCP states that CGS landform definitions will be used. There are other available landform definitions which are potentially more applicable to the specified context. For example, see *Terrain Classification System for British Columbia* (1997).

S5-84 58. The HCP does not propose to evaluate soil type and thickness for hillslope stability evaluations. Gray and Leiser (1989) indicate that specific soil types (e.g. ML, SM, etc.) identified under the Unified Soil Classification System are particularly prone to erosion. Other researchers (Hall, et. al. 1994) have also demonstrated that soil thickness and different soil types have different physical characteristics (strength, permeability, etc.) that help to control slope stability. In addition, the concept that root strength considerations, tree types (Redwood versus Douglas Fir) and soil thickness are directly proportional slope stability is well illustrated in *Level 1 Stability Analysis (LISA) Documentation for Version 2.0* (Hammond, et al, 1992). Therefore, we believe that it is appropriate that the hillslope evaluations for the HCP consider soil type(s) and thickness(es). It is likely that soil thickness could be estimated across the plan area using existing THP information and GIS tools assuming that there are landform maps available in electronic format for the topographic areas covered by the HCP.

S5-85 59. The HCP does not define the scale(s) at which hillslope evaluations will occur. It is essential that scale be defined, and that a sufficiently fine scale be used so as to ensure accurate definition and mapping, to properly determine the magnitude of ground-based survey intensities, and to develop and apply appropriately protective prescriptions. We recommend that the HCP be revised to address this deficiency.

S5-86 60. The HCP does not suggest using slope stabilization techniques such as those discussed in *Transportation and Research Board Special Publication 247* (1996). This is puzzling because slope stabilization techniques offer an excellent opportunity to open further areas to land management activities while ensuring that slopes remain stable and sediment discharges to receiving waters are prevented or minimized.

conservation measures. Tables F3-3, F3-4, and F3-5 show the approximate number of acres in the various MWPZs (see AHCP/CCAA Section 6.3.2.2.2) and that most of the landslide-related sediment does in fact come from the prescribed MWPZs. However, the Permits do not excuse Green Diamond from its obligation to comply with all other applicable laws and regulations. Other information, such as landform maps, may be necessary or appropriate tools to address other applicable laws such as the CFPRs.

Response to Comment S5-84

Soil type and thickness are among the factors typically used in quantitative or deterministic slope stability analysis. It is the Services' understanding that quantitative slope stability analyses generally exceed professional standards of practice for identifying and evaluating relative landslide hazards for forest management, as stated previously in response to Comment S5-101. However, the Permits do not excuse Green Diamond from their obligation to comply with all other applicable laws and regulations. Other information, such as soil type and thickness information, may be necessary or appropriate tools to address other applicable laws such as the CFPRs.

With respect to erosion hazards presented by different soil types, the AHCP/CCAA includes extensive conservation measures for road building disturbance and harvest-related site disturbance, regardless of soil type, as described in AHCP/CCAA Sections 6.2.3 and 6.2.4. In addition, riparian conservation measures will limit disturbance near Class-I and -II watercourses, as described in AHCP/CCAA Section 6.2.1. The Services believe that these conservation measures, collectively and together with other conservation measures in Operating Conservation Program, will minimize erosion hazards regardless of soil type and otherwise satisfy the ESA Permit issuance criteria discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1, and Master Response 8.

Response to Comment S5-85

For the purposes of the Plan, hillslope evaluations for slope stability will occur at an appropriate scale for the specific project (e.g. SSS delineation, SSS assessment, mass wasting assessment, individual THPs) based on the discretion of the supervising geologist. The most likely range of scales for such work is 1:6,000 to 1:62,500, which brackets the typical scale of work from THP preparation to watershed-scale geomorphic interpretation.

Response to Comment S5-86

The AHCP/CCAA does not propose to use slope stabilization techniques. The referenced document, *Transportation and Research Board Special Publication 247* (1996), describes numerous examples of engineered slope stabilization techniques utilized along state and interstate highways. The document also repeatedly acknowledges cost as a limiting factor in determining the feasibility of utilizing any of the described techniques. The Services believe that the described slope stabilization techniques are both impractical for forest management purposes and economically prohibitive in this case.

Response to Comment S5-87

As previously stated, the pilot SSS work focused on areas with a relatively high concentration of landslide activity. Based on that biased sampling method, the Services consider it reasonable to assume, for purposes of the initial default prescriptions, that this is a relatively conservative representation of watershed conditions and that the initial default SSS prescriptions (AHCP/CCAA Section 6.2.2.1) are appropriate. Other slope stability conservation measures are focused on existing landslides (AHCP/CCAA Sections 6.2.2.3 and 6.2.2.4) and headwall swales (AHCP/CCAA Section 6.2.2.2) that have a relatively high potential for failure and reasonable potential for sediment delivery to the watercourse network, seeps and springs. AHCP/CCAA Appendix F, Tables F3-3, F3-4, and F3-5 show the number of acres in the MWPZs (see AHCP/CCAA Section 6.3.2.2.2) and the proportionate sediment contribution from each as well as projected post-Plan sediment delivery values from each of the MWPZs.

Response to Comment S5-88

Local and regional geologic structures do exist in the Plan Area and may affect slope stability locally or on a sub-basin scale. However, due to the lithologic and structural complexity and heterogeneity of the Franciscan bedrock in the Plan Area, the locations and extent of locally favorable or disfavorable structural orientations relative to topography and hillslope aspect are presently unknown. Further, reliably identifying and extrapolating structural planes in the Franciscan complex for prescription writing purposes may typically require professional experience and interpretative work that is not normally associated with

S5-87 The HCP does not indicate an intent to conduct subsurface hillslope characterization efforts, nor to evaluate the effect of different silvicultural prescriptions on ground water levels and hillslope stability in different geologic terrains. We believe that without this information, it will be necessary to develop very conservative hillslope prescriptions in order to account for the high level of uncertainty regarding hillslope characteristics.

S5-88 61. The HCP mentions various local and regional structural elements (faults, fractures, jointing, etc.), some or all of which affect slope stability, but does not propose to evaluate these features in the context of slope stability. We believe that if the hillslope evaluation does not include these components, it is fatally deficient.

S5-89 62. The HCP appears to focus on hillslopes that have failed, but does not appear to consider areas which have not failed but where failure potential is highly. The entire landscape must be evaluated with respect to various land management activities in order to determine what types of land management activities will reactivate areas which have previously failed or will activate areas which have not previously failed. Without this information, it will be necessary to develop very conservative hillslope prescriptions and to apply them across the landscape if the stated objective to reduce management-related sediment delivery to the aquatic system from landslides is to be met.

S5-90 63. The HCP does not present any information regarding the relationships between wet areas and/or springs and landslides (or landslide susceptibility). This is suprising because ground water elevations and ground water daylighting are key indicators regarding landslide susceptibility. There is information available regarding springs and wet areas on topographic quadsheets, in THPs, and in road construction drawings and/or reports. This data should be compiled and spatially analyzed in relation to geology, slope, silviculture, and topography at a minimum. This can be accomplished using the spatial analysis component of a GIS system.

S5-91 64. We recommend that the following information, at a minimum, be provided on a scaled map (or maps) which subdivides each HPA by subbasin:

Specific Comments

S5-92 65. Page S-12. The slope stability summary indicates that the purpose of slope stability measures is to ". . . reduce management-related sediment delivery." The summary does indicate whether sediment delivery includes direct ("en masse") and indirect ("bleed") delivery from management-related hillslope failures. The HCP should clarify what comprises delivery from hillslope failures.

S5-93 66. Page S-12. The HCP indicates that slope stability measures focus on THP-level identification of areas prone to slope failures within each HPA. In concept this appears appropriate, but the proposed prescriptions do not acknowledge the significant differences that geology type plays in controlling slope stability. For example, Table 1 includes a column of problematic geology types, derived from

forestry. For these reasons, Green Diamond did not select unfavorable structural orientations as a trigger for specific conservation measures. Instead, Green Diamond chose a watercourse-centered approach to developing conservation measures for excessive sedimentation. The Services agree that this approach is appropriate for the purposes of the Plan.

The Mass Wasting Assessment, described in AHCP/CCAA Section 6.2.5.3.4 and Appendix D.3.5, may address possible relationships between local and regional structural orientations, forest management, and slope stability, depending on discretion of the professional in charge.

Response to Comment S5-89

The goal of the slope stability conservation measures, as stated in AHCP/CCAA Section 6.3.2.1, is "to reduce management-related sediment delivery to the aquatic system from landslides and landslide-related erosion that might occur in specific portions of the landscape." AHCP/CCAA Appendix F, Tables F3-3, F3-4, and F3-5 show Green Diamond's modeled pre-Plan sediment contribution from management activities and projected post-Plan sediment contributions from the same areas. Based on this model and the accompanying discussion in AHCP/CCAA Appendix F, the Services consider that the slope stability conservation measures are appropriate for the purposes of the Plan, and that the Plan as a whole, including the Operating Conservation Program's slope stability measures, satisfy the ESA Permit issuance criteria discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1 and Master Response 8. With respect to evaluating the entire landscape for slope stability concerns, the Mass Wasting Assessment, described in AHCP/CCAA Section 6.2.5.3.4 and Appendix D.3.5, addresses mass wasting processes more widely across the landscape within the Plan Area.

Response to Comment S5-90

The AHCP/CCAA Section 4.2.3 provides a brief overview of major landslide categories as used for AHCP/CCAA conservation measures, including references to the associations of high pore water pressures, sag ponds, springs and wet patches, saturated viscous earth, gullying and irregular drainage patterns with different types of landslides. The Services believe that the Plan as a whole, including the discussion in Section 4.2.3, satisfies the ESA Permit issuance criteria, which are discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1, and Master Response 8, and that the additional analysis recommended in the comment would not likely change this conclusion.

Response to Comment S5-91

Without additional information, the Services are unable to provide a substantive response to this comment.

Response to Comment S5-92

Sediment delivery from landslides includes direct delivery ("en masse") as well as indirect ("bleed") in some cases. For example, a landslide may travel downslope and form a wedge or apron against the slope with the toe of the debris in a watercourse. The toe of that debris is considered directly delivered to the stream and another increment will deliver indirectly through erosion ("bleed"). However, through time, incremental erosion, vegetation and consolidation of landslide debris may diminish its overall susceptibility to continued movement and erosion. Following the development of that type of condition, depending on site specific circumstances, sediment delivery from erosion at such sites may be considered as surface erosion and not necessarily landslide-related. In addition, surface erosion of abandoned landslides or stabilized landslide debris into watercourses may not be considered landslide-related sediment delivery, but rather simply as surface erosion, depending on the relative age of the landscape feature and its proximity to the watercourse network. The Services believe that the Plan adequately describes the meaning of "delivery from hillslope features."

Response to Comment S5-93

The slope stability conservation measures were developed from a watercourse centered perspective to ensure that the measures are

meaningful to the Covered Species. This system includes a variable maximum buffer distance and minimum slope gradient for the SSS prescriptions in the 11 HPAs, which will be determined by empirical landslide data that is a function of the varied geologic conditions across the Plan Area. The initial SSS prescriptions (AHCP/CCAA Section 6.2.2.1) are based on preliminary empirical landslide data and were extrapolated across the 11 HPAs to four initial default HPA groups that were largely defined by gross topographic and geologic similarities and differences. In addition, conservation measures for deep seated landslides (AHCP/CCAA Section 6.2.2.3) and headwall swales (AHCP/CCAA Section 6.2.2.2) are sensitive to geology to the extent that the development of such landscape features is sensitive to geologic conditions. Where geologic conditions lend themselves to the development of such landscape features, the slope stability conservation measures will apply, and where the geologic conditions do not result in the formation of these features, the conservation measures will not apply. Therefore, the Services believe that the slope stability conservation measures are appropriately sensitive to geologic conditions in the Plan Area.

Response to Comment S5-94

The role of foresters and the practice of geology has been discussed in Master Response 13.

Response to Comment S5-95

As described in AHCP/CCAA Section 6.3.2.3, the SSS conservation measures (AHCP/CCAA Section 6.2.2.1) are based on empirical data from various areas within the Plan Area, that was extrapolated across the Plan Area by using initial default HPA groups, defined by generally common geologic and geomorphic conditions. The conservation measures are sensitive to geologic conditions to the extent that the empirical landslide data is a function of geologic conditions, and the conservation measures for SSS are based on that data.

With respect to protecting covered species and habitat values in Class-III watercourses (which are predominantly ephemeral watercourses), the AHCP/CCAA provides measures for the maintenance of riparian function in Class-III watercourses in Sections 6.2.1.5 through 6.2.1.7, which are described in Section 6.3.1.3. Such prescriptions include prohibiting heavy equipment operations, retaining LWD on the ground, not igniting fires, and retaining hardwoods and non-merchantable conifers plus conifers that contribute to bank stability or act as a channel control with a minimum average of one conifer per 50 feet of stream length, depending on gradient.

Response to Comment S5-96

Overstory canopy retention is discussed in the referenced pages (S-13 and S-14) only in the context of RSMZs. Overstory is the

S5-93 Section 4.2 in to HCP. It appears that the HCP proposes uniform hillslope prescriptions regardless of geology type. Proposed hillslope prescriptions must take into account various geology types and their varying characteristics in order for any proposed prescription to be meaningful.

S5-94 67. Page S-13. The concept of training Registered Professional Foresters (RPFs) to recognize hillslope features and to consider the effects of various land management treatments on slope stability, while practical, may violate the Business and Professions Code for the practice of geology. The California Board of Registration for Geologists and Geophysicists should be contacted to determine what does and does not constitute the practice of geology, and what geologic-related activities are permissible for RPFs. Further, recognizing hillslope features is only one component in hillslope stability analysis, so even if this component falls within the permissible purview for RPFs, it will likely still be necessary to include additional licensed professionals, geologists, geotechnical engineers, etc. in order to adequately evaluate the implications of various land management treatments for slope stability evaluations.

S5-95 68. Page S-13. The HCP presents Table S-4 (Slope gradient for determining steep streamside slopes (SSS) and SSS zone widths for Class 1 and 2 watercourses, by HPA). These proposed prescriptions do not honor different types of geology and their relative slope stability attributes, nor does it recognize the need to protect Class 3 watercourses even though Section 4.2.4.3 (Headwall Swales) indicates that heads of Class 3 watercourses are an important source of debris slides and debris flows.

S5-96 69. Pages S-13 and S-14. The HCP text discusses different magnitudes of overstory canopy and buffer widths upslope of shallow-seated and deep-seated landslides. With regard to canopy issues, it is unclear why the text does not discuss mid-canopy and understory-canopy magnitudes when all levels of vegetal cover offer some degree of hillslope stability and erosion protection. Further, it is unclear what 85% overstory canopy refers to. Is this 85% of what is currently there, 85% of background canopy, or something else? Finally, the proposal to establish uniform 25-foot buffer widths is not supported by any meaningful data. Having reviewed hundreds of THPs and other forestry documents, we have seen buffer widths ranging from 25 feet to more than 200 feet depending on the situation. Using a 25-foot wide buffer on a progressive hillslope failure is almost guaranteed to be problematic.

S5-97 70. Pages 4-1 through 4-21. Section 4.2 discusses geologic and geomorphic factors, and identifies and discusses earthquake faults, but does not evaluate the potential effects on slope stability associated with these faults. Available scientific literature indicates that faults may act in a number of different ways which can affect slope stability and erosion. For example, there may be zones of deformation, and weakness, hydraulic barriers, and/or hydraulic conduits in the vicinity of faults. Because of these factors, it is clear that the presence of and effects that faults may have on slope stability must be considered in developing prescriptions that prevent sediment delivery from hillslope failures. The HCP does not do this.

focus of the conservation measures because it is the overstory that is most often merchantable and the target of harvest operations compared to understory and mid-story canopy trees or shrubs. The prescribed overstory canopy closure is measured against a hypothetical 100 percent overstory canopy closure. As for the fixed 25-foot tree retention conservation measure for deep and shallow landslides, the conservation measures are based on whether landslides are present and the likelihood that the landslides may deliver sediment to a watercourse. Alternatives to the default conservation measures will be based on the professional assessment of a California RG.

Response to Comment S5-97

The Plan acknowledges geologic faults in the Plan Area in AHCP/CCAA Section 4 and shows numerous faults on the attached Plan Area maps. The Plan also acknowledges the potential for landslides to move as a result of ground shaking due to earthquakes. The slope stability conservation measures (See AHCP/CCAA Sections 6.2.2) address landslides that fit within the MWPZs and shallow slides with a potential for delivery, including those slides that are related to ground conditions that are a result of faulting. Because the presence and effects of faults were considered in the Plan, no change has been made in response to this comment.

Response to Comment S5-98

See response to Comment S5-81

Response to Comment S5-99

AHCP/CCAA Appendix F1 discusses a qualitative comparison of field conditions in the Plan Area compared to deep seated landslide creep studies presented in professional and scientific literature to explain and justify estimates of deep seated landslide creep rates in the Plan Area. These values were used accordingly in Green Diamond's sediment modeling presented in AHCP/CCAA Appendices F1 and F3 to calculate approximate sediment input from deep-seated landslides (DSLs). Sediment volumes input from DSLs were then compared to sediment from other sources, such as steep slopes adjacent to watercourses and roads and watercourse crossings, as shown on the tables in Appendix F. Based on the reported values, DSLs contribute relatively less sediment than other sources, and much less than other management-related sediment sources, such as roads. For this reason, conservation measures were focused less on DSLs than on other management-related sources, where a greater and more cost-effective benefit from implementing minimization measures associated with the covered activities can be achieved.

Soil creep is another natural hillslope process that delivers sediment down slopes to the watercourse network. Soil creep rates likely vary greatly across the landscape, but are typically slow, on the order of millimeters per year or less. Forest management may affect soil creep rates on a site specific basis, but to what degree varies by geologic setting. However, based on the reported values of sediment delivery from DSL creep and the minimal relative

S5-98

71. Pages 4-1 through 4-21. Section 4.2 discusses geologic and geomorphic factors, including texture, as they pertain to slope stability. Unfortunately, the HCP does not fully identify textural differences for all types of geology nor assess the effects of those textural differences on slope stability. Commonly, texture is related to material strength and, hence, relative stability of a hillslope. The hillslope evaluation in the HCP should include textural identification and estimates of material strength accordance with *Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Landslides in California* (June 2002).

S5-99

72. Page 4-2. The HCP briefly discusses slip rates along faults but includes very little discussion about hillslope creep rates in any HPA. This is disturbing because hillslope creep can result in significant quantities of sediment delivery, and the magnitude and frequency of creep can be significantly affected by land management activities. Therefore, it is important to identify and measure creep rates for different geology types in order to define background rates and their spatial distribution as well as to identify those geology types most prone to increased creep rates and magnitudes as a function of land management types and intensity.

S5-100

73. Pages 4-1 through 4-21. Section 4.2 mentions discontinuities, as they pertain to slope stability. The HCP notes that many of the geologic units have been affected by tectonic activities changing the texture and adding discontinuities in the form of fractures, joints, foliation, etc., any of which can significantly affect slope stability. However, the HCP does not appear to include an evaluation of the effects of such discontinuities on slope stability.

S5-101

74. Pages 6-13 through 6-15. The HCP text presents specific prescriptions to address slope stability. There is no mention of comprehensive, pre- and post-project, slope stability evaluation, or assessment of factor of safety. Instead, it appears that some basic prescriptions are being proposed in lieu of comprehensive slope stability evaluations. We do not believe that the proposed slope stability measures will protect water quality or beneficial uses.

S5-102

75. Page 6-63. The HCP text correctly notes that different landscapes have different mass wasting characteristics that represent varying sensitivities to land management activities. Unfortunately, the HCP does apply this important conclusion to the evaluation and prescription development process. Clearly, the HCP should identify and intersect each type of management activity with each type of landscape and mass wasting process in order to develop gradational prescriptions that honor the natural variability and sensitivity of the landscape.

S5-103

76. Page 6-63. This page includes a discussion regarding "unforeseen circumstances" which could cause thousands of cubic yards of sediment delivery to watercourses. The proposed response is to conduct forensic analysis following such occurrences. This is not prevention but more likely indemnification.

influence of management on those features, it is reasonable to consider that soil creep contributes an equally small or smaller amount of sediment and that the management influence on that process is small or negligible, especially in comparison to roads and the MWPZs (see AHCP/CCAA Section 6.3.2.2.2 and sections 6.2.2.1 through 6.2.2.4). Green Diamond elected not to include specific conservation measures related to soil creep for this reason, and because conservation measures to address management-related sediment sources were determined to be more meaningful. The Services agree with this assessment and believe that the Plan, as a whole, including the slope stability measures, satisfy the ESA Permit issuance criteria discussed in EIS Section 1.3, AHCP/CCAA Section 1.4.1, and Master Response 8.

The Plan provides an additional layer of regulation that supplements all other applicable laws, and does not excuse Green Diamond from compliance with such laws and regulations, including the CFPRs.

Response to Comment S5-100

The discussion of geologic conditions in AHCP/CCAA Section 4.2, which includes references to discontinuities such as joints, fractures, and foliations, provides a broad overview of the geologic conditions in the Plan Area. The Services believe that the measures included in the Operating Conservation Program to address slope stability (AHCP/CCAA Section 6.2.2) are adequate in light of the inherent complexity of the bedrock in the Plan Area. Unfavorable structural and topographic relationships associated with Franciscan bedrock were not selected to trigger conservation measures because of practical considerations, including the need for professional geologic input in nearly all such cases to reliably identify, measure and assess these sites. Instead, for the sake of operability, the slope stability conservation measures are focused on landscape features that can be readily identified and categorized by California RPFs within the scope of their license. Some assessment of structural orientations relative to topography and slope stability is included in the long term Mass Wasting Assessment described in Section D.3.5 of the AHCP/CCAA, based on the discretion of the supervising geologist.

Response to Comment S5-101

It is the Services' understanding that comprehensive pre- and post-harvest slope stability evaluations and factor of safety calculations are beyond the current standard of practice for forest management. Instead, qualitative assessment of ground conditions by RPFs and qualitative geomorphic interpretations and assessment by RGs presently define the typical extent of investigation of the landscape for environmental concerns in forest management. On this basis, recognizable unstable areas and steep streamside slopes and headwall swales with a relatively high probability of sediment delivery to the stream network were selected to trigger specific mass wasting conservation measures (See AHCP/CCAA Sections 6.2.2.1 and 6.2.2.2). This approach provides for operability of the Plan in a manner that is generally consistent with current standards and methods of assessment and practice. However, if the standards of practice change during the term of the Permits, any RG reviewing forest management activities in the Plan Area will be expected to meet such standards as necessary to address applicable laws and regulations. Additionally, the Plan's conservation measures are weighted to provide for relatively cost-efficient mitigation of risk of sediment delivery from management, including landslides, to aquatic resources.

Response to Comment S5-102

The full range of natural variability that exists in the Plan Area with respect to the intersection of geologic and topographic and forest stand characteristics is not easily summarized. Therefore, conservation measures were developed from a watercourse centered perspective to emphasize watercourse protection. On that basis, existing landslides with a reasonable potential to deliver sediment to the watercourse network, deep-seated landslides, and steep streamside slopes and headwall swales with a relatively high probability of sediment delivery to the stream network (due to management) were selected to trigger specific conservation measures. See AHCP/CCAA Section 6.2.2.

The natural sensitivity of the landscape in the different HPAs to landslide processes is honored through the variability in the critical