Lance Clifford

Wendy S. Wyels, Chief
Compliance and Enforcement Section
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

Re: DRAFT CLEANUP AND ABATEMENT ORDER, RUBICON TRAIL, EL DORADO COUNTY

Dear Ms. Wyels:

I am writing this letter to express my concern with the "Assessment of Sediment Delivery from the Rubicon Jeep Trail" ("Assessment") prepared by the Regional Water Quality Control Board ("Agency"). I have spent the past several days reviewing this Assessment and its bibliography, and I believe that the Agency has failed to uphold both the spirit and the letter of standard geological practices in preparing the Assessment because the Assessment contains numerous errors and misrepresentations. I further believe that the Assessment should be withdrawn immediately by the Agency, and that the Agency should not rely on the Assessment when considering the draft Cleanup and Abatement Order.

At the outset, I note that the Assessment is not stamped by a licensed geologist, yet it purports to espouse a professional opinion founded in geology, defined below. Without a signature or stamp, I cannot be sure whom to direct my comments to, so I will direct my comments to the Agency in general.

The Business and Professions Code sets forth the requirements to become a geologist, and to maintain that license in good standing:

Section 7802 provides:

> 'Geology,' as used in this chapter, refers to that science which treats of the earth in general; investigation of the earth's crust and the rocks and other materials which compose it; and the applied science of utilizing knowledge of the earth and its constituent rocks, minerals, liquids, gases and other materials for the benefit of mankind.

Section 7803 provides:

'Geologist,' as used in this chapter, refers to a person engaged in the practice of geology.

Section 7832 provides:

> Any person, except as in this chapter specifically exempted, who shall practice or offer to practice geology or geophysics for others in this state is subject to the provisions of this chapter. (Title 16, Section 3003(f)(1), of the California Code of Regulations defines the practice of geology "for others" as: "The practice of geology or geophysics 'for others' includes but is not limited to the preparation of geologic or geophysical reports, documents, or exhibits by any commission, board, department, district or division of the state or any political subdivision thereof...")

Section 7835 provides:

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

Section 7860(b) provides:

> By a majority vote, the [Board for Geologists and Geophysicists] may publicly reprove, suspend for a period not to exceed two years, or revoke the certificate of any geologist or geophysicist registered hereunder, or may publicly reprove or revoke the temporary authorization granted to any person pursuant to Section 7848 or 7848.1, on any of the following grounds:
>
> (1) Conviction of a crime substantially related to the qualifications, functions, or duties of a geologist or geophysicist.
> (2) Misrepresentation, fraud, or deceit by a geologist...
> (3) Negligence or incompetence by a geologist...

Title 16 of the California Code of Regulations, Section 3065 provides:

> To protect and safeguard the health, safety, welfare, and property of the public, and California's environmental quality, every person who is licensed by the Board of Geologists and Geophysicists (Board) as a professional geologist or professional geophysicist, including licensees employed in any manner by a governmental entity or in private practice, shall comply with the professional standards in this section. A violation of any of the following professional standards shall constitute unprofessional conduct and shall be sufficient grounds for disciplinary action.

(b) Competence:

2. When practicing geology or geophysics, a licensee shall act with competence and reasonable care, and shall apply that technical knowledge and skill which is ordinarily practiced by licensees in good standing, practicing in this state under similar circumstances and conditions.

(c) Representations:

5. A licensee shall only express professional opinions which have a basis in fact, are within the scope of the licensee's own experience or knowledge, and are generally accepted geologic or geophysical principles.

9. A licensee shall not misrepresent data or its relative significance in any geologic or geophysical work product or oral conveyance of his or her professional work product.

(f) Document Submittal

1. A licensee shall not misrepresent the completeness of any professional geologic or geophysical document submitted to any governmental or regulatory agency.

I believe the Assessment has not been prepared consistent with these standards, and I request that the Agency withdraw the Assessment until it is corrected. The Agency has failed to number the pages of its report. Thus, I will divide my review into seven sections:

I. Omissions

II. Research Corruption

III. Use of Research that is not Peer-Reviewed

IV. Personal Communications

V. Disregard of Reported Research Results

VI. Misrepresentation of Explicit Language and Intent of Research

VII. Unwarranted Exaggerations

I. OMISSIONS

No Climate Data

The Agency has failed to include the recorded climate data for the area under examination. Quoting just one of the researchers cited in this Agency assessment explains exactly why this is such a significant omission.

Welsh, pages 135-6:

> This equation uses annual rainfall rather than total precipitation because road sediment production from snowmelt is nearly an order of magnitude lower than the sediment generated from an equivalent amount of rainfall (Vincent, 1985; BCC and NCASI, 2003). The field data collected for this study showed that snowmelt did not generate any sediment from the OHV trail segments, and this is why only the measured summer rainfall was used to calculate the rainfall factors used in SEDMODL2.

Thus, by not incorporating applicable climate data, the Assessment has failed to adequately consider a vitally important element in any sediment transportation model.

Rainfall Was Not Considered

The Agency has failed to include the R (r) factor for rain duration and intensity. From Section 3.2 of the Agency assessment:

> Sediment production is dependent on the depth of the dust layer and trail surface area (equation 3).

This statement omits the most significant factor in sediment production. Sediment production is not dependent upon the dust depth. Sediment production, in every single research citation used in this assessment, is dependent upon the duration and intensity of rain events. It is usually represented as R, or r, in the formulas developed to estimate sediment yield.

The Agency-devised "Equation 3" has no R factor and did not incorporate the R factor into any underlying calculation. To put it differently, the Agency's "determination" of the amount of sediment entering the stream network from the Rubicon Jeep Trail ("RJT") is false. Why? Because the Agency has omitted from its own formula the key variable in every single cited researcher's formula: The precipitation variable, R (r) and all variations of r: f ss = (100% - ROC final) r (Ziegler 2001).

For example, Bilby (1989), pg 456:

> Two factors have great potential to influence the rate of sediment delivery to roadside ditches: precipitation and use rate of the roads. Precipitation intensity and amount determine the sediment transport capacity of road surface runoff and, along with characteristics of the road segment, determine ditchflow...While the presence of surface flow was a prerequisite to moving material from the road surface to the ditches and downslope...Hourly sediment concentration in

ditchflow generally displayed an increase with discharge, but concentration values ranged widely at any given flow.

Overland Flow is Unsubstantiated

The Agency has failed to substantiate overland flow. From Section 1.1 of the Agency assessment:

> Vehicular traffic enhances sediment production by generating surface material that is easily transported by overland flow events (Luce and Black, 2001; Ziegler et al., 2001).

The Agency has failed to disclose that "overland flow events" are an indispensable factor in every sedimentation equation. Luce, Prasad, Tarboton, Black, Welsh, Cedarholm, Reid, Salo, Bilby, Sullivan, Duncan, Ross, MacDonald, and Ziegler all assert, in various terminologies, that "overland flow" (the water that runs upon the road surface during and after a rainstorm) is the prime factor in every sedimentation model. Incredibly, the Agency assessment has omitted, from its equation and its entire discussion, the prime mover of road surface sediment.

Without knowing anything about the duration or intensity of the overland flow events (climate), and with no rainfall factor (r) in its equations, the Agency cannot possibly calculate how much dust may be transported by overland flow events to the stream network.

Therefore, the Agency statements, "Annual sediment delivery was assumed to be 100% when the trail drained directly into the stream channel. Annual sediment delivery is assumed to be less than 100% for trail segments connected to the channel network via sediment plumes" are false assumptions.

The reason they are false is because 1) Agency has already selected the Ziegler formula (the "dust-layer" method) as the standard for this assessment, however, 2) Agency has omitted rainfall from the Ziegler formula, and 3) in the month of August, the Agency was measuring dust. To put it bluntly: At the RJT sites selected by the Agency, there was no rainfall. The factor (r) was zero.

In other words, if 95%, or 85%, or even just 75% of the precipitation in the area of the RJT is snow, and the summers are mostly dry, the outcome will be very different than if 100% of the precipitation is intense rain events, as in Ziegler's Thailand experiments.

To confirm my point: At Bilby, page 456, "...precipitation intensity and amount determine the sediment transport capacity of road surface runoff..."

Lack of Authority for Science-Based Statements

Agency apparently believes that the single statement in section 1.1 of Agency's

assessment, "OHV trails exhibit similar erosion processes to unpaved roads," excuses the Agency from professional standards for accurate representation of the research it cites. I disagree. If the expected professional protocol for literature citations is disregarded, there is no limit to shifting the claims that otherwise serious and ethical research could support.

From Section 1.0 of the Agency assessment:

> The assessment was prompted by stakeholder complaints and by field observations from Regional Board employees. Stakeholder complaints included a wide variety of concerns, including water quality impacts from excessive sediment, human waste, and from petroleum leaks/spills.

Agency does not reveal when or over what length of time these complaintsoccurred. Agency does not reveal what a stakeholder is. Agency does not utilize any documented reporting system, as one would find in a formal water quality monitoring program conducted over several seasons, or written and documented statements describing specific areas of concern such that Agency can justify expending substantial Agency resources on examining the complaints. Agency does not disclose how many, and over what length of time, or what type of field observations were conducted.

II. RESEARCH CORRUPTION

From Section 1.1 of the Agency Assessment:

> While the magnitude of trail-induced surface erosion is often much less than that of episodic erosion processes (i.e., mass wasting), aquatic ecosystems are typically not adapted to chronic low magnitude disturbance (Yount and Niemi, 1990).

This is simply false. From the actual Yount & Niemi abstract: "For the majority of studies examined, the systems recovered quite rapidly."

The Yount and Niemi paper did not conclude that aquatic ecosystems are "typically not adapted to chronic low magnitude disturbance." In fact, the paper found the complete opposite. After first distinguishing between *pulse* (short-term and localized) and *press* (long-term and broad distribution) disturbances, the authors went on to describe what types of disturbances would fit into each category. According to the authors, floods, droughts, biocide applications, and toxic chemical releases could generally fit into a pulse disturbance, while clear-cutting of an entire watershed, strip mining in which mountains are processed for ore, and the eruption of Mount St. Helens were examples of press disturbances. After reading the paper, I could find no case study in which the aquatic ecosystem did not adapt regardless of the disturbance; it was merely a factor of time. In fact, the authors state that species recovery (quite superior to adaptation) occurred regardless of the disturbance.

The statement about chronic, low magnitude disturbance appears to be derived from

nothing that is presented in the Yount and Niemi paper. That paper synthesizes research and observations of benthic recovery times from floods, drought, pesticide applications (directly in the stream channel and upon the surrounding lands), European rivers that were waste disposal systems for centuries, large toxic chemical discharges caused by factory fires, leaks and transport spills, mining pollutants, fish-management practices, physical channel modifications such as reservoirs, impoundments, diversions, and other stream meander-pattern restrictors, clearcutting, and road, bridge, & pipeline construction. When forest roads are the cause of disturbance, the referenced roads are timber haul roads, whose full bench cut construction caused extensive, high intensity disturbance to the stream channel.

The RJT was constructed more than 100 years ago. The upstream and downstream refugia (per the Yount & Niemi synthesis) are not disturbed. The aquatic ecosystem is not altered. The stream channels are not altered. In the context of the Yount & Niemi paper, the disturbance has been part of the habitat for several thousands of aquatic species generations.

The closest reference I can find in the Yount & Niemi paper to the claim made by the Agency is found at page 548 of Yount & Niemi:

> In this sense the response of a system to a long-term disturbance would not be called recovery but instead would be called adaptation or accommodation (Crossman and others 1973). . . . a sustained alteration of certain species densities, and this alteration is maintained until the other species adjust. . . . The terms acute and chronic come close but are probably too closely associated with toxicology to be readily accepted by ecologists....

In the context of the Yount & Niemi paper, none of the alterations were "low-level." Nonetheless, species recovery has occurred or is occurring in even the worst scenarios.

Therefore, I regret to state that the Agency's use of the Yount and Niemi paper is deceptive, at best.

I find similar problems with the Agency's use of Kondolf and Wolman (1993) in Section 3.4 of the Assessment. The Kondolf 1993 study has nothing to do with determining the range of "suitable" sediment size for spawning gravel. This study only reported what sizes of gravel spawning occurred in; it made no qualitative analysis on the suitability of the gravel. Furthermore, I wonder what qualifications a geologist has in offering a professional opinion on fishery matters.

Use of research in this manner is a serious breach of trust for all parties to this Assessment: the scientific community, whose reputation is damaged by the deceptive representation; the government agency entrusting the authors with the assessment; and, of course, the authors themselves, showing disregard for scientific integrity and their own professional reputations.

III. USE OF RESEARCH THAT IS NOT PEER-REVIEWED

Foltz 2006 is a print version of a presentation made by Randy Foltz to the ASABE which summarized his recent study about ATVs. The presentation is offered for sale on the ASABE website, although the author is listed as an employee of the Forest Service Research Station in Idaho and he conducted the research as a Forest Service employee, using Forest Service resources. Thus, it was expected to find the research on one of the Forest Service research sites as public information, with a standard Forest Service identifying number.

This search did not locate any research by R. Foltz. On Nov 12, 2008, Mr. Foltz was contacted in an effort to locate the original study. He explained it was on the San Dimas website, but it was hard to find so he would find it. Upon his prompt call back, Mr. Foltz said the paper was not on the site because it was not published. It was not published because it was still under review. Instead, Mr. Foltz provided the text of his presentation.

In the second paragraph of his presentation to the ASABE, it was learned that the objective of the study was to determine which types of ATVs and tire treads create an impact on the natural environment.

In doing the study, Mr. Foltz avoided ATV-altered sites to confirm and measure the effects. Instead, he and his team created new disturbed sites on four different National Forests. The new sites were generally flat, prepared areas, i.e. mowed grass to mark the "trail" selected for disturbance. To create the disturbed conditions in some cases as many as a hundred passes had to be made over the same spot within the space of two to three hours, then the simulated rainfall was administered. Mr. Foltz described this process in detail over a phone conversation. He stated that the original objective was to determine the effects of different types of ATV tires on various soil types. The project title, and narrative, expanded to "Erosion from ATV Vehicles" after the project was completed.

In other words, the work was done under conditions that were set up to create as much compaction and soil disturbance as the tires were capable of causing, because the original objective was to see what the tires did to the surface soil.

The concern with this research is as follows: This unpublished report, which is public information but only available for sale from a private site, had an objective to compare the effects of two different types of ATV tires on an undisturbed site. The Agency then transformed this study into a citation intended to support the statement that OHV trails are a "significant source of chronic erosion."

IV. PERSONAL COMMUNICATIONS

From Section 3.3 of the Agency assessment:

> While these segments do not deliver 100 percent of their sediment on an annual basis, most sediment deposited within a filter strip can be delivered to the channel

network during high magnitude, low frequency storm events (Dr. William Elliot, personal communication).

The footnote identifies Dr. Elliot as the Project Leader for Soil and Water Engineering at the USDA Forest Service's Rocky Mountain Research Station lab in Moscow, Idaho.

The problem about "personal communications" used in any government matter is that these communications are (by their nature) not in any record. From a legal standpoint, a "personal communication" is simple hearsay. Personal communications may represent professional opinion, personal opinion, or they may be used entirely out of context, and I have no way of determining which is correct. I don't know when Dr. Elliot said that. I don't know what "high magnitude, low frequency storm events" Dr. Elliot is referring to. I don't even know what the actual subject of the personal communication was.

In the Assessment, the context is most suspect: a government Agency includes an unrecorded communication from Dr. Elliot stating that "most" sediment deposited in a filter strip "can" be delivered to the channel network, yet all of the other cited, peer-reviewed research contradicts this directly, presents no empirical evidence that this actually occurs, or offers untested theories about how this might, but probably does not, occur. Perhaps the authors of the Agency assessment elicited such a response with repeated "what-if" scenarios, and perhaps even about an entirely different subject.

In other words, personal communications can represent anything, and in a government document, are the essence of arbitrary and capricious.

V. DISREGARD OF REPORTED RESEARCH RESULTS

From Section 1.1 of the Agency assessment:

> The hydrological impacts of OHV trails include: 1) a highly compacted trail surface, which results in a preponderance of Horton overland flow; 2) the interception of subsurface runoff by trail cutbanks [....]

With regard to 1), Welsh (2008), states that OHV trails are more frequently characterized by loose material on their surface.

And with regard to 2), at page 117 of Welsh (2008):

> In the case of the study area, however, the short duration of the sediment producing storms and the dry conditions during the summer mean that subsurface flow is unlikely to be intercepted by the OHV trails.

and

> OHV trails have no cutbanks.

Therefore, on what basis does the Agency claim that OHV trails intercept subsurface

flow? The cited research does not support the Agency's statement.

Also from Section 1.1 of the Agency Assessment:

> A growing body of literature suggests that OHV trails are significant sources of chronic erosion (MacDonald et al., 2004; Foltz, 2006; Welsh et al., 2008).

However, MacDonald et al. (2004) is a theoretical modeling program intended to assess the cumulative watershed effects at the hillslope scale. The objective was to develop and test a more reliable modeling method for estimating the cumulative effects of all activities at the hillslope scale. Further, the objective of the MacDonald research was not to determine whether any of the activities produced "significant" or "chronic" erosion. MacDonald et al. do conclude at page 153, "Taken together, the three years of data confirm that roads, high-severity wildfires, ORV trails, and certain skid trails were the dominant sources of sediment at the hillslope scale." However, this only means that based upon the sources studied, these sources produced the most. The MacDonald study never quantifies the amount as "significant."

Furthermore, the research did not find that any of the activities produced anything "chronic." At MacDonald, page 156, "Sediment production rates were highly variable between sites within a year as well as between years." "Highly variable" is anything but chronic.

I have already discussed the problems associated with relying on the Foltz study.

And Welsh, the last author cited for this proposition, provides in his article at page 110:

> No sediment was produced from the five segments at Log Jumper from November 2005 through April 2006 or any of the 10 segments from November 2006 through December 2006, and this indicates that the summer 2006 values actually represent annual sediment production.

If sediment is not produced for large parts of each year, then how can the Agency cite this article for the proposition that OHV trails are associated with "chronic" erosion? The simple answer is that the Agency cannot legitimately cite these articles for its proposition and that the entire statement is without basis in science.

VI. MISREPRESENTATION OF EXPLICIT LANGUAGE AND INTENT OF RESEARCH

Roads or OHV Trails?

From Section 1.1 of the Agency assessment:

> However, Eb can be a substantial portion of total erosion when gullying, rutting, or extreme precipitation events occur (Ziegler et al., 2001) (Figure 1).

Figure 1 is captioned, "A conceptualized schematic of erosional response by an OHV trail over time." However, this schematic is not found in Ziegler 2001, it is found at Figure 3 in Ziegler 2002. Regardless of which Ziegler article is cited, the repeated and explicit misrepresentation of road-sediment formulas as OHV trail predictive models is becoming an ethics question: Ziegler was experimenting on unpaved roads in Thailand, not OHV trails in California. Therefore to represent that Ziegler's studies involved OHVs is a significant misrepresentation.

Also from Section 1.1 in the Agency Assessment:

> Sediment delivery from OHV trails is inextricably tied to trail related runoff generation and redistribution processes (Luce, 2002).

This sentence is nearly an exact quotation from Luce except for several significant details. The exact quotation is: "Effects of roads on sediment generation are closely tied to runoff generation and redistribution processes" (Luce, 2002, page 2901). Note how the Agency has removed the word "road" and replaced it with the phrase "OHV trails." Luce was not discussing trails. He was discussing full-bench constructed roads with deep cutbanks and fillslopes. Is this substitution ethical? I do not believe so. Because the Agency claims that roads and trails are probably similar does not excuse Agency from accurate and ethical representation of the original literature. If the research was about roads, then that is what the Agency must admit to.

Another example of this type of misrepresentation is found in Section 1.1 of the Assessment:

> Erosion on an OHV trail can be described by the following equation (Megahan, 1974): $Et = Eb + Es$

However, Megahan did no calculations about OHV trails. Megahan never developed formulas to estimate the erosion patterns of OHV trails. Agency does correctly cite the origin of formulas for estimating sediment yield, but the Agency does not disclose that Megahan was seeking insights into the time trends in surface erosion following full-bench-cut haul road construction. He developed several variations of formulas in order that these trends may be measured and predicted.

The Agency inappropriately compares other roads to the RJT. At page 154 of MacDonald (2004):

> Figure 5. Sediment production vs. the product of road surface area and road slope for recently-graded and ungraded native surface roads.... Sediment production was normalized by annual erosivity.

Explanation: The Figure 5 referred to is a scatterplot graph that shows what the narrative does not say: recently-graded roads produced more than twice the sediment yield than

ungraded roads in the three years following grading. "Normalization by annual erosivity" means that after two or three wet seasons, the graded surface lost all of the soil that the grading detached. This result is repeated in every road research work cited in the Assessment, and in every other road research paper I have examined.

The Cedarholm, Reid, and Salos (1981) paper was to "present experimental data on logging road-caused sedimentation sources" (Cederholm, 1981, page 2). However, the RJT is not a logging road.

Also from page 2:

> At present the basin is 40 percent logged in the clearcut manner and the road system is over two-thirds complete. In recent years the rate of cutting and road building has been high, with the remainder of the timber scheduled to be cut by 1992. There are over 650 km of logging road in the basin now, and over half were built with sidecast construction in steep country.

However, the RJT is not in a watershed basin that is "at present" 40% clearcut and the RJT was not constructed by sidecast.

On page 25, Cederholm notes that the "results of this study indicate that logging roads are a significant source of fine sediment." Please note this work was published in 1981. Cedarholm's assumption that the reader already knows that logging trucks weigh 80,000 pounds and have five or six axles is so fundamental to research from the 1980's that Cedarholm does not even mention it.

The RJT is not used by multi-axle logging trucks. A loaded logging truck can weigh 80,000 pounds. The RJT is used by vehicles whose maximum gross weight is 6,000 pounds, on two axles.

The Bilby paper (1989) relied upon by the Agency has similar differences. The Bilby paper examines full bench cut roads, whose cutbank average angle ranged between 39 degrees and 53 degrees (Table 1, page 455). However, the RJT has no cutbanks.

In addition, the Bilby paper reviewed sediment impact on logging roads that were graded on a regular basis. From Bilby page 455: "The mainline sites were graded once or twice per week while the secondary road sites were graded only three times during the 23-week study period."

The RJT is never graded. The RJT is maintained entirely by hand. Please reference Coe (2006), whose research reported that recently graded roads produced more than twice the sediment in the following three years than ungraded roads, and, as the amount and size of tread surface irregularities, forest litter, rocks, boulders and blowdown debris on the road surface increases, the erosion rate decreases.

Study Limitations

The Agency further misrepresents the studies cited by failing to accurately divulge the limitations of the studies themselves. For example, the Welsh (2008) study is devoted to testing and improving sedimentation models. At page 68 (roads chapter), Welsh admits:

> ...the performance of the model was very poor when the storm-based predictions for each segment were summed to provide an annual prediction (R2eff =-0.50). The poor relationship between the sum of storm-based predictions and the measured annual values is related to the consistent over-prediction of sediment production from the smaller storms (Figure 2.9), as these errors become larger as the sediment production values are summed.

At page 70:

> The performance of the empirical models was surprisingly poor given that the segments that were used for developing the models were the same segments that were used for validation.

At page 139:

> Both WEPP Road and SEDMODL2 were very poor predictors of the sediment production from OHV trail segments, as indicated by the respective R2eff values of -0.37 and -2.01.

Yet the Agency assessment never reveals that even the most highly-developed and well-tested models are unreliable predictors of sediment transport from roads into stream networks.

VII. UNWARRANTED EXAGGERATIONS

At Section 1.1, the Agency Assessment declares:

> Trail segments were determined to be hydrologically connected when: 1) Trail segments discharged runoff and sediment directly into a stream at a trail-stream crossing; 2) Runoff and sediment from trail segments traveled diffusely across hillslopes and subsequently delivered to the stream channel; 3) Runoff and sediment from trail segments was discharged into gullies that were connected to the channel network; 4) Runoff and sediment from trail segments was discharged into unchanneled swales that were visibly connected to the channel network; and 5) Low order stream channels were intercepted onto the trail and subsequently rerouted back into the channel network.

Utilizing these criteria, the Agency has listed nearly every natural feature surrounding the RJT as hydrologically connected.

Especially egregious is the Agency assertion that "sediment from trail segments traveled

diffusely across hillslopes and subsequently delivered to the stream channel." Several researchers cited by the Agency Assessment expressly point out the opposite. For example:

> In general, it is necessary for ditch discharge to enter directly into a defined channel to have an impact on stream water quality. Those road drainage points which discharge water on the forest floor at a sufficient distance from a channel to enable infiltration of the water through the soil contribute very little to the sediment loads of streams (Haupt 1959). (Bilby, 1989, p. 462).
>
> The procedures used to minimize input of road sediment at these locations may take a variety of forms. The most effective, and potentially least costly, approach is to drain the ditch onto the forest floor before reaching the stream. (Bilby, 1989, p. 465).

The Agency representation of "hillslope scale sedimentation" as a source of sediment delivery into stream networks is not supported by the research, nor is it supported by any on-site Agency field testing. Hillslope scale sediment yield is not synonymous with hydrologic connectivity. Coe (2006) provided ample evidence that diffused runoff did not enter any stream channel. It is in Coe's research that we find the explicit use of a professional standard for the distance between any road-generated sediment plume and a stream channel, yet the Agency did not utilize this standard in preparing the Assessment.

"Unchanneled swales" are not mentioned in any of the hydrologic connection research. Unchanneled swales are, simply put, unchanneled. Stream connectivity is absent. It should be self-evident that when the swale is unchanneled, it is not transporting water.

VIII. CONCLUSION

Based upon all of the above arguments, I believe the Agency's Assessment has omitted significant data from consideration, and the Assessment sets forth conclusions based upon research that has been significantly misrepresented, disregarded, not peer-reviewed, and exaggerated. This violates Section 3065 of Title 16 of the California Code of Regulations, and I therefore insist that the Agency withdraw the Assessment and not rely upon it when considering the draft Cleanup and Abatement Order.

Sincerely,

Digitally signed by Lance Clifford
DN: cn=Lance Clifford, o=Pirate Media Group, ou, email=lance@pirate4x4.com, c=US
Date: 2009.03.30 12:40:36 -07'00'

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