



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Comment Responsiveness Summary

for the NORTH FORK EEL RIVER TOTAL MAXIMUM DAILY LOADS FOR SEDIMENT AND TEMPERATURE

December 26, 2002

Introduction

This document describes how the U.S. Environmental Protection Agency (EPA) is responding to comments received from the public on the proposed North Fork Eel River Total Maximum Daily Loads (TMDLs) for Sediment and Temperature. EPA solicited comments from the public from 13 September 2002 to 28 October 2002. For each comment received, this document summarizes the comment and EPA's response, and identifies whether the final TMDLs were revised based on the comment. The document is organized according to the individual or organization submitting the comments. In most cases, comments are quoted directly from the source. In certain cases, comments are paraphrased. EPA did not address comments that did not pertain to the North Fork Eel River TMDLs. EPA appreciates the constructive input which was submitted on these TMDLs. Further questions about this document or the final TMDLs should be directed to Palma Risler at 415-972-3451 or risler.palma@epa.gov.

List of Commentors

1. Lou Woltering, Six Rivers National Forest
2. David Leland, North Coast Regional Water Quality Control Board

Commentor #1: L. Woltering, Six Rivers National Forest

Comment 1.1: "Our primary observation is that water temperatures and sediment sources appear to be operating within their natural range of variability. The Forest Service believes, based on information from the 1940s to the present, that the mainstem North Fork Eel, particularly on Forest Service lands, is mostly still in its natural condition and that any impairment of stream temperature or sediment is due to natural causes and constraints. Data in the North Fork Eel TMDL and Forest Service data supports these conclusions (Fig 2-1, Fig 4-3 and enclosures).

Response: EPA has examined the available sediment source data to compare existing sediment delivery rates on Forest Service lands with the load allocations set in the TMDL and 125% of natural sediment delivery. The final TMDL includes analysis and conclusions that the USFS lands are already meeting the load allocations for sediment. Specifically, whereas this TMDL allows 20% of the total sediment delivery to be related to human activity, our data indicates that on USFS lands, only 10% of sediment from landslides is related to human activity and for small features only 13% of sediment delivered to streams from public lands was estimated to be related to human activity.

In regard to temperature, the analysis showed that the current condition is very close to the TMDL and desired condition (e.g. the shade resulting from natural riparian vegetation) on Forest Service lands in the North Fork Eel. We are not, however, able to conclude that the difference in current vegetation (compared to natural potential vegetation) is natural, because available information is limited. It is possible that the current condition is natural and that the current condition has not reached its natural potential due only to natural factors, such as fire and floods. Alternatively, past practices by the Forest Service may have allowed some harvest in the riparian area. Regardless, under the current Northwest Forest Plan standards and guides, riparian areas will be allowed to reach their natural potential.

Thus, current management practices by the Forest Service seem to have resulted in meeting the sediment load allocations and will, if they have not already, result in meeting the load allocations for temperature. The final TMDLs contain revised language to make this point more clearly. Although the State of California is responsible for developing implementation measures for the TMDL (adoption of an implementation plan by the NCRWQCB for the entire Eel River system is scheduled for December 2007), EPA supports continuation of the Forest Service's current management practices to minimize sediment delivery and retain riparian shade.

Comment 1.2: "In the draft TMDL this critical point <that USFS lands are close to their natural condition> is not very clear and should be highlighted."

Response: See response to comment 1.1.

Comment 1.3: "Disclosing this information is the first step leading to a potential de-listing of a watershed."

Response: Decisions related to listing under Section 303(d) of the Clean Water Act are the responsibility of the State of California, subject to EPA approval. The State Water Resources Control Board is scheduled to take final action on California's 2002 list in January 2003. At this time, they are proposing to retain the North Fork Eel on the list. The Forest Service should be aware that criteria for listing and delisting for the next cycle are not yet available. If the Forest Service believes that the North Fork, or some portion thereof, should not be listed in the next cycle, EPA recommends that they discuss the situation and provide supporting information to NCRWQCB staff.

Comment 1.4: "The Forest Service believes that separating the TMDL data by landownership would be useful in illustrating geographically where potential problems (if any) exist."

Response: The information available is insufficient to separate the sediment TMDL by landownership, however, EPA has estimated sediment delivery from Forest Service lands. This data shows that sediment from Forest Service lands is primarily natural. See response to comment 1.1.

Comment 1.5: "This <separating data by ownership) is particularly useful when developing a TMDL implementation plan."

Response: The final TMDL contains additional language on implementation recommendations. See also response to comment 1.1.

Comment 1.6: "The Forest Service believes that stream temperature within the mainstem, particularly on Forest Service lands, is naturally elevated and any "impairment" is due to natural factors. The basis for this conclusion is that there has been no timber harvesting within the mainstem corridor that has altered vegetative cover or shade and many surrounding tributaries currently provide cool water refugia for salmonids in the mainstem."

Response: Modeling completed for the TMDL analysis confirms the Forest Service statements that the mainstem is naturally elevated, but modeling was conducted ONLY for the area north of Yellowjacket. In this area, the model showed no changes in shade from the current condition to the "natural potential" condition. A point of clarification, current temperature conditions in the tributaries provide better conditions in some areas than the mainstem, but not cool water. Only Panther, Bluff and part of Cox Creek were <17° C.

Comment 1.7: "There is no evidence that grazing along the mainstem has altered vegetative shade to the extent that these activities would alter stream temperatures on a

watershed scale.”

Response: See response to comment 1.6.

Comment 1.8: “The Forest Service recommends that the model#2 existing vegetation scenario be used in modeling stream temperatures. Given that almost no historic timber harvesting has occurred within riparian areas on FS lands, particularly on the mainstem, the existing vegetation type and size of model #2 is the most realistic....

Response: EPA retains scenario #3 - Natural Potential - as the basis for the temperature TMDL. As explained in the TMDL, EPA believes that shade from natural potential vegetation best meets the water quality standard that temperatures not be altered from natural conditions. EPA does not have enough information on past practices to conclude that riparian areas, particularly along the tributaries, are at natural levels of shade. EPA has also added language interpreting the water quality standard as - natural shade shall not be altered. This should assist with concerns that the modeled information is not correct because natural shade can be determined on a site specific basis.

Comment 1.9: “The problem statement regarding impairment of stream temperature is somewhat confusing.” Commentor cites the TIR data, the model, riparian vegetation not manipulated by management. “Thus, why is there a need for a load allocation for temperature?”

Response: As discussed in response to Comment 1.1, although our analysis indicated that the current temperature condition in Forest Service areas is very close to the TMDL and desired condition, we were unable to conclusively determine that the water quality standard (no temperatures above natural conditions) was being met. Additionally, under the Clean Water Act, TMDLs are developed for waters on a State’s 303(d) list. In the North Coast, watersheds have been listed as large units. This has the advantage of forcing an analysis of how upstream sources are impacting downstream areas. During TMDL analysis, more refined information on the relative importance of sources (natural v. unnatural, landownership, geographic, type of source) are often uncovered and this can be fed into the next listing cycle.

Comment 1.10: “Forest Service standards and guides clearly do not allow for any vegetative manipulation that could influence stream temperatures in the tributaries of mainstem river.”

Response: EPA understands that current standards and guides do not allow vegetative manipulation in riparian areas that would adversely affect shade and thus stream temperatures. These standards and guides have not always been in place, and we do not have enough information to conclude that reductions in riparian vegetation have not occurred in the past. Also, we have no guarantee that the standards and guides will not be

changed in the future. EPA supports retention of standards and guides which protect stream temperatures.

Comment 1.11: “Do TMDLs apply to situations where the limitations are natural? ... if a system has naturally occurring high stream temperatures that are lethal or stressful for salmonids, do you still have temperature impairment and a need for a TMDL?”

Response: The Clean Water Act envisions several ways to address waters with elevated pollutant loadings. For situations where pollutants occur at elevated levels due exclusively to natural factors, it may be appropriate for the state to develop site-specific water quality standards. However, once a water is included on a state's 303(d) list, the Clean Water Act provides that a TMDL shall be established. Water bodies are sometimes listed when they do not meet State water quality standards due to natural factors because of lack of information, lack of analysis or because they are part of large watershed units. In the North Fork Eel and tributaries (and other North coast rivers and tributaries), EPA is not aware of any information or analysis available to the State or EPA prior to the TMDL analysis that indicated whether or not the monitored temperatures were natural.

In the case of the North Fork Eel River, EPA does not have an analysis to conclude that the only source of high stream temperatures is natural. There may be subwatersheds where water quality standards are currently being attained, but our analysis shows that this is not true for the watershed as a whole. If the Forest Service believes that the subwatershed(s) in which their lands are located are meeting water quality standards, they may wish to discuss dividing the watershed into smaller units for future listing purposes with NCRWQCB staff. Alternatively, the Forest Service may want to discuss with the NCRWQCB how to account for current practices that protect the riparian zone within the context of listing, delisting and/or meeting allocations. See also response to comments 1.1 and 1.3.

Comment 1.12: “ The temperature load allocation is not very clear and difficult to follow... the load is converted to percent shade for various tributaries and along the mainstem... having a load allocation implies that we have the ability to influence increases in shade, particularly when using Model #3 which is not a reflection of the natural environment.”

Response: The TMDL sets allocations for shade for various reaches of the North Fork Eel and its tributaries, based on model results. EPA recognizes that conditions within a modeled reach are not necessarily uniform, and that the modeled shade condition may not be the actual, on the ground conditions, at every location within the reach. EPA encourages the NCRWQCB to consider site specific conditions when developing measures to implement the TMDL. EPA has added text to the TMDL to clarify this point. See also response to comment 1.1.

Comment 1.13: “Since we have not modified the existing riparian canopy, why would we

have a load allocation for these areas?”

Response: See response to comment 1.11.

Comment 1.14: “Do we now need to go out and measure the natural existing shade and prove that natural conditions meet these “modeled” load allocations? If the natural existing shade does not match the “modeled” load allocations, the TMDL implies that we need to implement actions to move toward those load allocations. Modifying natural systems is not the intent of the TMDL, but that appears to be the case here...”

Response: The State is responsible for developing measures to implement the TMDL. EPA encourages the Forest Service to discuss future monitoring and assessment efforts with NCRWQCB staff. See also response to comment 1.12.

Comment 1.14: “The Forest Service believes that sediment “impairment” of the mainstem on Forest Service lands is attributable to natural causes and that the final TMDL should disclose the relative sediment contribution by landownership...”

Response: See responses to comments 1.1 and 1.4.

Comment 1.15: “Based on the load allocations... the Forest Service lands already meet the load allocation. The final TMDL should clearly state that the Forest Service has already met the sediment TMDL load allocations. This is a critical first step in potential de-listing of Forest Service lands within the North Fork Eel.”

Response: The final TMDL emphasizes that Forest Service lands are currently meeting the load allocations. See response to comment 1.1.

Comment 1.16: “The temperature model seems to be at odds with the field data we collected (e.g, Panther creek, Bar creek, etc.). Why are you using the model when we have real data?”

Response: The temperature model was developed using field data logger information provided by the Forest Service and others. Field data was not available for all locations. A model was used to estimate stream temperatures at additional locations, and to analyze the affects of changes in riparian vegetation on stream temperatures. The field data was used to calibrate the model, but as is normally the case in model development, a perfect calibration is not possible. Additional model calibration information is included in appendix A.

Comment 1.17: “In Figure 3-3 it looks like there are no streams with shade over 80%. Having been down in some holes (like Panther Creek) I find this hard to believe.”

Response: There are six processes that allow heat energy exchange between a stream and its environment: solar energy, longwave radiation, evaporation, convection, stream bed conduction and groundwater inflow/outflow. These energy processes have been closely studied by researchers in these fields, who have determined that there are mathematical relationships to account for effects. Researchers have found that the most important source of summertime stream heating is contributed by solar radiation and the SHADE model contains solar radiation elements (including direct beam, diffuse radiation and albedo - a reflectivity element) in its calculations. These effective shade percentages (reduction in heat) are not the same as the amount of the stream in shadow, although they are related concepts. Shade in the model and TMDL is defined as the percent of solar radiation reduced by riparian vegetation and topography. The vegetation calculations include factors for both canopy height and canopy density. The canopy density is limited to 80%. Given that the model limits the canopy density to 80%, no stream segment will have higher shade values.

Comment 1.18: "On pages 16/17 there is a statement about heat being added by mechanism other than direct sun. How is heat added when the stream is in 100% shade?"

Response: See response to comment 1.17.

Comment 1.19: "Turbidity - you mention comparing NFE to a paired watershed. Which watershed?"

Response: EPA recognizes that a number of issues related to targets and monitoring need to be developed further as the NCRWQCB develops measures to implement the TMDL. EPA encourages NCRWQCB staff to work with technical experts, including those from the Forest Service, and the public when developing monitoring and implementation measures. EPA encourages the Forest Service to consult with NCRWQCB staff before undertaking additional monitoring in response to the TMDL.

With regard to turbidity monitoring, EPA believes the NCRWQCB should evaluate a variety of approaches when developing monitoring plans, but EPA does not have a specific watershed in mind for pairing with the North Fork Eel.

Comment 1.20: "Bulk Samples - methods? Any consideration of surface armoring?"

Response: See response to comment 1.19.

Comment 1.21: "Embeddedness - methods?"

Response: See response to comment 1.19.

Comment 1.22: "Pool distribution and depth - text does not describe specific target."

Response: See response to comment 1.19.

Comment 1.23: "Stream crossings with diversion potential: The problem with diversions is not so much water draining "across and through the road fill" as [it is] water draining down the road away from the stream crossing. This results in the water carving a new channel down some hillslope and/or greatly increasing the discharge of an adjacent channel (leading to channel erosion). This is why diversions are so significant."

Response: EPA has clarified the TMDL accordingly.

Comment 1.24: "Sediment source analysis: Table 4-3 shows 84% natural, Table 4-4 shows 82% natural,.....so how do you get to 68% natural by Table 4-5?"

Response: The final TMDL relabels the above tables to provide further clarity. Table 4-3 is large features, Six Rivers National Forest only. Table 4-4 is small features, both USFS and private lands. Table 4-5 includes these numbers PLUS large features in the largely private lands in the southern part of the watershed.

Comment 1.25: "Public notice in Willits and Santa Rosa is great but what about something a little closer (like Eureka). If you really want feedback you should probably add the Times Standard, the Arcata Eye, and EcoNews."

Response: EPA determined the appropriate location for public notice by consulting with local residents. In addition, all the major landowners were notified.

Comment 1.26: "Who is responsible for all this monitoring and who pays?"

Response: The NCRWQCB is responsible for developing measures to implement the TMDL, including monitoring plans. Questions such as those posed by the commentor will be addressed as the NCRWQCB develops the implementation measures.

Comment 1.27: "Pg. 8. When describing the sedimentation conditions within the North Fork Eel it is necessary to be geographically site specific. 2nd paragraph citing Dresser: the riparian changes observed were only a small portion of the North Fork Eel on Forest Service lands. Did similar conditions occur off of Forest Service lands or was this unique to the very headwaters? Unless you are very sure, do not extrapolate to the rest of the basin."

Response: The final TMDL clarifies that Dresser's observations apply to a small portion of the watershed. No information is available for the rest of the watershed.

Comment 1.28: "Pg. 8 - state what the "good" ranges of sediment sizes are just like you stated good ranges of water temps for salmonids."

Response: The final TMDL has added information on sediment conditions in the mainstem on USFS lands that reviewed significantly more stream miles than the 3 SCI spot locations described above. The final TMDL includes a caveat on the data cited above; the data is Forest Service monitoring data and EPA does not have targets for this particular method.

Comment 1.29: "Pg 8 - You are implying that West Fork has deep pools when compared to shallower pools in Kettenpom. In fact, the West Fork was the most "hit" by the 1964 flood although looking at it today you would never know it. It looks very "recovered"."

Response: The pool data is from 1998, indicating a recovery in the West Fork.

Comment 1.30: "Pg 8 - You only discuss sediment conditions in the upper watershed on FS lands. Is there no comparable data on the lower basin on private lands? If there is some data, it would be good to state it."

Response: The embeddedness information (estimated visually) is from 16 streams throughout the watershed, both USFS and private. The final TMDL clarifies this.

Comment 1.31: "Pg. 10 - The temperature model predicted that 46% of the stream miles under current conditions would have inadequate or lethal conditions. How do you reconcile this modeling exercise with the TIR data (Fig. 2-1) that show for current conditions almost the entire length of the mainstem has inadequate stream temperature? ... it seems that the temperature model is giving you overly optimistic results."

Response: The TIR data is for the mainstem, including both USFS and downstream private lands. The model was for only the upper 5 watersheds, primarily USFS lands, including tributaries and the mainstem. The areas where the TIR data and the model overlap (the mainstem from river mile 28 at Yellowjacket to river mile 36 (confluence with west fork) both show similar results. This area of the mainstem was sampled by TIR to be primarily 19 - 24°C, with some locations over 24°C and none cooler than 19°C. The model predicted this same area as 19-24°C. The language in the final TMDL has been revised to be clearer.

Comment 1.32: "Pg.11 - qualify the statement from Dresser about widespread loss of riparian habitat. On Six Rivers lands, this was only a small part of the headwaters of the NFEel and not an explanation for why stream temperatures have "changed?" or are elevated."

Response: The final TMDL includes this qualification.

Comment 1.33: "Pg. 12 - Temp Model #3 - historical full growth model. When we walked the majority of the mainstem river on FS lands this summer, the lack of conifer presence that provided shade was very notable ...see attached photo log. Using the scenario #3 and assuming that conifer will provide shade I think is overly optimistic. I recommend using scenario #2 particularly since it represents essentially unmanaged riparian vegetation."

Response: EPA retains scenario #3 - shade from natural potential vegetation - as the basis for the temperature TMDL. However, we have revised the text to clarify that this scenario assumes that conifers will occur only in those areas currently with conifers. Areas of grassland and hardwood remain in those vegetation types. The model uses CALVEG GIS data. This data depicts only a very small area of the mainstem (from Yellowjacket upstream) composed of conifer vegetation type.

Comment 1.34: "Pg. 15 - Table 3-2. Why are there targets only for the 5 subwatersheds on Forest Service lands. It would seem that if you are doing a TMDL for the entire watershed, targets should be developed everywhere. If the targets were not developed due to lack of data, perhaps the development of a temperature TMDL is premature... regardless of court orders and time lines."

Response: The TMDL sets load allocations for effective shade for all streams in the watershed. Stream temperatures corresponding to the same effective shade conditions were estimated for five subwatersheds using a model. The resulting stream temperatures for the five subwatersheds are identified in the TMDL as the water quality targets for temperature for that area. EPA believes that this information assists the public and land managers by providing a clearer picture of what in-stream temperatures can be expected under natural conditions. EPA did not set water quality targets for temperature for the remaining portions of the watershed, due to resource constraints. We do not agree with the commentor that, however, that this is a reason not to establish the TMDL. The TMDL provides a justification for conserving and/or achieving natural shade and assists the public in interpreting stream temperature data in the context of both salmonid preferences and natural conditions.

Comment 1.35: "Pg. 17 - The logic in converting "heat" ly/day into shade and from there how you get a load allocation is not very clear. I had to read it several times and was still unclear. Unless you are actively harvesting or manipulating riparian areas (maybe industry can still do this but FS can't), how can you influence these wildland systems?"

Response: The text of the TMDL has been revised to clarify this section. See also response to comment 1.1.

Comment 1.36: "Pg. 18 Figure 3-3 Not sure I understand this figure? Are these shade allocations? In other words, are these the desired % shade on these segments of stream? If that is the intent, this is a pretty strange concept. The riparian areas on the NFEel are

wildland systems and not influenced by management. I don't think we can improve shade on these riparians and the intent of a TMDL is not to alter natural systems."

Response: The final TMDL includes more explanation of the shade load allocations, what they imply and how they are to be implemented. The Forest Service can have a load allocation without implying that past or future management is not protective. See also response to comment 1.1.

Comment 1.37: "Pg. 20 Deep pools...you should be made aware that at least one deep pool was monitored and it had DO levels that were lethal. Between the high temps on the top of the pool and the lethal DO levels on the bottom, the fish are truly in pinch. We do not know how pervasive these conditions are through the pools in the NFEel. Regardless, the NFEel is not a fish friendly stream!"

Response: The final TMDL adds information about dissolved oxygen and deep pools.

Comment 1.38: "Pg. 21 - In summary, state % sediment volume from natural vs management and break out by landownership (FS vs Private)."

Response: See responses to comments 1.1 and 1.4.

Comment 1.39: "Pg. 29 - Table 4.4 List the sediment data by landowners. Also, no land use association (natural) value of 82% does not match with the value of natural (62%) in Table 4-5. This is confusing. Separate all discussions of sediment by landowners since Six Rivers clearly has not contributed management related landslide sediment since 1975. It would be useful to display the sediment information over several time periods since undoubtedly the bulk of the historic sediment have arrived in short spurts associated with storm events. (see Landslide summary report as an example)."

Response: See response to comment 1.24.

Comment 1.40: " Pg. 32-33. Load Allocations - separate load allocations by landowner. It makes no sense to have a load allocation for lands on Six Rivers when our data show that we are not producing sediment from landslides. Need to show that Six Rivers is already meeting the load allocation."

Response: See responses to comments 1.1 and 1.4.

Comment 1. 41: The Forest Service sent a marked up copy of the draft TMDL that primarily noted clarifications, typos and other marks.

Response: The final TMDL was revised in a number of places based on the Forest

Service comments.

Comment 1.42: page 11 of draft. There is an important interaction between sediment and temperature that should not be disregarded.

Response: The final TMDL includes additional text on how increased sediment can affect stream temperatures through stream widening, loss of riparian vegetation and/or filling of pools.

Commentor #2 - North Coast Regional Water Quality Board, David Leland

Comment 2.1: "Chapter 1, paragraph 1. The primary purpose of the TMDL program on the North Coast is identified as protection of salmon habitat from excess sediment and temperature increases. Other beneficial uses are also affected by sediment and temperature increases, and are considered in TMDL development. These include municipal and domestic water supplant contact and non-contact recreation. In the Klamath River watershed, the focus of the TMDL program will be on increases in nutrients and temperatures."

Response: The final TMDL clarifies the above.

Comment 2.2: "Section 1.1, paragraph. 1. The north Fork Eel is designated by the state as Hydrologic Area 111.50."

Response: The final TMDL includes the above information.

Comment 2.3: "Section 1.3. Model River should be North Fork Eel River.

Response: The final TMDL includes the correction noted above.

Comment 2.4: "What is MWAT? MWAT as defined here is actually the maximum value of the 7-day running average, not the maximum week."

Response: The final TMDL includes the correction noted above.

Comment 2.5: "Chapter 3, Summary. It might be clearer to talk about the percentage of stream miles that are good to marginal, so that improved conditions show an increase in stream miles."

Response: The final TMDL revises the language as recommended.

Comment 2.6: "Section 3.1, paragraph. 2. The text equates beneficial uses with cold

water fish. This should be clarified to indicate that in the North Fork Eel the most sensitive uses and the focus of the TMDL are uses associated with the cold water fishery.”

Response: The final TMDL includes the clarification noted above.

Comment 2.7: “Examining the Role of Shade...Is it possible to offer any discussion as to why stream flows would be lower now than during the homesteading period? When was the homesteading period?”

Response: The final TMDL includes additional language on stream flow changes, which include possible - but not verified -changes in the fire frequency and climatic changes.

Comment 2.8: “Selection of Scenario...Target shade conditions should be set to the natural potential for species of the North Fork Eel. Although the current condition is natural, yet less than the natural potential, the trees continue to grow. The natural shade condition should be that which is provided by riparian vegetation at their full natural potential height and density, while making allowances for fire, wind, disease, natural mass wasting and other natural processes. Ultimately, the North Fork Eel temperature analysis shows that in order to attain the water quality objective for temperature set forth in the North Coast Water Quality Control Plan, there can be no reduction of stream shade resulting from human activities. The document should state this finding explicitly.”

Response: The final TMDL includes the recommended changes.

Comment 2.9: “Table 2-1 and Figure 3-1. The descriptors of the temperature ranges are different for several of the ranges.”

Response: The final TMDL uses consistent descriptors.

Comment 2.10: “Section 3.4 Load allocation for the rest of the watershed. Using a single value for all stream reaches not modeled will set an unachievable target for the larger streams, and will underestimate what is achievable under either Scenarios 3 or 4 in many tributaries. For the tributaries, this underestimate will not result in meeting the water quality objective of natural receiving water temperatures.”

Response: EPA is retaining a single average value for all stream reaches not modeled, because we do not have adequate information to set more site-specific load allocations. See also response to comment 1.12. If additional data and information is developed in the future, it may be appropriate for the Regional Board to revise the TMDL.

Comment 2.11: “Appendix B, Table 12. The results of the aerial photo analyses presented in Table 12 seem surprising. Although it is reasonable that the lower half of the watershed

has a much higher rate of sediment delivery than the upper half given the differences in terrain, the relative contributions reported in the table (93% coming from the lower half, 7% coming from the upper half) are surprisingly divergent. USEPA should review methods, assumptions, and calculations to verify this striking difference in sediment delivery rates.”

Response: EPA reviewed methods, assumptions and calculations in discussions with the PWA and USFS analysts who conducted the aerial photo analysis. The discussion included both senior analysts (William Weaver at PWA and Mark Smith at Six Rivers National Forest) as well as staff who conducted the aerial photo analysis. It was agreed that the basic identification of features on aerial photos was not an issue, as this is a fairly routine process for trained professionals. The USFS and PWA used the same equations and also thought that the depth assumptions of 6-8 feet was reasonable. The discussion focused on the differences in photos viewed (PWA was funded by EPA to view 1968, 1991 and 2000, while USFS viewed 1944, 1960, 1975, 1990, 1998) and how “relic” landslides were evaluated. It was determined that this was likely not a large factor as both PWA and USFS looked at vegetation patterns and stability through time. PWA looked at the absolute number of landslides during the more recent period 1991-2000 (36 landslides) and compared this to their estimates for the pre-1968 period (42 landslides), to see if this provided any indication that using less photo years could increase their sediment delivery numbers. However, given that the landslide frequency was similar this was also eliminated from consideration. Thus, the large differences in landslides feature observed during the most recent period (USFS 1 feature, PWA 36 features) was determined to account for the large differences, and no further investigation was undertaken.