



February 15, 2016

Via Electronic Mail

Mr. John W. Corbett, Chair

Board Members

Mr. Matthias St. John, Executive Officer
North Coast Regional Water Quality Control Board
5550 Skylane Blvd. Ste. A
Santa Rosa, CA 95403

Re: Upper Elk River: Technical Analysis for Sediment (Tetra Tech, 2015) and Proposed Adoption of a Basin Plan Amendment to the Water Quality Control Plan for the North Coast Region for the Upper Elk River Sediment Total Maximum Daily Load and Action Plan

Dear Chairman Corbett, Members of the Regional Water Quality Control Board, and Mr. St. John:

Humboldt Redwood Company (HRC) appreciates the opportunity to comment on the Upper Elk River Sediment Total Maximum Daily Load (TMDL) and associated Action Plan being proposed for amendment into the North Coast Region Water Quality Control Basin Plan. HRC recognizes and supports the NCRWQCB's longstanding desire to establish an effective and meaningful TMDL and implementation plan for the Elk River watershed. Matters of health and safety related to downstream flooding and water supplies have been reported now for nearly 20 years and have been pointed to as reason for intense scrutiny of upstream land use activities, primarily forest management related. As a result forestry practices were substantially modified over 15 years ago to reduce sediment effects, and harvest acreage limitations were established to address concerns over peak flows and landsliding. Cleanup and Abatement Orders (CAOs) were issued requiring the largest timberland owner in the upper watershed (PALCO) to inventory and remediate sediment sources originating from past practices to the maximum extent feasible. Rigorous timber harvest and watershed trends monitoring and reporting programs were established to evaluate compliance and effectiveness of the change in forestry practices and the watershed's response over time. Further modifications in forestry practices occurred in 2008 when Humboldt Redwood Company acquired the PALCO timberlands and immediately eliminated the use of clear-cut harvest practices and harvest of old-growth timber. The substantial reduction in sediment inputs to the system as a result of these actions is well documented (Tetra Tech, 2015; HRC, 2015; HRC 2014; SHN, 2013; Oswald, 2012; Sullivan and Simpson, 2012; Sullivan and Manthorne, 2012; Sullivan and Dhakal, 2011).

Success in minimizing timber harvest related sediment inputs and riparian impacts in the upper watershed has allowed for ongoing recovery of the upper watershed and has reduced downstream effects from what they might have been otherwise. However it is becoming apparent that this success can do little to increase the sediment and streamflow carrying capacity of the mid and lower channel reaches. The extent to which improvements in water quality itself (i.e. suspended sediment concentration and turbidity) have been made cannot be quantified since water quality conditions were not measured in the 1990s and prior during periods of substantially less restrictive logging practices. Available water quality monitoring data from 2003 to present indicates a relatively static condition throughout most of the upper watershed with suspended sediment concentration yields and turbidity strongly correlated to rainfall frequency and intensity.

The Upper Elk River: Technical Analysis for Sediment (Tetra Tech, 2015) concludes that despite a significant reduction in timber management related sediment delivery, stream channel, banks, and floodplain continue to aggrade; and therefore revisions to existing Waste Discharge Requirements (WDRs) must be made to further reduce sediment loading in combination with instream sediment remediation and channel restoration activities if a condition of watershed 'dynamic equilibrium' is to be achieved. The Tetra Tech Report (TTR) defines dynamic equilibrium as a condition in which suspended sediment entering the TTR designated 'impacted reaches' equals the volume of sediment exiting these reaches, and ongoing aggradation is abated.

Dr. Lee MacDonald, consulted as a third-party expert, provides his scientific opinion on the information, concepts (including *dynamic equilibrium*), and strategies contained within the TTR relative to the feasibility of proposed TMDL targets and actions necessary to achieve or trend towards these targets. Dr. MacDonald's detailed technical comments regarding the TTR and TMDL are being submitted under separate cover by him at the request of HRC. Discussions with Dr. MacDonald and review of his written comments, in combination with our understanding of the environmental effects of forestry operations lead us to conclude the problem statements found in both the TTR, and more pointedly the proposed Basin Plan amendment, are oversimplified and place excessive and arbitrary emphasis on the effect of contemporary timber management on downstream conditions.

The TTR, extensively referenced in both staff's proposed WDRs for HRC timberlands (Draft Order R1-2016-0004) and the proposed Basin Plan amendment, does not evaluate the HRC Report of Waste Discharge (ROWD, 2015) in sufficient detail to make any specific findings as to the effectiveness of the sediment prevention and minimization measures and strategies presented therein. Instead, the TTR relies primarily upon floodplain channel conditions, along with hypothetical forestry impacts, to support a pre-determined recommendation that additional forestry restrictions must be warranted. The heavy reliance upon floodplain conditions to support this conclusion, including the proposed unusual assignment of a zero (0) TMDL allocation, is further confounded by the TTR's misguided application of the concept of 'dynamic equilibrium'.

Important to understanding the relative effect of contemporary forestry practices on total sediment loading is the establishment of a reasonable estimation of natural background loading; and the discernment of contemporary timber management loading from that of pre-existing chronic legacy

sources. MacDonald provides a detailed analysis of natural sediment loading suggesting inherent rates are substantially higher than those presented in both the TTR and HRC Watershed Analysis (2014). This finding suggests that the HRC watershed analysis estimate of contemporary forestry-related loading (~48 tons/mi²/yr; HRC 2014) is less than 10 percent of total loading. This amount is not only offset by ongoing legacy source remediation activities, such as upstream crossing decommissioning or upgrading and removal of unstable fills threatening discharge, but is itself minor, relative to total sediment loading and downstream land use affecting channel conditions such as levees and dikes limiting off-channel capacity and converting estuary and wetlands to productive agriculture, and other channel constrictions associated with floodplain roads and bridges.

It is promising to see the TTR and TMDL Action Plan call for attention to the floodplain as downstream land use and infrastructure, combined with inherent geomorphic setting and sea level rise are likely the primary factors controlling conditions and behavior of the lower Elk River. While we are concerned the TMDL presents an unrealistic theoretical future in which a further significant reduction in loading combined with removal of 600,000 cubic yards of sediment from the affected reach results in a self-maintaining, non-aggrading floodplain channel condition; we do agree the Elk River Recovery Assessment and Stewardship Project can, with good leadership and participation, strategically address TMDL objectives of reducing flooding impacts, improving domestic and agriculture water supplies, and enhancing the existing relatively productive Elk River fisheries. These efforts should not be limited to in-channel and off-channel solutions, but should also look to infrastructure improvements. Such improvements may include floodplain-sensitive road and bridge design and alternative access routes, and alternative domestic water supply sources such as community wells or annexation by the Humboldt Bay Municipal Water District. It is for this latter reason we are particularly pleased to see the County of Humboldt in a leadership role in the Stewardship Project.

Recommendations

In this section we provide specific recommendations to the NCRWQCB which we believe would significantly improve the Elk River TMDL prior to adoption. Much of the technical detail in support of these recommendations can be found in Dr. Lee MacDonald's comments.

The proposed basin plan amendment *problem statement* (page 2) declares sediment discharge from timberlands *alone* as responsible for exceedance of water quality objectives and flooding rather than presenting a more balanced and accurate summary of the problem. Residential rural development and associated infrastructure located on the floodplain, along with the cumulative effects of longstanding downstream agricultural land use share the stage with upstream timber management influences on the current condition and carrying capacity of the 'impacted reaches'. There is substantial evidence indicating that significant floodplain modification over the last 150 years combined with sea level rise and lack of stream channel management all play a prominent role in how the mid and lower stream channel and floodplain function. The unusual bifurcation of the Elk River watershed in this proposed TMDL resulting in exclusion of the lower watershed and historic estuary immediately downstream of the 'impacted reach', suggests an underestimation of the effect the conditions the lower channel and associated floodplains have on the impacted reaches' capacity to transport sediment and streamflow.

We respectfully request that both the TMDL and Action Plan more fairly and accurately represent the complexity of land use history and inherent environmental circumstances and that the TMDL include the entire Elk River watershed. **(Recommendation 1)**

In support of the basin plan amendment problem statement, the proposed Action Plan source analysis (page 2) limits its description of primary land-use related factors to timber harvest, logging roads, and historic logging practices. Neither the Tetra Tech Report (TTR) nor the proposed basin plan amendment, discern in any meaningful detail the difference between persistent chronic sediment sources originating from historic logging practices (i.e. pre 1974 establishment of the California Forest Practice Rules; pre 1999 establishment of the HRC Aquatic Habitat Conservation Plan), and sediment generated from current state-of-the-art forestry practices. This missing distinction is critical to understanding the significance of contemporary forestry operations relative to downstream channel conditions. The *physical change* in practices beginning in 1999 include the establishment of enhanced riparian zones and no harvest areas adjacent streams, use of slope stability models and licensed geologists to investigate and avoid impacts to unstable areas, changes in logging techniques reducing ground disturbance, and requirements to upgrade logging road conditions and restrict use during periods of wet weather. Persistent chronic sediment sources originating from pre-1999 practices dating back many decades are addressed and remediated to the extent feasible as part of contemporary forest plans. The details of current forestry practices are readily available (HRC ROWD, 2015; California FPRs, 2015). It seems reasonable considering their demonstrated effectiveness in sediment prevention and minimization they be considered for adoption by the NCRWQCB in the form of Waste Discharge Requirements (WDRs) in compliance with CWC 13360 prior to being pre-empted by the TTR or TMDL Action Plan. We note comment letters provided by CDFW (January 20, 2016) and CAL-FIRE (January 26, 2016) in support of HRC's current practices as effective in erosion control and comment by NOAA (January 15, 2016) suggesting efforts to most effectively address downstream TMDL concerns should now be focused downstream. **(Recommendation 2)**

It also seems reasonable and necessary that a description of current forestry practices pursuant existing Aquatic Habitat Conservation Plans (AHCPs) and the Board of Forestry Forest Practice Rules (FPRs) be referenced in the 'Source Analysis' and the 'Watershed Efforts' sections of the proposed TMDL Action Plan. In addition, significant actions taken in the Elk River watershed such as the estimated 350,000 cubic yards of sediment removed or prevented from entering the stream system since 1999, including the strategic decommissioning of 45 miles of historic logging road for the purpose of erosion control on HRC timberlands should be acknowledged as critical to watershed recovery. No mention of these measures is currently noted in either the TTR or proposed Basin Plan amendment. **(Recommendation 3)**

Comparison of the proposed Elk River TMDL's natural loading estimates to other adopted TMDLs for north coast California streams suggests Elk River has *inherently lower sediment yields* than other coastal watersheds located on more competent, less erosive terrains. However, softer localized terrain present in the mid and lower Elk River watershed combined with local tectonic uplift rates make for inherently higher natural erosion rates and sediment yields. Measured in-stream sediment yields support the contention Elk River has several sub-watersheds with inherently high sediment concentrations. This,

along with Dr. MacDonald's comments regarding Elk River sediment loading, suggests the TMDL should assign a higher natural loading estimate prior to Board adoption. **(Recommendation 4)**

The level of anthropogenic loading presented in the proposed TMDL, on the other hand, is too high for several reasons:

- The proposed TMDL ignores field verified measurements provided by HRC and Green Diamond Resource Company resulting in overestimates of stream channel densities on managed lands by one-third (33%). This overestimation significantly effects TMDL calculations for management-related bank erosion and streamside landslides.
- The proposed TMDL assigns the majority of streamside bank erosion and small streamside landslides to management activities in a manner *inconsistent* with the findings of the report from which the overall rates were developed (SHN 2012).
- The TMDL contends low order channel headward migration is occurring on managed lands at a perpetual rate distinct from unmanaged lands. Studies undertaken to document this phenomena have found no physical evidence in support of this theory.

The importance of understanding and accurately depicting the relative proportion of sediment loading sources in the TMDL is critical to the Board determining feasible TMDL targets and where action should be focused to effectively address flooding, water supply, and other beneficial use concerns, including whether or not any additional sediment prevention and minimization measures beyond those detailed in the HRC ROWD should be required. We ask that the TMDL use the best available science relative to stream densities and the calculation of associated inputs, remove low order channel incision and headward migration as a management-related source, and rely upon the findings of the SHN streamside landslide and bank erosion report in allocation of these sources as background or management-related. **(Recommendation 5)**

While we generally support the TTR list of hillslope Water Quality Indicators (WQIs) and numeric targets, there are several minor modifications to items listed in Table 2 of the proposed Action Plan (page 4) that would benefit the logic and feasibility of the TMDL WQIs and associated targets:

- (1) 100 percent of road segments cannot be hydrologically disconnected from watercourses. We recommend the target read: *road segments should be hydrologically disconnected from watercourses to the extent feasible* (generally >90% in coastal watersheds).
- (2) It is not necessary that 100% of harvested areas have ground cover in order to prevent surface erosion. We recommend the target read: *harvested areas have ground cover sufficient to prevent surface erosion deliver.*
- (3) We are uncertain as to what is meant by *a less than 10% increase in peak flows in 10 years related to timber harvest*. Perhaps the intent is less than a 10% increase in peak flows on an individual instantaneous peak flow basis considering cumulative harvest conducted over a prior rolling ten year period? The area associated with this target currently reads Class II/III catchments, however assessment of peak flow effect is typically done at a larger scale, which we

would suggest for the purpose of implementation should be identified as individual sub-watersheds or sub-basins (a term used in both HRC's ROWD as well as staff's proposed watershed-wide WDRs).

- (4) The restoration of riparian function is a valid and important indicator, however, the specification of *300 feet on either side of a Class I or II watercourse and 150 feet on either side of a Class III watercourse* does not appear supported by any specific line of reasoning in the TTR. As pointed out in the CAL-FIRE comment letter (January 26, 2016) regarding the draft WDRs for HRC, detailed review of scientific literature available on the subject of necessary riparian widths to provide for maintenance and restoration of aquatic function and water quality upon which the State's FPRs for anadromous salmonid watersheds are based, have found buffer widths similar to those presented in the HRC ROWD as typically sufficient. The CAL-FIRE letter goes on to note that additional riparian protection can and should be applied on a project by project basis where site conditions (e.g. slope stability) warrant. We recommend the WQIs for Class I, II, and III streams be consolidated and simply read *characteristics of riparian zones associated with Class I, II, and III watercourses*.

(Recommendation 6)

We agree modification of channel conditions at strategic locations within and downstream of the TMDL designated 'impacted reaches', combined with other downstream strategies addressing infrastructure, provides the greatest opportunity for reducing flooding impacts. Sediment and stream flow modeling and implementation of pilot projects as being coordinated under the active Elk River Recovery Assessment are important steps in evaluating short and long term means for expanding carrying capacity. However the establishment of a 'steady-state' channel cross-sectional area as a specific WQI seems premature until the Elk River Recovery Assessment has had the opportunity to test the TTR theory of *dynamic equilibrium*. Recognizing approximately 25% of the total suspended sediment load that enters the impacted reach currently becomes temporally entrapped, while the remaining 75% passes through (Tetra Tech 2015), is it reasonable to believe that this 25% can be reduced to 0%, and that aggradation in a <1% gradient stream channel can be eliminated completely without substantial routine channel maintenance?

The proposal to establish an *off-property* targeted downstream channel condition that is linked to the proposed WDRs and our forestry activities, is unfounded. The scientific evidence does not support the TMDL's current underlying contention as presented in the TTR, proposed WDRs, and Action Plan, that channel conditions in the impacted reach are a reflection of the effectiveness of HRC forestry operations on the hillslope. *There are other significant inherent and anthropogenic factors at play dictating the channel's behavior as it flows across its floodplain*. The evaluation of the effectiveness of HRC forestry practices for the purpose of regulation and meeting waste discharge requirements should be made *on the hillslope* through investigation for significant sediment discharge sources (SDS) related to HRC land use activities. We would ask that the TMDL *remove its two phased approach* linking upstream forestry WDRs to downstream off-property current and future channel conditions. **(Recommendation 7)**

The other instream indicator presented in Table 3 of the proposed Basin Plan amendment (page 4-5) is chronic turbidity. The numeric target relative to salmonid feeding appears to be currently being met as

salmonids are found throughout their historic range in the watershed and are feeding year around as evidenced by their year around presence, including relatively abundant returns in recent years based on available data (HRC, 2014). Domestic and agricultural water supplies are currently being pumped from Elk River however water quality for the purpose of domestic water supplies remains a significant concern. The 'numeric targets' presented in Table 3 are not quantified and therefore, as presented, cannot be evaluated for feasibility of achievement. Concerns remain that without a specific target to evaluate there may remain a significant gap in what RWB staff interprets the TMDL target to be and what is inherently feasible considering watershed setting and land use history. We understand the intent of the target being *a reduction in overall turbidity exceedance times* and believe a more general measureable target such as this is more appropriate, absent the establishment of specific feasible numeric targets. **(Recommendation 8)**

The TMDL proposes an indefinite 'zero load' allocation based on the condition of specific stream channel reaches, banks, and floodplains until the sediment and streamflow capacity of the affected reaches can be expanded. The recommendation is confounded by the Action Plan's acknowledgement that no "amount of land use restriction and channel restoration can physically result in zero loading of sediment." Because the weight of evidence does not support the inferred contention that affected reaches conditions are a reflection of upstream sediment loading alone, but rather a reflection of inherent watershed setting, downstream land use activities, contemporary sea level rise, *and* sediment loading; we ask that the Board to consider the establishment of a load allocation consistent with other coastal stream TMDLs (e.g. 125% of background). **(Recommendation 9)**

In closing we again emphasize that HRC recognizes and supports the NCRWQCB's longstanding desire to establish, in the near term, an effective and meaningful TMDL and implementation plan for the Elk River watershed. Based on the input provided by Dr. Lee MacDonald, and the understanding of our own science team in discussion with others including representatives from state and federal agencies, we believe careful consideration of the recommendations provided herein, along with Dr. MacDonald's comments, will serve to accomplish a scientifically defensible TMDL and effective implementation plan for Elk River. We therefor ask that the Regional Board not approve the TMDL and Action Plan as proposed but, rather, direct its revision to be consistent with the extensive science and documentation referenced herein and in Dr. MacDonald's submission.

Thank you for your consideration.

Sincerely



Michael W Miles
Director Forest Science

References:

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