11/15/06 Bd Mtg
Shasta River
Deadline: 11/1/06 12 pm

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COMMENTS ON PROPOSED SHASTA RIVER SEDIMENT TOTAL MAXIMUM DAILY LOAD AND ACTION PLAN

To

STATE WATER RESOURCES CONTROL BOARD

Chair Tam Doduc and Members of the State Water Board

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U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 9

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Coast Action Group submits these comments in review of the North Coast Regional Water Quality Control Board's (RB) Staff Report for the *Staff Report for the Action Plan for the Shasta River Watershed Temperature and Dissolved Oxygen Total Maximum Daily Loads* (Shasta TMDL).

It is understood that the Board requested submittal of additional comments concerning flow related issues and other limited language changes. It is important to point out that not only is the flow issue important in of itself. The issue of flows can not be separated from many of the limiting factors and existing conditions on the Shasta River – including but not limited to elevated temperature, lack of Dissolved Oxygen, nutrient loading, and pH.

Coast Action Group would like to remind the Board the actions necessary to Implement (the Action Plan) the TMDL must be adequately described, there must be reasonable assurance of success in

meeting Water Quality Standards, and there must be timelines and monitoring to assure and test efficacy.

The Shasta TMDL Action Plan language is comprised of language that is insufficient in ability to meet Water Quality Standards due to the fact that a significant amount of language in the Action/Implementation Plan is unenforceable. However, there is sufficient comment in the file on flow needs and the flow relationship with conditions related to the other noted pollutants that points to the necessity to for the Regional Board (and SWRCB) to enforce minimum flow standards . Flow maintenance (45 cfs recommended) as part of the Action/Implementation Plan must be accomplished to remedy the noted conditions.

The issues of dealing the problem related to unenforceable language can be addressed in several ways (including use of Waste Discharge Reporting and/or Conditional Waivers). These options are discussed later in this paper.

Thus we will go first to the flows discussion - with general comment. There is additional comment on is flows related and other pollutant related conditions included later in this paper.

Maintenance of Flows – TMDL Action/Implementation

There is sufficient evidence in the file to show that diminished flows are linked to impaired conditions. The Regional Board did a good job in there analysis with information (data), and allocation analysis with targets that justify the absolute need for maintaining a minimum by-pass flow of 45 cfs.

The analysis and data establish TMDL compliance with Water Quality Standards, where pollutant source analysis for temperature conditions (and other pollutant loading conditions) show that cold water inputs must be maintained at 45 cfs if stream temperature is to be lowered to a acceptable target (a 5 degree reduction in stream temperatures). The absence an acceptable number, as a numeric target, would make policy assuring movement towards WQS unenforceable. Lack of such numeric target, related to flow maintenance, and supporting analysis would make the TMDL and Action Implementation Plan non-compliant with the necessary legal mandates under both the CWA and State Water Code

The Basin Plan has a non-degradation objective - that is currently being violated. Temperature sensitive habitat is being degraded. Flows are a controllable issue and inputs of additional pollutants (in this case elevated temperature) are not permissible.

Habitat is currently in a degraded condition. A flows target to lower instream temperature by 5 degrees is necessary to meet WQS. Additional stream shade is important. Stream shade alone can not reach the stated target. Affects from stream shade recruitment will not be seen for at least 40 years. **Note: Maintenance of the instream flow target is supported in the Peer Review in the file by Dr. Coutant**.

Return flows (alone) will not solve the problem as they are insufficient, they are too warm, and they contain additional pollutants.

The RB has gone to great lengths to show the linkages with flows and temperature. The RB has provided sufficient analysis and calculation to show that the 45 cfs target is need to address the temperature issue to meet Water Quality Standards - address issue related to Beneficial Use Protection (Cold Water Fishery, Spawning) and meet Basin Plan Water Quality Objectives.

The data and analysis has established that flows are critical to meeting WQS. Additional cold water is need to meet WQS, protect Beneficial Uses and conform to the Water Quality Objectives in the Basin Plan. Failure to address flows, analysis and allocation, and flow targets would make this TMDL non-compliant with the mandate of, both, State and Federal Code.

Without temperature lowering the WQS cannot be met. The temperature objective and Beneficial Uses (Cold Water Fishery and Spawn) cannot be protected. Thus, without support for minimum flows the TMDL Action/Implementation document would not address the necessary mandated issue (as provided by the Regional Board analysis - source analysis, allocation, and flow objectives)

There is concern that the 45 cfs target minimum flow implementation will impact only certain diverters. The Division of Water Rights (SWRCB) will have to take charge of any allocation analysis (if needed) and spread the impact of reallocation over all diverters/users.

There are reasonable opportunity and feasible methods to make sufficient cold water available to support the 45 cfs minimum flow requirement. The SWRCB and Division of Water Rights must address the issue of wasteful practices, and diversion license condition enforcement in allocation analysis.

The water quality compliance scenario in temperature TMDL (Implementation) recommends a 50% increase in flow from Big Springs Creek. We agree that this is one scenario with potential to helping with flow issues. The TMDL Action/Implementation does not lay out a clear path for how such a substantial increase in flow could be achieved. The RB proposes to take no action to increase flows to improve water quality for five years. This is a long time, given the stock status of Klamath River salmon. Affecting this change should take no longer than two years. Implementation relies heavily on voluntary measures. RB language stressing the ability to follow up with enforcement helps, yet there is no assurance of compliance and/or description of actions to take place.. The implementation plan proposes good ideas for how to manage tailwater return flows, riparian areas, and rangelands.

Water Quality Objectives and Flows

The RB staff presented more than adequate discussion and analysis supporting the flow target and linking lack of flow with elevated temperature. More science and linkage analysis could be developed, and presented, linking low flows to other pollutant problems – lack of DO, nutrient loading and cycling, and pH – all of which are limiting factors. There is no question that low flows adversely affect all of these pollutant factors. Remedy to fixing the problems related to these factors relies on the TMDL Action/Implementation Plan ability to support the 45 cfs flow target.

The pollutant pH not considered: "Narrative and Numeric Water Quality Objectives applicable to the Shasta River basin TMDLs" should also include the *Basin Plan* water quality objectives for pH in the Shasta River. The Shasta River is not officially listed as pH impaired, summer pH values in mainstem Shasta River are extremely high (>9.5), and are unequivocally related to nutrients and DO.

The pollutant pH directly affects salmonids, with pH levels above 8.5 being stressful and pH 9.6 being lethal (Wilkie and Wood 1995). Ammonia toxicity increases with pH (U.S. EPA 1999). High maximum pH and high diurnal ranges of pH are often symptomatic of nutrient enrichment and excessive growth of aquatic plants, which makes pH a highly useful index of photosynthesis. As described in Chapter 4, the primary cause of the low dissolved oxygen problems in the Shasta River is excessive respiration by aquatic plants. Analysis of pH data is a valuable tool to help understand the spatial and temporal dynamics of DO and nutrient impairment (Kier and Associates 2006).

The pollutant pH should also be specifically mentioned in this sentence on page 2-24, "In this context for the Shasta River TMDL, Regional Board staff define nuisance aquatic growth as that which contributes to violation of numeric water quality objectives (particularly dissolved oxygen) or adversely affects beneficial uses."

Temperature Requirements of Salmonids: This section presents the best available science, including from U.S. Environmental Protection Agency (2003).

Temperature Conditions of the Mainstem Shasta River: Indicates the seasonal variability versus life history requirements, duration of stressful conditions and the temperature profile of the river from Dwinnell Dam to the convergence with the Klamath River.

The TMDL states "Weekly maximum temperatures exceed the spawning, incubation, and emergence threshold (i.e. MWMT of 13°C) at all Shasta River reaches from April through June, and during the second half of September." Data shows temperatures are above 13°C until mid-October, not September. This should be corrected.

Temperature Source and Linkage Analysis:

Stream Heating Processes - This section presents a good description of how the Shasta River warms.

Shade - On page 3-6, there is discussion of a reach at river mile 37.3 shown in Figure 3.2 where the riparian vegetation noticeably changes from sparsely vegetated to densely vegetated, coincident with a 4 degree drop in temperature. It seems unlikely that riparian vegetation would rapidly cool temperatures by 4 degrees C. As Dr. Coutant points out in the peer-review (Appendix I) another possibility is that hyporheic exchange cooled the water.

Nutrient Criteria:

> "Nutrients do not directly affect salmonids, but impact them indirectly by stimulating the growth of algae and aquatic macrophytes to nuisance levels that can adversely impact dissolved oxygen and pH levels in streams. The concentration of nutrients required to cause nuisance levels of periphyton varies widely from one stream to an-

other. Detailed data analysis is required to determine relationships. U.S. EPA (2000) and Tetra Tech (2004) provide excellent summaries of the literature on these analytical methods and will not be repeated here. Such analyses have not yet been conducted on the Shasta River."

The nutrient concentration required to cause impairment in a stream varies widely according to many factors, thus the more specific the analysis the better. Thus, we cannot see any justification for the TMDL to use the numbers presented Dodds et al. (1998) derived from across North America and New Zealand, rather than the USEPA (2002) criteria derived from data in Nutrient Ecoregion II (Western Forested Mountains) of the western United States. We recommend that both Dodds et al. (1998) and USEPA (2002) remain in the literature review presented in 2.5.1, but that when analyzing Shasta River nutrient data in section 2.5.2 (Shasta River Watershed Nutrient Conditions), the USEPA (2002) recommended criteria should be used instead.

Total Phosphorus: Consideration of total Phosphorus inputs has left out contributions from land use.

Total Nitrogen: Consideration of N inputs and complex relationships are not considered in sufficient depth, except to understand that there is a problem. . The real problem with nutrient sources, which the TMDL repeatedly overlooks, is the total amount of nitrogen (in all forms) contained in those nutrients sources and its stimulation of aquatic plant growth. This occurs throughout the Staff Report and the *Basin Plan* amendment language, and should be corrected.

The TMDL should also recognize that the form of nitrogen is also important (as inorganic forms of nitrogen such as ammonia and nitrate are available to immediately stimulate plant growth). The statement "Total nitrogen values in springs are generally within the mesotrophic boundary" (p 2-30) is inconsistent with the rest of the nutrient discussion. The statement should be changed to "Total nitrogen values in springs are several times higher than the USEPA (2002) recommended ecoregional criteria."

Little evidence is provided to support the statement that "Maximum total nitrogen levels in the mainstem Shasta River increase in a downstream direction." Table 2.8 provides total nitrogen data on the Shasta River near the headwaters, Shasta River above Dwinnell, and then lumps all mainstem sites below that as "Shasta River below Dwinnell Dam." To support that statement, the sites below Dwinnell Dam should be analyzed individually. Appendix B of the TMDL contains USGS and RWB data from 2002-2003 indicating that the patterns at sites below Dwinnell Dam are complex and that analysis of the data is confounded due to the use of a laboratory with inadequate detection limits for Kjeldahl nitrogen.

Nutrient Affects - Potential Municipal and Domestic Water Supply and Contact Recreation Impairment : Discussions of Dwinnell Reservoir in Section 2.5.2 note increased nutrients as compared to reaches of the Shasta River above, but do not mention the role of the nitrogen-fixing blue green algae *Anabaena flos-aquae* as one of the sources of nutrient pollution (though it is later in the document in Chapter 4). *Anabaena flos-aquae* is correctly noted in the text to be a producer of anatoxins.

Flows and Pollutants

Nutrients and Flows: The TMDL is lacking in linkage and analysis (and modeling) regarding the relationship of flows and their effects on pollutant levels – or how increased flows might limit the effects of N, P, and pH conditions.

Tailwater Return Flows: The attribution of warming in Big Springs Creek to diversion and agricultural return water is correct:

Tailwater Return Flow Quality – Effect on DO; The most important mechanism by which tailwater returns affect DO is not included in the bullets on page 4-15. Tailwater returns are increasing nitrogen levels in the Shasta River, which can increase growth of aquatic plants. As shown in Chapter 7, respiration of aquatic plants, stimulated by high nutrient levels, is by far the largest contributor to dissolved oxygen demand in the Shasta River. While it is worthwhile to mention that tailwater returns do increase nitrogenous oxygen demand of the Shasta River, the most significant effect of tailwater on oxygen demand is to increase total nitrogen levels and stimulate aquatic plant growth

Flows – DO Effects: This section does not mention a third important way in which flow affects dissolved oxygen. We recommend that the following text be added to the last sentence in this section (after "…caused by photosynthesis and respiration.") on page 4-21:

> Flow can affect dissolved oxygen through its effects on water temperature. For instance, larger volumes of water have a higher thermal mass are more resistant to heating and cooling. So if a large volume of water is cool (i.e. from a spring-fed creek such as Big Springs) it can travel downstream and retain its low temperature. Low temperatures allow water to water hold more dissolved oxygen. Through this mechanism, flow can affect dissolved oxygen.

Fish and Flows: The Shasta TMDL does not address the October 1 deadline for shutting off stock water and increasing stream flows for fish passage. Snyder (1931) noted that fall Chinook salmon entered the Shasta River in September. Fish now delay their migration until after October 1 because of lack of sufficient flow and associated warm water temperatures. This delayed pattern of entry into the Shasta River is manifest in both wet and dry years. Fall chinook forced to sit for weeks in stressful Klamath River conditions likely have reduced fecundity. This intensive selection pressure likely selects for later run timing.

The fish distribution map indicates that Big Springs is not currently salmonid habitat yet the California Department of Water Resources (1981) *Klamath and Shasta River Spawning Gravel Enhancement Study* showed a huge concentration of fall chinook spawning Big Springs Creek. This is a tangible indication that Big Springs Creek was a significant refugia for Pacific salmon in the early 1980's before reduction of flows due to ground water pumping.

Groundwater Accretion / Spring Inflows: This section of the TMDL contains good discussions of why groundwater accretions and spring inflows are important to water temperatures in the Shasta River. Groundwater accretions and spring inflows are not included in the TMDL's water quality model.

Hyporheic function: The TMDL should consider the potential of hyporheic function. Connection of surface water to these sub-surface waters is recognized as having a potential cooling influence (Poole and Berman, 2001; U.S. EPA 2003). It is important to note that this is a different mechanism than springs or groundwater accretion. It is not "new" cool water that dilutes the warm river water, but rather that warm river water enters the sand/gravels of the hyporheic zone and then re-emerges cooler, with no net effect on the amount of water in the stream. While magnitude and distribution of this effect in the Shasta River is unknown, it may be significant (and likely the cause of the cooling described in section 3.3.2 and shown in Figure 3.2). As Dr. Coutant mentioned in his review, the model could potentially simulate this effect: As noted by Dr. Coutant, failing to include this mechanism would lead to incorrect findings

Lake Shastina and Minor Impoundments: This section does not mention two of Lake Shastina's most important effects on oxygen demand in the Shasta River:

1. Shastina reduces peak flows, allowing organic matter and fine sediments to accumulate in the channel, contributing to oxygen demand via macrophyte respiration, and
2. Shastina increases nitrogen concentrations, stimulating aquatic plant growth and hence contributing to oxygen demand via macrophyte respiration.

Implementation

The RB and SWRCB have are required to take actions to attain WQS (water quality objectives and beneficial protection and restoration) The final TMDL Action/Implementation plan must assure movement towards attainment of WQS by adoption of the *Shasta TMDL Action/Implementation Plan* in to the *Basin Plan* (NCRWQCB, 2001). If there are multiple ways to meet the objectives, we support giving landowners the flexibility to decide how they want to meet those objectives. For example, if other regulatory and policy processes such as the *Shasta Incidental Take Permit* (SCROD, In Draft), *Coho Recovery Plan* (CDFG, 2004), and Timber Harvest Plans will result in the attainment of water quality objectives, then further regulation by the RB is not necessary.

Duplicative and overlapping regulation benefits no one. Unfortunately, these other processes often rely on voluntary measures that neither guarantee that water quality problems will be remedied nor that TMDL objectives will be achieved. When other policy approaches and voluntary landowner actions fail to achieve the TMDL objectives, then the RB must use its considerable regulatory and enforcement authority to take necessary actions to ensure results.

The Shasta TMDL does not set a clear monitoring program, leaving it until a year after TMDL approval. It would seem wise to encourage continuation of specific ongoing monitoring efforts of relevant parameters before the more comprehensive plan is drafted.

TMDLs and TMDL Action Plans Should be Consistent with Other State Policy

The State Non-Point Source Policy mandates regulation of pollutants by use of Waste Discharge Permits, Conditional Waivers (related to the WDRs), and/or Prohibitions. The word voluntary is not in the lexicon of the State Non-Point Source Policy. Voluntary Implementation proposal should be considered, if and only if, such proposal meets the standards necessary under Section 12342 of the State Water Code, with adequate descriptive language for the proposed actions that

includes performance standards and timelines, with performance monitoring to be accomplished. TMDLs should nexus with and be in conformance with State NPS Policy.

Tail water Returns: We recognize that tail water returns are a substantial contributor to water quality problems. Tailwater returns contain nutrient pollutants. We support many of the recommendations in this section.

Water Use and Flow: The water quality compliance scenario in Chapter 6 includes a 50% increase in flow from Big Springs Creek. We strongly support that decision. However the TMDL Action/Implementation Plan must provide description of actions taken to provide for such substantial increases in flow. As discussed above, increased flows are a necessary mandate of this TMDL. There are reasonable and available solutions to solving the flow problem. Consideration should be given to associated cost factors for assisting water conservation to offset the current demand for groundwater.

Described actions to increase flows must have timelines – that will achieve the goal of lowering in-stream temperature 5 degrees – in a reasonable period of time. Five years for action to occur is too long. Two years would be a more reasonable time period.

Reliance on voluntary actions to solve the flow problem is not sufficient remedy (nor does is meet CEQA, TMDL, and Water Code mandates).

While many of the ideas proposed in the *Coho Recovery Plan* are positive, they are also voluntary. It is important for the Regional Water Board to remember that it has a responsibility to protect public trust resources and ensure results. If voluntary measures work, that would be great, but they are often insufficient and further action is required.

Lake Shastina: Enforceable language needs to be developed to deal with the nutrient loading problem and bioaccumulation of nuisance materials (related to nutrients) in Lake Shastina.

> "Initiate, complete, and submit to the Regional Water Board the results of an investigation characterizing, quantifying, and analyzing the sources of nitrogenous oxygen demanding substances contributing to low dissolved oxygen levels affecting the beneficial uses of water in Lake Shastina and to waters of the Shasta River downstream from Dwinnell Dam.
>
> Based on the results of the investigation, the Regional Water Board shall determine appropriate implementation actions necessary to reduce the nitrogenous oxygen demand that is lowering dissolved oxygen concentrations in Lake Shastina and affected areas downstream from Dwinnell Dam."

Urban and Suburban Runoff: The discussion of urban and suburban runoff does not contain any language regarding planning or design, an oversight that should be corrected.

A Stormwater Runoff Plan needs to be developed and integrated in to Urban and County Planning. We recommended the addition of the following language:

> "New developments should be designed to minimize stormwater runoff and maximum infiltration by minimizing impervious surface area, minimizing hydrologic connection between impervious surfaces and watercourses, and constructing stormwater retention basins. Existing developments should be retrofitted to minimize stormwater runoff."

United States Bureau of Land Management: Grazing and other land use not in conformance with actions that will attain WQS must be limited by enforceable language. Grazing guidelines that will recover and maintain properly functioning riparian need to be developed.

Grazing BLM and Private Landowners: Grazing Practices must provide described criteria/actions to maintain properly functioning riparian corridor and inhibit soil loss from poor grazing practices. Reasonable timelines for implementation and effective monitoring must be in place.

Water Diversion: Water diverters should participate in the CDFGs Coho Recovery Strategy (CDFG 2004a) and Incidental Take Permit Program (CDFG 2004b). The Regional Board shall work with DFG to establish monitoring and reporting elements of these programs in order to gage their effectiveness.

Water diverters should participate in and implement flow-related measures outlined in the Shasta CRMPs Shasta Watershed Restoration Plan. The Regional Board shall work with the Shasta CRMP to establish monitoring and reporting elements in order to gage the Plans implementation and effectiveness.

The Regional Water Board and SWRCB should actively encourage the purchase of water rights for the purpose of maintaining adequate stream flows.

Recommendation: revisit adjudication to stop riparian appropriation of water purchased for in-stream flows and fish.

If after **two years**, the Regional Board Executive Officer finds that the above-measures have failed to be implemented or are otherwise ineffective, the Regional Board will recommend that the SWRCB consider seeking modifications to the decree, conducting proceedings under the public trust doctrine, and/or conducting proceedings under the waste and unreasonable use provisions of the California Constitution and the California Water Code.

JURISDICTION - State Water Resources Control Board

The following outlines SWRCB jurisdiction in water rights - surface and subsurface flows.

The people own the state's waters. See Water Code § 102. Use of that water is of public concern. See id. § 104. All waters shall be managed for the greatest public benefit. See id. § 105.

The State Water Board has exclusive jurisdiction to issue, condition, or rescind post-1914 appropriative water rights. See Water Code § 1250 et seq. It also regulates other rights, including

pre-1914 and riparian, to prevent waste or unreasonable use. See id. §§ 100, 275; California Constitution, Article X, section 2.

More generally, the State Water Board is responsible to "provide for the orderly and efficient administration of the water resources of the state." Water Code § 174. The State Water Board "shall exercise the adjudicatory and regulatory functions of the state in the field of water resources." Id. It shall take "all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water" in California. Id. § 275. To perform these functions, the State Water Board may: "(A) Investigate all streams, stream systems, portions of stream systems, lakes, or other bodies of water; (B) Take testimony in regard to the rights to water or the use of water thereon or therein; and (C) Ascertain whether or not water heretofore filed upon or attempted to be appropriated is appropriated under the laws of this state." Id., § 1051. Its function "has steadily evolved from the narrow role of deciding priorities between competing appropriators to the charge of comprehensive planning and allocations of waters." National Audubon, 33 Cal.3d at 444.

As required by the public trust doctrine, the State protects the trust uses of navigable waters fishing, navigation, commerce, and environmental quality to the extent feasible in water rights and other regulatory decisions. See National Audubon, 33 Cal. 3d at 437, 441. The State Water Board may reexamine prior diversions to determine whether they should be changed to protect the public trust uses of the affected waters. See id. at 446.

The State Water Board may adopt guidelines and procedures to implement applicable laws and rules. See Water Code § 275. It may formulate and adopt state policy for water quality control. See id. § 13140.

Guidelines for Substantive Review of Water Right Permit Applications

The State Water Board may approve a permit application on proof that (A) water is available for diversion and (B) the diversion will be put to reasonable and beneficial use. See Water Code § 1240. It may establish streamflow and other conditions as it deems necessary to protect fish and wildlife resources. See id. § 1257.5. It will consider the Basin Plans applicable to the affected stream and may subject the permit to those conditions necessary to implement the plan. See id. § 1258; see also id. § 1243.5. A.B. 2121 requires consideration of such plans. Id., § 1259.4(a)(2).

A.B. 2121 requires that, by January 1, 2007, the State Water Board shall adopt instream flow guidelines for these coastal streams in accord with water quality standards for the purpose of water rights administration. See Water Code § 1259.4(a)(1). Prior to such formal adoption, the Board may consider the 2002 Joint Guidelines. Id. § 1259.4(b).

Under Water Code section 1052, the State Water Board may impose an Administrative Civil Liability (ACL) up to $500/day of unauthorized diversion. This is a form of civil penalty, subject to judicial review, for trespass on this public property. Pursuant to Water Code section 1055.3, "[i]n determining the amount of civil liability, the board

Case On Point

Where the SWRCB asserted jurisdiction (in compliance with Section 13242 , and other sections, of the Water Code and linking narrative objectives to numeric objectives) on the San Juaquin River TMDL for DO (excerpts from the case is included - below):

On flows, and related to Water Code Section 13242 (where Water Quality Control Plans (TMDLs) must include described actions that must take place in specific time frames – with compliance assurance: In State Resources Control Bd., Cases, 136 Cal. App. 4th 674,703-705 (2006), State Water Resources Control Board Cases. C044714 P. 707-705

In describing "the nature of [the] actions… necessary to achieve the [se] objectives" (Section 13242, subd.(a)), the board explained that it would "initiate a water rights proceeding following adoption of this water quality control plan" that would "address the water supply-related objectives in this plan through the amendment of water rights under the authority of the [Board."……..

The plan also included, in the second component of the program of implementation, the narrative objective for salmon protection. The Board explained: "It is uncertain whether implementation of the numeric objectives [*705] in this plan alone will result in achieving the narrative objective for salmon protection. Therefore, in addition to the timely completion of a water rights [***46] proceeding to implement the river flow and operational requirements which will help protect salmon migration through the Bay-Delta estuary, other measures may be necessary to achieve the objective of doubling the natural production of Chinook salmon……"

Irrigation Structures : Language regarding irrigation structures and stream flow impediments is sufficient.

Timber Harvest Activity: The Regional Water Board shall rely on applicable current regulations, existing permitting and enforcement tools, and other ongoing staff involvement, summarized in the listed below, associated with timber harvest activities. As such, no new regulations or actions are being proposed in association with this TMDL:

* ZBerg-Nejedly Forest Practice Act and the California Environmental Quality Act (CEQA)

* Management Agency Agreement between the CDF and the State Water Resources Control

* Board to oversee water quality protection on timber operations on non-federal lands in California.

* Senate Bill 810, enacted in 2003, provides that a Timber Harvest Plan (THP) may not be approved if the Regional Water Board finds that the proposed timber operations will result in discharges to a water body impaired by sediment and/or is in violation of the Basin Plan.

* Regional Water Board Timber Harvest General Waste Discharge Requirements (Order No.

R1-2004-0030) and Categorical Waiver of Report of Waste Discharge (Order No. R1- 2004-106) for timber activities on private lands. Both the Categorical Waiver and the General Waste Discharge Requirements programs use the CDF timber harvest, functional equivalent review process for THPs and Non-industrial Timber Management Plans (NTMP) to ensure compliance with the CEQA.

* Active and continuous oversight by Regional Water Board staff of the timber harvest review and inspection process.

* Habitat Conservation Plans and Sustained Yield Plan review.

* U.S. Forest Service activities (discussed in Section 8.1.17) and CDF and Board of Forestry meetings and review.

Lake Shastina: The Montague Water Conservation District shall take the following actions:

Initiate within two years, complete and submit to the Regional Water Board within five years, the results of an investigation characterizing, quantifying, and analyzing the sources of, and ways to reduce, nutrients and nitrogenous oxygen demanding substances contributing to low dissolved oxygen levels affecting the beneficial uses of water in Lake Shastina and to waters of the Shasta River downstream from Dwinnell Dam.

Based on the results of the investigation, the Regional Water Board shall determine appropriate implementation actions necessary to reduce the nutrients and nitrogenous oxygen demand that is lowering dissolved oxygen concentrations in Lake Shastina and affected areas downstream from Dwinnell Dam.

The Regional Water Board shall study the possibility of using pulse flows from Lake Shastina to clean out accumulated organic matter and macrophytes from the Shasta River.

Proposed action is sufficient.

The cities of Yreka, Weed, the Lake Shastina Development and other stakeholders should identify possible pollutants, their sources, and volumes of polluted runoff from urban and suburban sources within their spheres of influence that may discharge, directly or indirectly, to waters of the Shasta Valley watershed.

Cities and other stakeholders responsible for urban and suburban runoff should implement the following measures:

Seasonal scheduling of construction activities to prevent unnecessary waste loads in stormwater runoff.

Seasonal scheduling for the application to lawns and gardens, municipal facilities, and agricultural areas of fertilizers, pesticides and herbicides, and other oxygen consuming materials that

may contribute to dissolved oxygen impairments to watercourses in the Shasta River hydrologic system from cities, towns, developments and other concentrations of urban and suburban populations.

New developments should be designed to minimize stormwater runoff and maximum infiltration by minimizing impervious surface area, minimizing hydrologic connection between impervious surfaces and watercourses, and constructing stormwater retention basins. Existing developments should be retrofitted to minimize stormwater runoff.

When, and if, pollutant sources are identified that discharge, or threaten to discharge, nutrients, oxygen consuming materials, fine sediment, and other polluting constituents to nearby watercourses from existing runoff control facilities, the Regional Water Board will work cooperatively with responsible parties to ascribe appropriate management measures and reasonable time schedules to control and eliminate said pollutant discharges**.**

Implementation - General Discussion

Regional Board staff accomplished (given the complexity of the task) a reasonably good job in the assessment of conditions in the Shasta River drainage of pollutant source and wasteload allocation, with the identification of appropriate instream targets. While the Regional Board staff worked hard and covered many aspects of the problem, some critical facts affecting pollutant loading and allocation have not been addressed - as discussed above. The purpose of the Shasta River Total Maximum Daily Load (TMDL) is to identify loading allocations that, when implemented, are expected to result in the attainment of the applicable Water Quality Standards (WQS) for Sediment and Temperate. Failure to address certain factors (see Problem Statement), compromises the TMDL and renders it inaccurate.

The proposed TMDL should take a much needed science based step towards achieving a waste load reduction plan for the Shasta River. The TMDL should include adequate: **Problem** assessment, which includes an assessment of existing instream and upslope conditions, identification of instream numeric targets for instream and upslope conditions - Water Quality Indicators and Water Quality Objectives - which are intended to interpret and apply the narrative water quality standards and also represent the optimum instream conditions for cold water fish; **Assessment** of significant sediment and temperature sources that have in the past or are presently impacting the stream system; **Linkage** analysis to determine the magnitude of reductions necessary to attain the numeric targets; **Allocation** of pollutant loading analysis which identifies the loading capacity of the stream and individual load allocations for land use activities.

Regional Board staff has done a very serious amount of work in attempting to bring together the vast amounts of information and science needed for making necessary determinations. Yet, for the Shasta River TMDL for Sediment and Temperature to be complete and effective, additional factors (regarding areas omitted), must considered. There is significant information (some that has been presented and resides in the file - some requiring additional study) that must be taken into consideration.

Recommendation: Though there are some shortcomings in this TMDL, with areas that are incomplete or could use additional data or science, it does incorporate the necessary elements regarding pollutant loading which address the statutory and regulatory requirements for the Technical TMDL along with needed documentation of the basis for the TMDL. These elements include an assessment of the pollutant problems and impacts on the beneficial uses, development of instream numeric targets that interpret and apply to the WQS, an assessment of the sources of the pollutant, and estimation of loading capacity and associated load allocations to meet WQS.

Due to the time schedule related to the Consent Decree, action must be taken in compliance with this schedule. It is recommended that either, the Regional Board (and SWRCB) adopt the currently proposed TMDL (noting deficiencies), with attached direction to staff to address specific issues needing correction. In addition, the SWRCB must take some action (not necessarily attached to the Basin Plan Amendment) to address flow maintenance issues.

v There are aspects of the implementation plan that are actions yet to be described, and requests for actions where the implementation of same are totally voluntary. This renders aspects of the Action/Implementation Plan unenforceable.

State water law says that an implementation plan (Water Quality Control Plan) must contain a description of the nature of specific actions that are needed to achieve the water quality objectives, a time schedule, and a plan for monitoring compliance (State Water Code Section 13242). As a Water Quality Control Plan, the Implementation/ Action Plan must be adopted into the Basin Plan (Water Quality Control Plan for the Region).

Reliance on unenforceable language is inconsistent with Cal Water Code - unless voluntary actions submitted as planning documents to be approved by the Regional Board are found to be equal to or better than enforceable criteria capable of meeting Water Quality Standards. Such voluntary actions (meeting Cal Water Code) should be held open as options for attaining targets and to meet Water Quality Standards.

The Implementation /Action Plan lacks linkage and consideration with what is, or should be, the matrix of near-stream and in-stream desired conditions - or - linkage and explanation of how such voluntary actions will, or are capable, of attaining these near-stream and in-stream desired conditions or Water Quality Standards.

Linkage with Anti-degradation Policy

Voluntary actions sought in the Implementation/Action Plan not only do not meet Cal Water Code mandates - they are not consistent with the Basin Plan Anti-degradation Policy (which is amended into the Basin Plan and is enforceable):

Basin Plan Anti-degradation Policy: *"Controllable water quality factors shall conform to the water quality objectives contained [in the Basin Plan]. When other factors result in the degradation of water quality beyond the levels or limits established [in the Basin Plan] as water quality objectives, then controllable factors shall not cause further degradation of water quality. Controllable water quality factors are those actions, conditions, or circumstances resulting from*

man's activities that may influence the quality of waters of the State and that may reasonably be controlled."

In this case:

- Temperature, Sediment, and Nutrients are pollutants for which this waterbody is listed as impaired - with flows be a major component of the problem

- Temperature, Sediment, Nutrients, and flows are controllable factors.

- Discharge of additional amounts of these pollutants as a result of land use practices is subject to the anti-degradation policy (the Basin Plan, state and federal),

- And, in the case of a reduction in shade and/or instream flows that would cause introduction of additional pollutant - temperature and nutrients; such additional introduction of pollutants are not allowable, and must be prohibited, under the anti-degradation language.

The Anti-degradation language was added to the Basin Plan by Resolution No. R1-2004-0092.

Recommendation: It is recommended that upon approval of the TMDL by the Regional Board (or EPA) that direction be given to the Board staff to create an enforceable Implementation/Action Plan - meeting Cal Water Code criteria. That such Implementation/Action Plan offer several options, including the option of self directed voluntary land use planning to be reviewed and approved as adequate by the Regional Board - where the language and standards and language are enforceable and will provide some assurance of attaining WQS.

NOTE: Waste Discharge Requirement and/or Conditional Waiver of Same adopted by the Regional Board can serve to address many of the outstanding problems regarding enforceability. Appropriately designed WDRs, or Conditional Waivers could set conditions necessary to meet WQS over time.

CONTENTS OF A TMDL

A TMDL reflects the total pollutant loading a waterbody may receive and still meet water quality standards. By statute (section 303(d)(1)(C)) and regulation (40 CFR section 130.7(c)(1), TMDLs are to be developed for all waters on the Section 303 (d) list. EPA's regulations at 40 CFR section 130.2(i) define a TMDL as the sum of "waste load allocations" plus load allocations (loads allotted to existing and future non-point sources, plus loads from natural background) plus a margin of safety to account for uncertainty. *"It further states that TMDL Plans may address individual pollutants or groups of pollutants, as long as they clearly identify links between: 1) the waterbody use impairment or threat of concern, 2) the causes of impairment or threat, and 3) the actions needed to remedy the impairment."*

The final TMDL should result in a Basin Wide Conservation Plan (Implementation/Action Plan) with the possible incorporation of Site Specific Conservation Plans to be approved (with

provided numeric targets and source analysis) and Monitoring Program for the management and reduction of sediment and temperature sources.

PROBLEM STATEMENT - SEDIMENT AND TEMPERATURE

Problem Statement

The Regional Board staff did, for the most part - with exceptions noted above - did a good job of identifying the pollutant factors causing impairment.

Relative Risk Assessment:

An assessment of the water quality problems (including water use and extant habitat conditions affected by pollutants) is necessary to clearly identify the water quality standards being violated or threatened and to identify the pollutant(s) (in this case sediment, temperature, nutrients, and low flows) for which the TMDL is being developed. The Regional Board did summarize existing information in the Strategy which provides a general understanding of the watershed and condition of the fishery noting that historic populations of coho salmon, chinook salmon, and steelhead trout are greatly reduced as are habitat conditions in almost all tributaries due to excessive sediment loading in combination with low flows, elevated temperatures, and nuisance related to nutrient loading. . For an accurate TMDL calculation all factors should be considered for determinations **(**mass wasting, surface soil and fluvial erosion, sediment transport, sheet erosion, water use, major hydrologic events, related nutrient effects, etc.**).** From this information the wasteload allocations, instream targets, and source analysis can be derived - with reasonable accuracy. These findings should be used to support future implementation and monitoring strategy to be developed**.**

Linkage Analysis

Documentation of land use intensity in the Shasta River and loss of salmonid population density and habitat is sufficient to derive linkage of such relationship to specific land use activity. (see - Report of the Scientific Review Panel on California Forest Practice Rules, 1999).

Linkage analysis is a useful way of assigning source responsibility and implementation development. Justification of source reductions can be supported by linkage analysis. Given that source and loading estimates are far less than 100% accurate, linkage analysis helps recognize the relative importance of quantified results and resolution to general conclusions that substantial sediment loading reductions.

MARGIN OF SAFETY

Section 303(d) and the regulations at 40 CFR 130.7 require that "TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards with seasonal variations and a margin of safety which takes into account any lack of

knowledge concerning the relationship between effluent limitations and water quality." The margin of safety can either be incorporated into conservative assumptions used to develop the TMDL or added as a separate component of the TMDL (EPA, 1991). Conservative assumptions have **not** been made in each case as a way of addressing the uncertainty and areas that are underestimated associated with the data.

SEASONAL VARIATION

It is difficult to accurately predict specific impacts of sediment (and other pollutants - nutrient, temperature) loading at particular times and places on particular salmonid life stages given spatial and temporal lag time between sediment delivery and the occurrence of sediment related impacts on beneficial uses. In addition, it is not feasible to predict or control sources at fine spatial and temporal scales in many cases. Therefore, an approach in TMDL development is to select indicators to interpret narrative WQS which are believed to provide a good composite picture of instream sediment-related conditions and changes over time. Then, targets and associated TMDLs/LAs are set at levels believed to be protective of beneficial uses at key life stages taking into account the lag time effects.

Conclusion: There are a number of uncertainties associated with the supporting documentation, most notably in the source analysis. Given these uncertainties, additional conservative assumptions should be made regarding the amount of loading reductions that are needed to attain WQS. This approach is warranted and meets the statutory requirements that a margin of safety take into account any lack of knowledge concerning the relationship between the effluent limitations and water quality.

The submittal of site-specific data in the future will help to reduce the uncertainty associated with the current assessment and will therefore allow for a reduction in the degree of conservatism associated with the current assumptions. Thus, it is likely, depending on the quality and quantity of the site-specific data which is submitted over time, that adjustments to the TMDL in the future will result in less stringent allocations as the margin of safety is reduced.

OTHER FACTORS

Lacking Fishery Habitat and Abundance Survey Data and Relationship to Flows/Water Use

Salmonid abundance data for all of the watershed assessment areas collected over time indicate definite loss of abundance of chinook and coho salmon, and steelhead trout. The data also indicates a change in fishery abundance to increased levels of steelhead trout relative to coho(and chinook). This indicates that the habitat requirements for these fish not being met. Though the most recent surveys show existence of coho, some areas of the Shasta that previously supported coho show almost none to be existing. Barriers to fish migration, including sediment deltas and aggraded reaches which dewater in the summer, were found in several sub-basins as well as the mainstem. Fish population data generally indicates that chinook and coho populations have dramatically declined. Steelhead populations appear to have declined as well, but range more broadly throughout the basin.

Discussion of land use and erosion control guidelines, including culvert installation and sizing, should be included in the problems statement and targets sections. Road maintenance and potential for diversion would logically cover this subject. Since a significant part of the erosion problem is related to improper culvert installation and sizing. Eventually all culverts fail (Tom Spittler, CGS); thus, culverts deserve their own individual consideration. Improper installation may not only impede fish migration but may add to or exacerbate erosion potential. The possibility of sizing policy could be discussed or be part of Site Specific Plans and the Basin Wide Conservation Plan (Implementation/Action Plan).

For trends to be determined, monitoring regimes linked to the targets matrix must be in place and capable of producing data for evaluation over time.

Fish Food Production Areas, and macroinvertibrate discussion is directly linked with near stream food/canopy characteristics and forested near stream desired conditions. Discussion should be present considering these attributes.

Suspended sediment is noted as a limiting factor in many stages of the growth cycle of salmonids and is discussed as same in many scientific documents. This element should be an enforceable part of the targets and implementation strategy.

The structural elements needed to limit sediment inputs and to control and sort instream sediment conditions as well as provide essential habitat conditions for propagation and survival, inclusive of but not limited to temperature, are related to the need to develop late seral type near stream conditions. Fragmented consideration of essential habitat needs works no better than fragmentation of habit itself, or attempts at implementing a fragmented attainment strategy. Omission of the essential factors related to temperature loading will lead to fragmented analysis, conclusions, and implementation.

TEMPERATURE - RELATED SUBJECTS

Current stream conditions in respect to the pollutant Temperature are documented as being far in excess of optimal or health range of acceptable stream temperatures for salmonids. Available monitoring data provides an abundance of devastating evidence that temperature is a major limiting factor for salmonids in the Shasta River basin. Temperature conditions are not supporting beneficial uses of water. The Water Quality Objective for Temperature is very far from being met.
It is noted that, both, groundwater infows, and stream shade (near stream micro-climate) are primary factors related to stream temperatures. Areas of sparse streamside vegetation are noted. However, the impacts of water use for irrigation on groundwater supply to the instream flows are not documented. It is known that there is a relationship, but the exact nature (ratio of use to instream flow) of the relationship remains to be determined. Impacts of sediment buildup on stream flow must be analyzed /assessed, with linkage to both temperature impairment and salmonid habitat conditions, to develop comprehensive pollutant loading analysis and implementation strategy.

The Temperature analysis should consider the best science available for flow and riparian assessment. Studies by Bartholow, Essig, Poole, and Berman should be referenced in terms of impacts of microclimate and overstory on stream temperature. These studies indicate that air temperature and near stream microclimate to be major factor in determining instream water temperature. FEMAT suggests that the zone of riparian influence is two site potential trees - where buffering, in the form of cool air temperatures and high humidity over the stream, deteriorates rapidly under one site potential tree height protection.

TEMPERATURE SCIENCE/CRITERIA

The NCRWQCB based much of their scientific discussion of temperature values on Sullivan, K et al, 2000, An Analysis of the Effects of Temperature on Salmonids of the Pacific Northwest with Implications for Selecting Temperature Criteria, Sustainable Ecosystem Institute. There were many other citations including Spence et al (a major compendium of relevant science - see quotes below), Hines and Ambrose, etc..

NCRWQCB staff reported (north coast temperature listings) stated: "While these thresholds (MWAT of 14.8C relate to reduced growth, temperatures at sub-lethal levels also can effectively block migration, inhibit smoltification, and create disease problems (Elliot 1981). Further, the stressful impacts of water temperatures on salmonids are cumulative and positively correlated to the duration and severity of exposure. The longer a salmonid is exposed to thermal stress, the less chance it has for long-term survival (Ligon et al, 1999). I would add to this that thermal barriers and waters with elevated temperature limit opportunity to seek and find food (thermal barriers) as well as cause fish to congregate in limited cool areas (if available) subjecting them to mass predation.

Temperature studies from Mendocino (Hines and Ambrose, 2000 - which included work on Big and Ten Mile Rivers) and Humbolt (Welsh et. al) counties that examined salmonid habitat utilization and temperature relationships. These studies showed absence of coho in streams where MWMT was greater than 18 C and 90% absence where MWAT was greater than 16.7 C and where coolest streams showed presence of coho in MWAT ranges less than 14.5 C (Welsh et. al). These thresholds being exceeded by almost all (with few exceptions) MWAT data on most stations on in the Shasta River. These studies support the MWAT values in the Shasta River as being not supportive of either coho or steelhead trout in most of the Shasta River drainages.

There are some more current papers out on temperature effects on salmonids, not considered. One by Essig (1998) on the background effects of temperature on salmonids.

Additional information on temperature affects on salmonids can be found in An Ecosystem Approach to Salmonid Conservation, B. Spence, G. Lomnickey, R. Hughes, R. Novitzki, for Management Technology (MANTECH), 1996. This document supports the following discussion (as quoted from Spence et al): Elevated temperatures result in impaired growth rates, increased disease rates, loss of swimming speed and stamina. This results in losses to predation, less efficient feeding, and altered maturation and death (Bjornn and Reiser 1991, EPA 1987, and Spence, et al. 1996). **Feeding and Growth** - Ingestion rates of fishes generally increase with increasing temperature, except when temperatures exceed the thermal optimum for the species

(Brett 1971). Growth rates decrease at a threshold above the thermal optimum. Reproduction and **Embryological Development** - Modification of temperature, water quality, streamflow, and physical structure all affect how much energy can be devoted to reproductive output. Water temperature greatly influences times to hatching and emergence for Pacific salmonids. Development time decreases in an asymptotic fashion with increasing incubation temperatures with the rate of change in development time relative to temperature increase being at the low end of the tolerable temperature range (Beacham and Murry 1990). Early emergence because of warming of water temperatures may increase exposure of fry to high-flow events and alter the natural synchrony between emergence and predator cycles or prey cycles. **Respiration** - In general, the oxygen demands increase with increasing temperature, although oxygen consumption may decrease as temperatures approach lethal levels, particularly at high levels of activity (Brett 1971). **Smoltification** - Because development and growth are highly influenced by water temperatures, modifications to thermal regimes can potentially alter the time of smoltification (reviewed in Wedemeyer et al, 1980; Hoar 1988). **General** - Similarly, temperature and stream flow patterns may be important cues for releasing migratory behavior (Hoar 1988). Temperature, in particular, has pervasive effects on bioenergenic pathways, affecting appetite, digestion rate, standard and active metabolic rates, and food conversion efficiency. **Competition -** Changes is in physical (e.g., temperature, stream flow, habitat structure) and biological (e.g., food availability, species composition) characteristics of streams and lakes can alter competitive interactions within and among species, potentially resulting in a restructuring of fish communities. **Predation** - Habitat alterations can affect predation rates by .... modifying temperature, which affects the metabolism of piscivarous fish and the ability of fish to elude predators and by obstructing passage, which may delay migration and thereby increase exposure to predators. **Disease and Parasitism** - Water temperature greatly influences the immune system of fishes, the number and virulence of pathogens, and in the case of microparasites, the occurrence of infective life stages in natural and aquacultural environments. Consequently, changes in water temperatures caused by forest and range practices, dams, and irrigation can alter the susceptibility of salmonids to infection by these pathogens. With most pathogens, the susceptibility of salmonids to infections tends to increase with increasing water temperatures (Table 4-5 Pathogens of salmonids found in the Pacific Northwest - relationship to temperature).

TARGETS

Temperature analysis in this TMDL should have a good reference background of Targets for desired conditions.

Temperature analysis in this TMDL should have a good scientific reference to, both Targets, and affects of elevated temperatures on salmonids. **See** - *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards, 2003, and other temperature science noted in the listing fact sheets.*

Most of the monitoring data and analysis presented indicating existing temperature regimes (in MWAT) far in excess of conditions suitable for salmonids in various life stages. A matrix of acceptable Targets should be developed for reaches of the watershed indication the acceptable MWAT range and percent of habit that should fall into that range. A Target of 16.7 C (absence

line for coho) is a logical goal. It should be determined what percentage of the watershed should meet this target to address beneficial use issue.

Targets should also be developed for other factors that influence elevated temperature loading (i.e. Percent shaded area appropriate for forested areas, percent shaded area appropriate for non-forested areas, minimum or acceptable low flow targets for various reaches of the drainage, etc.). These Targets should be the basis for the development of enforceable implementation policy

Timber Harvest Activity - Relationship to Degraded Conditions

THPs approved by CDF in the recent past allowed for timber harvest activity at a very high level (disturbance level) in many planning watersheds. This high level of harvesting and along with excessive road densities have contributed to accelerated erosion in the Shasta River Watershed. Forest Practices (administered by CDF) have allowed timber operations in sensitive areas and in the near stream zone were unstable soils and erosive conditions exist, allowed winter logging, and allowed a level of disturbance that exacerbated pollution levels form non-point sources. This activity occurring in areas that are steep, geologically unstable, and subject to erosion. Current logging practices allowed inappropriate road construction and erosion control consideration. Lack of overstory and vegetative cover affects the hydrologic regime and rate of erosion.

These findings are appropriate:

- Road density and road classification adds fundamental information regarding the potential for sediment delivery from roads.

- The higher the road density, the higher the ground disturbance, and therefore the higher the potential management-related sediment delivery (Lewis,1998).

- Permanent roads are theoretically designed for all-season use and theoretically receive regular wet-weather maintenance. Seasonal roads are designed primarily for non-wet weather use and do not receive regular winter maintenance. Both permanent and seasonal roads are intended to have watercourse crossings capable of passing a fifty-year flood event (this should be upgraded to 100 year event, as all culvert fail eventually, and incorporated into Implementation /Action Plan language). However, because of the difference in maintenance, the failure of a watercourse crossing on a seasonal road is more likely to go unchecked than one on a permanent road.

- Permanent roads are more likely to be surfaced than a seasonal road and therefore theoretically contribute less sediment from the road surface, as long as the surfacing is well designed.

The Regional Water Board was provided road-related data regarding hillslope and proximity to Class I streams. Based on their review of available data and information Regional Water Board staff identified several sediment-related factors.

- Roads on steep or convergent hillslopes are more likely to fail and/or deliver sediment than those on ridge tops or above wide, flat riparian zones.

- Streamside roads are more likely to deliver sediment generated by road-related causes than those outside a riparian buffer.

- Roads with well-placed rolling dips are less likely then those with numerous culverts (particularly if they are undersized or prone to blockage by debris) to divert streams and deliver eroded road fill.

- Roads with well-engineered outslopeing are less likely than those with miles of inside ditch and waterbars to deliver eroded fill and elevated flow.

Several conclusions regarding roads in the Shasta River watershed are appropriate.

- The road densities indicate a substantial degree of ground disturbance within individual sub-basins, within individual assessment areas, and throughout the Shasta River watershed overall.

- The density of seasonal roads (which is substantially greater than that of permanent or temporary roads) indicates a significant potential for minimally maintained crossings and other road-related facilities. This suggests the possibility of failed crossings that go unfixed for some period. Further, as a general matter, unsurfaced roads have a greater potential for surface erosion than do surfaced ones.

Timber Harvest Implementation Actions

The State is to identify implementation measures needed for pollutant loading reductions indicated in the TMDL, and to incorporate the TMDL itself in the Basin Plan (40 CFR 130.6). In addition, it is necessary to provide for follow-up monitoring to evaluate TMDL effectiveness and the need for revisions (EPA 1991). This is particularly true for TMDLs, such as the Shasta River TMDL for Sediment and Temperature, which involve substantial uncertainty in the analysis. As noted in the discussion, the current Implementation/Action Plan is comprised, for the most part, with unenforceable language.

The suggested use of existing permitting and enforcement tools (e.g. THP Review process, WDRs (and Waivers of same)) are not sufficient to address shortfalls that have been noted as part of this process by many agency and independent scientific review panels (including the NCRWQCB itself). The MAA with the Board of Forestry has been of little help in addressing the issues of beneficial use protection in timber harvest. In fact, the BOF is considering removing what protective rules exist now (5.1.10.1) (these rules sunset Dec. 06). Participation in the THP Review process is necessary to protect beneficial uses. For Regional Board staff obtaining desired results on the limited THPs that are reviewed (less than 50% of all THPs by Regional Board staff) in the THP Review (approval) process, which is an ongoing fight with CDF (and the BOF) - throughout the entire process) it would more efficient and more sound policy to have protective timber harvest standards amended into the Basin Plan. Specific regulation is necessary to eliminate areas of contention - as well as freeing up staff time to address a larger number of THPs.

Waste Discharge Requirement do not provide the necessary framework of enforceable standards, with amendment into the Basin Plan, to address sediment and temperature inputs in the context of timber harvest operations.

Forest Practices

Please note, in reference Implementation discussion: Report of the Scientific Review Panel On California Forest Practice Rules and Salmonid Habitat, Prepared for The Resources Agency of California and the National Marine Fisheries Service, comprised of a selected panel of scientists, 1999, indicates that "the Forest Practice Rules" and their administration by the California Department of Forestry "do not protect the beneficial uses of water." ""Silviculture is the leading source of impairment to water quality in the North Coast of California. Related to these water quality problems, California has a number of species, in particular salmon, that are endangered threatened or otherwise seriously at risk, due in very significant part to forestry activities that impair their spawning, breeding and rearing habitat." (Findings for the California Coastal Non-point Program and CZARA Action Plan, USEPA/NOAA, 1999) A Scientific Basis for the Prediction of Cumulative Watershed Effects, UC, Berkeley, June 2001, and finally the Final Report on Sediment Impairment and Effects on the Beneficial Uses of Elk River and Stitz, Bear, and Jordan Creeks, Concur, 2002, also support the findings noted above. All of these noted scientific reviews indicate the Forest Practice Rules, including projects related to small landowners and Non-Industrial Timber Plans, are deficient in Cumulative Impacts Analysis and can not be counted on to protect the beneficial uses of water and meet Basin Plan water quality objectives. No study has shown that smaller timberland owners and/or Non-Industrial Timber Plans have lessened impacts related to pollutant inputs from timber harvest activity

These documents, noted above, not only indicate impairment from current and historic forest practices, they provide analysis and prescriptive measures to be taken to address attainment of WQS. These documents all point to, but do not address directly, the level a disturbance precedent to the deteriorated watersheds conditions present in the Shasta River. They do indicate that level of disturbance is a major factor and needs to be addressed if we are ever going to meet WQS. And, in fact, a TMDL is a vehicle designed to (in this case) make determinations regarding level of disturbance that is acceptable and related mandatory controls to meet WQS.

Other references to review for appropriate regulatory guidelines are:

Coho Recovery Guidelines (DFG)- Regulations specifically referenced for Timber Harvest activity in the form of an Incidental Take Permit (Draft 2112 - rules). The Coho listing under CESA is referenced in the Implementation/Action Plan document. All notation and/or reference to Coho Recovery proposed actions (timber harvest and well as other policy) is absent in terms of any nexus with enforceable language.

Threatened and Impaired Rules (FPRs): These regulations are currently in place in the Forest Practice Rules and are intended to address beneficial use issues related to Forest Practices on listed/impaired watercourses. CDF has stated that these regulations are, in themselves, sufficient to protect beneficial uses. There is no documentation to support this claim by CDF. However,

these regulations are superior to the baseline of regulations that preceded the Threatened and Impaired Rules. The Board of Forestry is considering removing these regulations at this time.

Forest Practice Rules proposed language changes proposed by the NCRWQCB to the Board of Forestry (in several iterations): These proposed rules changes, written to address failure of the FPRs to protect beneficial uses, contain enforceable language that would produce positive changes towards attaining WQS.

Implementation Proposal submitted to the NCRWQCB for the Garcia River TMDL by Coast Action Group: This proposal was submitted to the Regional Board as suggestions for rules imposition for beneficial use protection.

The discussion in all of the above referenced documents indicate: 1) Areas of failure of the Forest Practice Rules to address protection of beneficial uses, 2) Areas of necessary correction of Forest Practice land use that will show positive trends, via rules (currently in place or suggested) for use in guiding implementation planning - with some assurance of trends towards attaining WQS (for both Temperature and Sediment). Within all of these documents there is a significant (striking) degree of similarity in the description of actions necessary to be taken as enforceable guidelines for timber harvest activity on impaired waters of the north coast, and specifically the Shasta River Watershed.

Recommendation: That the (above mentioned) readily available information be reviewed for development of comprehensive and enforceable language to be added to the Implementation/Action Plan of the Shasta River TMDL.

Sincerely,

for Coast Action Group

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