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June 11, 2004 cc to RB1
emailed to CJW

Mr. Art Baggett
State Water Resources Control Board
P.O. Box 944213
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Subject: Adding Sediment Impairment of the Mainstem Klamath River to the Clean Water Act Section 303 (d) - List of Water Quality Limited Segments, June 2004

Dear Chairman Baggett and Members of the Board:

I understand that the State Water Resources Control Board (SWRCB) has opened a comment period to allow consideration of additional rivers or water bodies for listing as impaired under the Clean Water Act Section 303 (d) statutes. I am a fisheries scientist with an extensive history of work in the Klamath River Basin. It has come to my attention that the Klamath River is not listed as sediment impaired, which is in contrast to the available body of knowledge regarding the river both in my personal experience and in the literature (Kier Associates, 1991; 1999; NAS, 2003, de la Fuente and Elder, 1998, Payne and Assoc., 1989; CDFGF, 2003). In addition to direct evidence of impacts to the mainstem Klamath, major tributaries such as the Trinity, South Fork Trinity and Scott rivers are noted as impaired by sediment (U.S. EPA, 1999; Graham Matthews & Assoc, 2003; CSWRCB, 2002) and sediment from these systems routes through the lower mainstem Klamath River, adding to its impairment.

The Long Range Plan for the Klamath River Basin Fishery Conservation Area Restoration Program (Kier Associates, 1991), which was extensively reviewed before publication, presents considerable evidence that the mainstem Klamath River is sediment impaired.

With regard to the Lower Klamath Basin, the *Long Range Plan* noted huge contributions of sediment from tributaries. This sediment is creating problems with fish passage and stream bed stability, and is contributing to the sedimentation of the lower mainstem:

> "Payne and Associates (1989) found that stream-mouth deltas, almost nonexistent prior to 1955, have grown to 500 and 700 feet in width since 1964. Delta widths changed dramatically after the 1964 flood, but increased even more after the high water of 1972. The initial incursion of sediment came with the 1964 flood but is still being delivered to the lower reaches of the streams. Streambed conditions near the mouths were found by Payne and Associates (1989) to be so unstable that no fishways could be installed and the study concluded that no

> lasting solution, other than natural recovery, was possible. Logging in many of these drainages continues today. This delays their recovery and, according to Coats and Miller (1981), could lead to substantial new sediment loads in the event of a major flood."

Voight and Gale (1998) noted that 17 of 23 tributaries to the lower Klamath River remained underground, indicating lack of recovery and continuing contributions of sediment. Figure 1 shows the lower Klamath River in 1998, looking upstream from the Highway 101 bridge. Sediment deposits in the margins indicate sediment impairment.

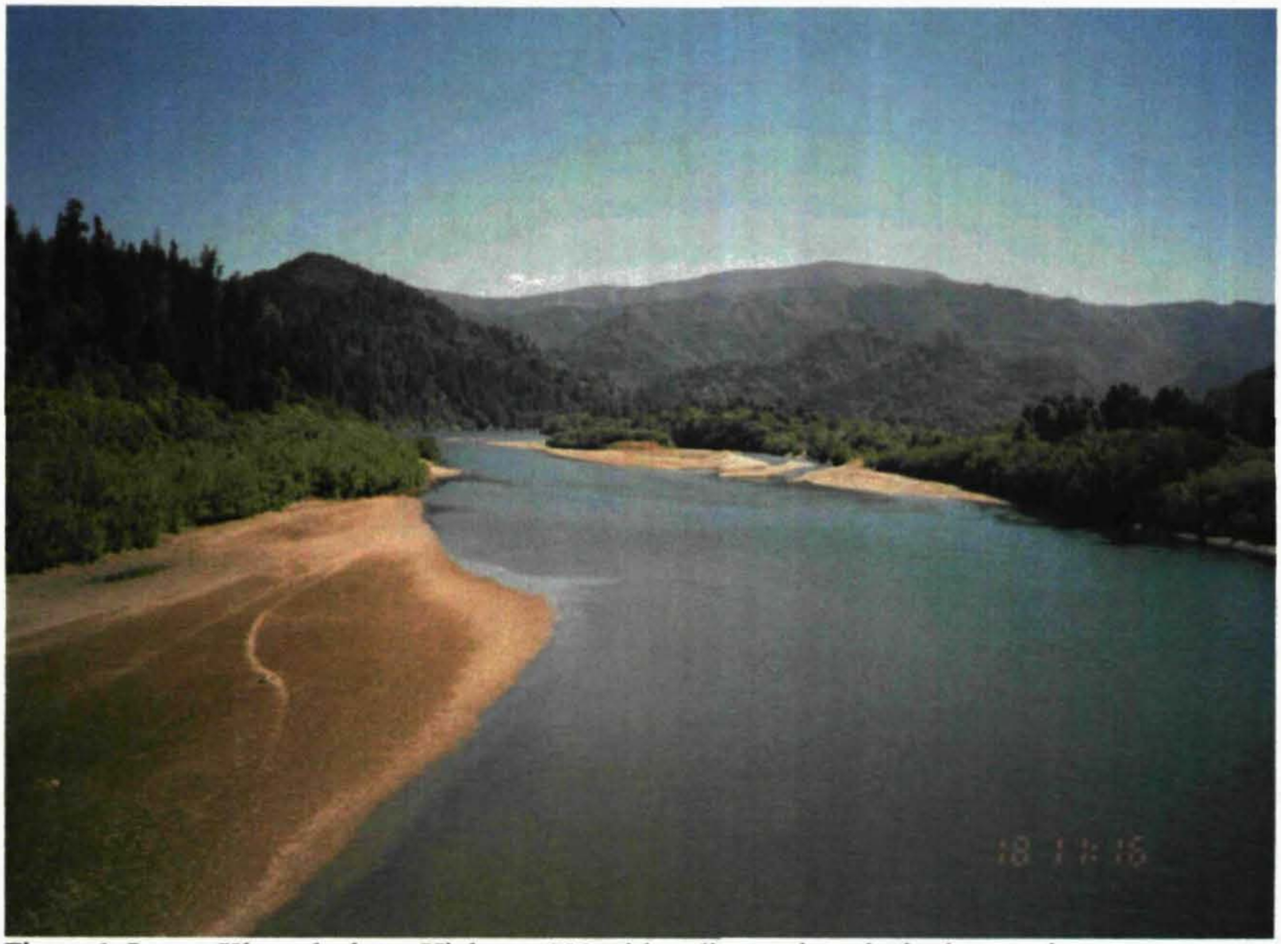

Figure 1. Lower Klamath above Highway 101 with sediment deposits in the margins.

The Long Range Plan (Kier Assoc., 1991) cites longer term sediment impairment noted by Cal Trans (1989):

> "These stream sections (Lower Klamath) are thought to be in an aggraded condition: the Klamath River is reportedly aggrading at the rate of 100,000 to 150,000 cubic yards per year in the proposed reach while Turwar Creek has shown "substantial aggradation in the channel" over the last thirty years. The streamflow there goes subsurface during the summer and early fall, posing a barrier to upstream migrants in the fall (Caltrans 1989).

The Long Range Plan (Kier Associates, 1991) also made the case that the near extinction of the eulachon or candlefish (Larson and Belchik, 1998), a lower mainstem Klamath River spawner, was indicative of major problems with sediment supply, size and bedload movement.

The Mid-term evaluation of the Klamath River Basin Fisheries Restoration Program (Kier Assoc., 1999) evaluated changes in the health of the Klamath River and its tributaries between the inception of the program in 1989 and 1998. They found evidence of continued sediment contributions from logging in the Lower Klamath basin, but also major pulses associated with the January 1997 storm in reaches further upstream.

With regard to the Lower Klamath, Kier Associates (1999) found:

"Channels of most Lower Klamath tributaries have continued to fill in as sediment yield in the watersheds remains high. Timber harvest in all Lower Klamath watersheds exceeds cumulative effect thresholds and all streams (except upper Blue Creek) have been severely damaged during the evaluation period. Clear-cut timber harvest in riparian zones on the mainstem of lower Blue Creek and the mainstem Klamath River occurred in 1998 in inner gorge locations. Aggradation in salmon spawning reaches can be expected to persist for decades. Fourteen of the seventeen major tributaries in this region go underground in late summer (Voight and Gale, 1998)."

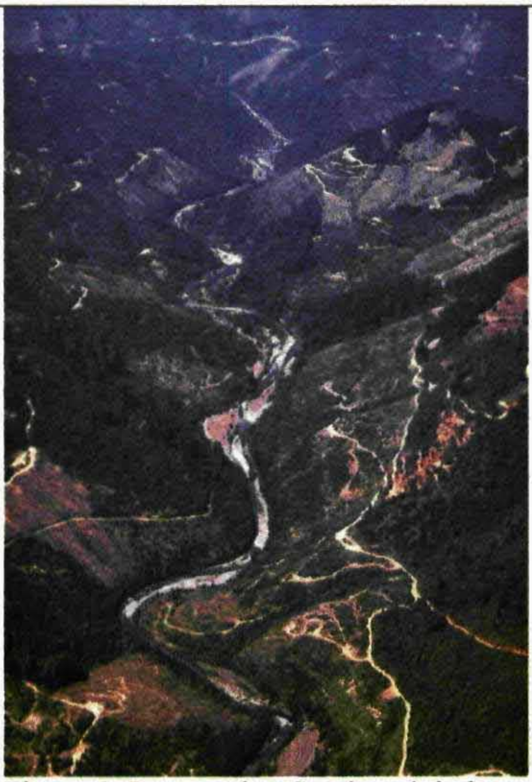

Figure 2. Lower Blue Creek and timber harvest.

Figure 2. Watershed conditions and land use management in lower Blue Creek contribute to sediment yields. High road densities contribute chronic fine sediment to Blue Creek and other Lower Klamath tributaries. Road failures during storm events may also lead to larger yields, which aggrade stream beds to the point where surface flows are sometimes lost. In this photograph, Blue Creek remains on the surface, but the lower creek is widened by sediment. The U.S. Fish and Wildlife Service (1988) is concerned about deteriorating spawning gravel quality in reaches downstream of these activities.

Kier Associates (1999) noted that "major influxes of sediment continue to pulse through the mainstem, restricting pool depths and temperature stratification." The California Department of Fish and Game (2003) noted that shallow riffle crests in the Lower Klamath River, which are caused by sediment build up as well as low flow releases from dams, impeded fish passage of adult salmon and contributed to the fish kill of over 33,000 adult salmon and steelhead in September 2002.

Contributions of sediment to the mainstem Klamath River between the Salmon River and Beaver Creek, including the Scott River and its tributaries, were documented by de la Fuente and Elder (1998). They noted that the January 1, 1997 storm caused hundreds of landslides in the Klamath National Forest and 446 miles of scouring in tributary channels (Figure 3).

Figure 3. This aerial photo shows tracks of debris torrents in Walker Creek, which buried the stream channel and extended all the way to the mainstem Klamath River.

The quantification of sediment inputs to the mainstem Klamath River were beyond the scope of the study by de la Fuente and Elder (1998), but very large deltas at the mouths of tributaries left clear evidence (Figure 4). Roads, recent clear-cuts and areas burned in the 1987 fires had the greatest number of landslides. De La Fuente found that a

Figure 4. Mouth of Elk Creek. The delta extending to the edge of the photo at right was aggraded more than ten feet after the January 1997 storm.

rain-on-snow event triggered many natural landslides, but that road failures and landslides in clear-cut areas substantially added to sediment yield in some watersheds. Impacted tributaries are listed in Table 2, which shows the magnitude of stream damage and antecedent land use or events. The stream damage level is indicative of the amount of sediment contributed to the mainstem Klamath River.

Table 1. Middle Klamath tributary response to the January 1997 storm and summary of antecedent watershed conditions , from Kier Associates (1999).

Stream	Damage	Road Density	Logging/Salvage	Fires
Red Cap	Low	Low	Low	Low
Bluff	Low	Low	Low	Low
Camp	Low	Low	Low	Low
Independence	High	Moderate	High	High
Ukonom	High	Moderate	Moderate	High
Elk	Very High	High	High	High
Indian	Moderate	High	High	Moderate
Horse	High	Very High	High	Low
Grider	High	Moderate	Moderate	High
Walker	Extreme	Very High	High	High
Beaver	Moderate	Very High	High	Low

The de la Fuente and Elder (1998) noted major sediment contributions from the Scott River and its tributaries during the January 1997 storm. Longer term studies (Sommerstrom et al., 1991) show that huge amounts of decomposed granite sands are in the Scott River (Figure 5) as a result of land use activities. The National Academy of Sciences (2003) report on the Klamath River and Endangered fishes also recognized Scott River impairment: "Highly erodible decomposed granite has led to a serious loss in volume and number of pools in tributaries and associated degradation of spawning and rearing habitat. Logging over the past 50 years has taken place on a mix of USFS land and land held by a few large private timber companies. Historical logging practices have been poor, particularly on private land, and have left a legacy of degraded hillslope and stream conditions." The Scott sends a constant supply of sand to the mainstem Klamath, contributing to its sediment impairment.

Figure 5. The mainstem Scott River stream bed below Jones Beach has a high amount of decomposed granite sand, contributed from upland. This sand also makes its way into the Klamath River.

The Trinity and South Fork Trinity River basins are also recognized as sediment impaired (U.S. EPA, 1999; Graham Matthews & Assoc, 2003). Sediment unleashed in these basins eventually flows into the Lower Klamath River.

Please contact me if you need further evidence of mainstem Klamath River sediment impairment. I hope you recognize the Klamath River as sediment impaired so it can get the appropriate attention and remediation. As you are aware, several fish stocks in the Klamath are at risk of extinction (Higgins et al., 1992), and some of cold water fish are recognized as beneficial uses under the Clean Water Act. The recovery of these species may be confounded if sediment problems are not addressed.

~~Sincerely,~~

Patrick Higgins

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