

July 9, 2002

MEMORANDUM

TO: Gualala River Watershed Council (GRWC)

FROM: Matt O'Connor, PhD, RG #6847  
GRWC Contract Hydrologic Consultant

RE: Review of KRIS-Gualala

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Introduction

GRWC requested that I review portions of the KRIS-Gualala draft product developed by Pat Higgins, Institute for Fisheries Resources (IFR) available via the internet. The version of the website that was reviewed was that which was posted July 8 and 9, 2002. Comments submitted by other GRWC reviewers (K. Morgan and H. Alden), as well as correspondence from Cathy Bleier (State of California, Resources Agency) regarding the status of response to comments, were reviewed. A complete review of the site was not conducted; this review examines hypotheses 2, 4 and 6 listed on the homepage of the KRIS Gualala site.

General Comments

In addition to some specific comments on specific issues and interpretations regarding the hypotheses noted above, I have one general comment regarding the structure of the home page. A link is provided to the State NCWAP Report for the Gualala at the top of the page, and an accompanying explanation of the context of information provided at that link. Immediately below on the homepage is a listing of six hypotheses that are apparently alternative/dissenting hypotheses regarding conditions, causes and effects in the Gualala River watershed developed by IFR. I say "apparently" because there is no statement regarding the origins or authorship of the material contained in these links. If these links remain, a clear statement regarding their context and authorship should be provided on the home page, including any disclaimers requested by State agencies who's work and conclusions might be confused with IFR's work and conclusions.

IFR, apparently on its own initiative, develops conclusions regarding cause and effect that the NCWAP process rejected. In particular, claims by IFR that sediment size characteristics present in portions of the Gualala where data are available are attributable to logging that has occurred since the mid-1980's ignores watershed geologic conditions and historic management of the Gualala River. Large swaths of terrain are mantled by deep rockslide and earthflow materials mapped by California Geological Survey (CGS) in the NCWAP report. These geologic materials are very likely to be significant long-term, natural sources of relatively fine-grained sediments. In addition, the NCWAP report documents extensive and locally severe watershed disturbance by logging in the 1950's and 1960's that are of a magnitude that greatly exceed more recent logging disturbance. Sediment generated by these disturbances, particularly the gravel fraction of the bed load material in the Gualala, would be routed through the river channel network over a period of decades to centuries. Consequently, sediment characteristics in the lower portions of major tributaries c. 2000 in the Gualala where data are available cannot be attributed to recent management influences in isolation. IFR concludes that because there have been recent harvest

activities, any sediment characteristics that might be deleterious to fish habitat are in fact attributable to recent management activities, and ignores evidence to the contrary.

IFR's hypothesis that current surface sediment sizes in the Gualala where data are available are detrimental to fish depends to large extent on unpublished work by Knopp (1993). In a previous memorandum to GRWC, I argued that the Knopp data could not be compared to the Gualala data because of significant differences in the channel gradients where the data were collected. Participants in the NCWAP process agreed. I also raised questions regarding some of the assumptions and methods used in the Knopp study, and a statement regarding the limitations of applicability of the Knopp data can be found on the website. A link to this memo is provided in the bibliography on the website, but the central point of the memo is ignored in IFR's hypothesis development. IFR proceeds to compare the Knopp data to the Gualala data, and cites this comparison as evidence that surface size distributions of sediment in the Gualala are detrimental to fish. It is possible, if not likely, that sediment sizes in the lower gradient reaches of the Gualala where most of the data currently available have been collected are controlled to a large extent by declining stream gradient. This decline in gradient occurs as the Gualala River encounters deep alluvial valley fills that have been deposited over geologic time in response to rising sea level, a point of geologic history developed in some detail by CGS in the NCWAP report.

In summary, the IFR hypotheses and the argument presented to support them are built on selective use of data and ignore substantial, credible data contrary to their hypotheses. This is troubling in that it may tend to undermine conclusions based on interdisciplinary analysis of the data conducted in the NCWAP process; it appears that this is the intent of IFR's presentation of alternative hypotheses.

Some additional technical comments on the hypotheses and supporting argument presented by IFR are presented below.

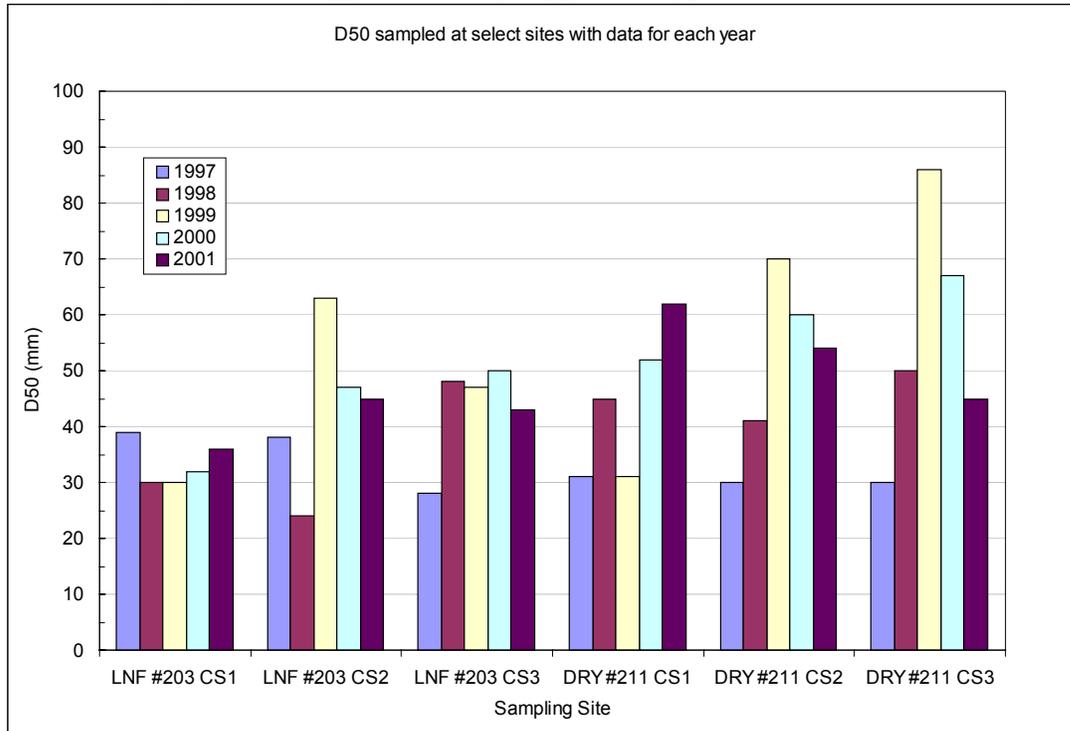
**IFR Hypothesis #2: Elevated levels of sediment in the Gualala River limit coho salmon and steelhead trout production.**

1. Elevated levels of fine sediment limits production - clearly salmonids need coarse sediment for spawning. The presence of gravel-textured deposits in the lower reaches of Gualala River tributaries is ordinary and expected; why is this construed as detrimental to fish habitat? Again, reference my prior memorandum regarding the Knopp study.
2. If smaller size bedload is being moved "during low recurrence interval storms", one could just as well make an argument for a coarsening of the bed or bed armoring?
3. The graph that shows D50's sampled from '97 to '01 is difficult to interpret with respect to time trends; it does not show any clear trends in terms of coarsening or fining. There are only six stations that were sampled every year, and the data does not suggest any clear trends evolving from these sampled sites. An alternative graphic presentation of some of the data is presented below.
4. The pool data (V\* and lack of pools over 3 ft deep) appears to be the most compelling data that supports the hypothesis.

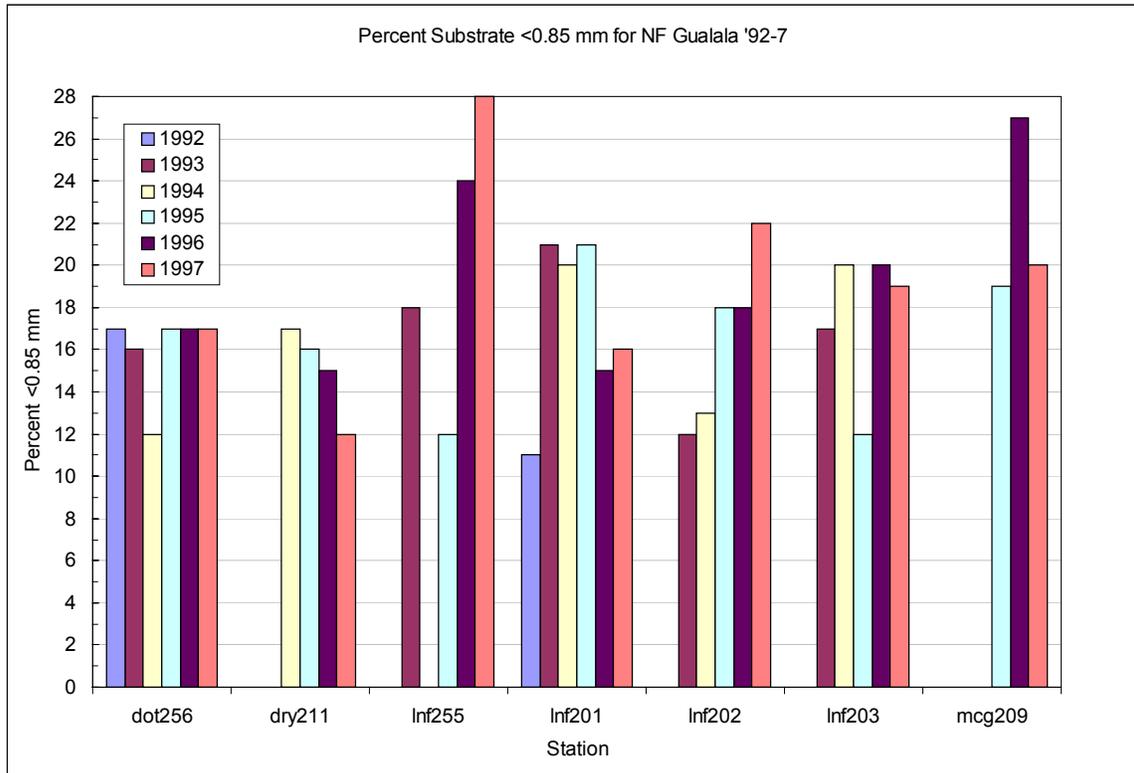
**Hypothesis #4: Sediment contributions to the Gualala River from recent land use management (1985-2001) are significant and preventing recovery of aquatic habitat.**

1. It seems that overbank flows in this type of environment would be welcome - floodplains are being inundated like they should be, with attendant unspecified ecological benefits.

2. The two graphs do not appear to clearly support the hypothesis.



This figure does not show any clear trend in either direction of coarsening or fining of particle sizes at sampled sites with a complete 5-year record. In fact, 5 of these 6 sites have coarser surface textures in 2001 than they did in 1997.



This figure shows the percent of channel substrate that is less than 0.85mm. 14% is the level set by TMDL standards. No clear temporal trends are evident from this graph, but it does suggest that enough fine grain material is present to degrade the quality of spawning gravels. Regardless of TMDL target levels, historic or natural levels of fine sediment in the bed are unknown.

**Hypothesis #5: Recent riparian timber harvest has exacerbated water temperature problems and further depleted large wood supply in many Gualala River subbasins.**

1. The data does suggest that current conditions would lead to higher instream temperatures, but the watershed is on a trajectory towards recovery. It is mentioned that harvest after WWII “substantially depleted riparian zones”, a fact that is not refuted by anyone. This historic management impact on riparian zone forest stands implies that the watershed can recover to the point where desirable shading and instream temperatures might be attained. GRI/GRWC data regarding riparian stand conditions demonstrate the presence of well-stocked and/or recovering riparian stands. It should be clearly stated that current management practices are restoring riparian forest conditions, and that forestry impacts on streamside shade and instream temperature that were likely to have unambiguous, significant impacts occurred in past decades.
2. The riparian zone of Robinson Creek is now 8 years older than when the data was collected. It seems reasonable to assume that today more than 25% of the trees will be greater than 12" diameter; 45% of the trees in 1994 were medium to large which suggests that there should be a fair amount of shade cover already.
3. It is unclear why the SHALSTAB model results are presented to support this hypothesis.