State of California — Department of Fish and Game

Memorandum

Date : 29 September 2004

To : Robert W. Floerke, Regional Manager
California Department of Fish and Game
Central Coast Region
P. O. Box 47
Yountville, California 94599

From : Kris Vyverberg,
Engineering Geologist/Geomorphologist
Fisheries Engineering Program
Statewide Technical Assistance Team
Native Anadromous Fish and Watershed Branch

Subject : Lily Timber Harvest Plan (1-04-032 MEN), North Fork and Little North Fork of the Gualala River, Mendocino County

This memorandum addresses portions of the Gualala Redwoods Incorporated (GRI) Timber Harvest Plan for areas of the North Fork and Little North Fork of the Gualala River in Mendocino County. In addition to observations made by myself and Central Coast Region Timber Conservation Program staff during the Pre-Harvest Inspections (9 April and 18 May 2004), my comments and recommendations are also based on my review of the following documents:

- The Timber Harvest Plan (THP),
- The report summarizing questions from the THP Review Team and GRI's response (California Department of Forestry (CDF), 26 March 2004),
- The Pre-Harvest Inspection (PHI) report from CDF (Cafferata, 25 May 2004),
- The PHI report and request for additional information from the California Geologic Survey (CGS)(Spittler, 15 June 2004),
- GRI's response to the aforementioned CGS report (GRI 2004), and
- The supporting literature as referenced in the text, the complete citations of which are included at the end of this document.

Overview and Background

The physical evidence indicates that the floodplains of the North Fork and Little North Fork of the Gualala River in the THP area are well connected to their rivers and are active during as yet defined but apparently frequent flow events. The Forest Practice Rules (hereafter referred to as Rules) implicitly recognize that the river channel and its floodplain inseparably comprise a stream by defining the channel zone to include the *bankfull channel and floodplain*. Timber harvest activities are excluded from the *bankfull channel and floodplain* area with the exception of selection or thinning operations specifically directed to assist rehabilitation and recovery of the channel zone and aquatic habitat. On the other hand, the supporting definition of the Watercourse and Lake Transition Line (WLTL), or landward boundary of the channel zone, is currently defined in such a way as to commonly separate the active channel from its floodplain by locating the WLTL below the bankfull stage and within the active channel. GRI

seemingly acknowledged this conflict by locating the WLTL as specified in the Rules, but then adding a 75-foot buffer between the stream and major harvest activities. The buffer includes a no-cut zone that extends 30 feet landward from the stream channel to a thinning zone that extends 45 feet beyond that.

The elements of the THP that I speak to here are those addressed by GRI in their response to resource agencies comments and requests for additional information (Cafferata 2004; Spittler June 2004; GRI 2004). These elements include:

- Identification of the active side channels as opportunistic drainages developed on old skid trails and roads, and designated as man-made ***Class IV watercourses***;
- The contention that side channel use as winter refugia by salmonids would occur – at best – for a day or two every decade or so;
- The contention that rivers in the THP area are unlikely to abandon their existing channels and establish new alignments (avulsion) because the channels of the North Fork and Little North Fork of the Gualala River are stable, and
- The use of buffers between the river and major timber harvest activities as the concept is applied by GRI and concurred with by CDF and CGS.

Whether intentional or not, the proposed no-cut and thinning buffers honor the intent of the *channel zone* definition by extending a higher level of protection to the stream corridor than would exist by applying the definition of the WLTL boundary alone. On the other hand, the sensitivity of floodplain areas to harvest activities is directly related to how active its surfaces are and where the ecologically significant habitat is relative to harvest boundaries. In the absence of any hydrologic or geomorphic analyses to help us refine our understanding of the relation of the floodplain surfaces to their rivers we're left with only the physical evidence to consider. This evidence indicates that ***hydrologically and ecologically important portions of these floodplain surfaces are outside those areas protected by the proposed buffers***. CDF and CGS staff concur with this interpretation to varying degrees (Cafferata 2004, Spittler 2004).

Comments and Recommendations

1. **The Department should reject the proposed Class IV watercourse designation for active side channels on the floodplains of the THP area. These features should be designated and extended the protection of the Class I stream channel of which they are functionally a part.** GRI contends that side channels, so briefly inundated and so infrequently available for use by salmonids, don't require the same level of protection as Class I watercourses. There are several basic flaws in this reasoning:
   - The active side channels are not unique watercourses. Rather they are ***segments of the total channel cross section that are intermittently active and that are inseparably part of their Class I designated main channels.*** Specifically Dry Creek, and the North Fork and Little North Fork of the Gualala River.
   - Adult and juvenile salmonids are known to utilize such side channels – and the alcove-like portions of partially inundated channels – as velocity refugia during high flow conditions. In the near-complete absence of pools with the depth and structure in the main channel to provide similar or alternative refuge, the side channels should be

viewed as ecologically important and very limited seasonal habitat worthy of a high level of protection (Gualala River Watershed Assessment, 2003).

2. **There are three problems with the contention that a 10-year recurrence interval flow is necessary to inundate the side channels, and then for a day or two at most every decade:**
   - GRI provides no substantiating hydrological analyses, such as a flood frequency analysis or flow duration curves of the frequency or number of days during which the rivers flow at this or any other flow event.
   - The ***probability*** or recurrence interval of the flow necessary to inundate the channels **only *tells us how likely this event is*. *It says nothing about when it will actually occur*.** Thus, a ten-year recurrence interval event could occur this year, next year, every year for several years in a row, or not at all for several years running.
   - The physical evidence indicates that the side channels are hydrologically functional to varying degree across a range of frequent flow events – certainly with greater frequency than from the 10-year interval event suggested by GRI in the absence of any substantiating hydrologic data. This evidence includes (1) distinct silt lines on conifers 3 to 4 feet above the base of the trees (thought by CDF to possibly be from 2000-2001 flows estimated to be 1-5 year recurrence interval events, Cafferata 2004), (2) the presence of recently deposited silts and sands on the floodplain, and (3) the presence of recent sand and gravel deposits in the side channels along with standing water, saturated soils, and woody debris accumulations.

   I don't know to what degree the side channels developed along old roads ***versus*** old roads that opportunistically followed natural ephemeral side channels. I know we saw examples of both cases during the PHIs. Regardless of to what we owe their development, the side channels are a physical attribute important to the hydrologic and ecological function of the floodplain. The value of this habitat can't be judged solely by the recurrence interval of a particular flow event. It must be judged by its ecological relevance and its availability to provide refuge when the activating flow event ultimately occurs.

3. **In harvest units with active side channels, the Department should request that either the protective buffer be extended to include the side channels, or that the WLTL be relocated landward of the active side channels.**

4. **I tend to agree with GRI's contention that the proposed harvest activities are unlikely to precipitate a channel avulsion event. However I do not share their confidence – nor that of CGS staff – that channel avulsion is unlikely to occur in the THP area.** As support for their conclusion that the channels are stable and unlikely to relocate, GRI cites their channel survey data showing no more than ± 0.5 feet of change in channel elevation since 1998, and the conclusion of the Gualala River Watershed Assessment (GRWA) that the instream conditions of the North Fork Subbasin are improving (NCWAP, 2003).

   Even with the qualitative versus quantitative nature of the habitat surveys, I'm at a loss to explain how the GRWA determined that the dramatic loss of pool habitat they report equates with channel stability and improved instream conditions. And it is a mistake to

assume – in the absence of any other hydrologic or geomorphic data – that the persistence of a particular channel condition is equivalent to stability or some return to a quasi-equilibrium condition denoting ecosystem well being.

It is my opinion, that the North Fork and Little North Fork channels in the THP area have an excess accumulation of sediment. This ***aggradation*** of bed materials is reflected in (1) a low pool frequency in general and shallow pools where pools exist, (2) the movement of coarse sediment into floodplain areas and along lowland roads where fine sands and silts would typically be deposited, and (3) the recent relocation – or avulsion – of a channel segment in harvest unit 15 of the THP area. Collectively these conditions suggest that the bed of these channels has increased in elevation and that the stage has been set for avulsion in response to the right set of flood event conditions. I recognize that the lingering effects of past logging activities may dominate this process, and I'm not suggesting new harvest activities be avoided altogether. Nor am I suggesting that if channel avulsion occurs that it will necessarily be a negative event. I am saying the GRI should demonstrate that my assessment is incorrect or acknowledge that the conditions for avulsion are present and develop a THP that manages their harvest activities around this potentiality.

5. **The Department should reject the streamside buffer concept as it is applied in this THP.** GRI contends the 30-foot streamside buffer is more than generous given that their reading of current literature on this topic suggests that a 10-foot buffer is adequate to protect the primary source of wood to the river. CDF and CGS generally concur with this perspective. There are, however, a number of problems with this assertion. The two most problematic are that (1) this particular buffer concept has been removed from its contextual framework of a watershed-based wood recruitment analysis, and (2) the recruitment results extrapolated from other watersheds are being applied to the Gualala North Fork Subbasin in a one-size-fits-all fashion that fails to consider the influence of site-specific conditions (see comments above in 4). Bank erosion rates –and thus wood recruitment – from geomorphically similar floodplain environments can vary greatly between watersheds. The degree of variability arises from site-specific variations in bank erosion rates, past logging practices, the local flood or other disturbance-event history, and the degree of interaction between a particular river and its floodplain. The potential for great human-induced and natural variability between basins argues strongly against extrapolating wood recruitment results – and buffers based on these results – from one watershed to another. The argument is all the more compelling when the THP lacks any hydrologic or geomorphic data to suggest that recruitment rates and buffers developed elsewhere might be suitable for use in this watershed. However generous it might otherwise appear to be, the buffer doesn't extend landward far enough to protect the total channel cross section, the hydrologic function of the floodplain or the ecosystem attributes associated with the floodplain.

6. **GRI should provide the context for the buffer of the type they propose by completing a watershed-based analysis along the lines suggested by the literature that they and CDF reference.** If GRI would like to develop stream corridor buffers along the lines they suggest, I recommend we encourage them to do so (Benda and Associates 2004; Benda et al. 2003; Benda et al. 2002). Such an approach would certainly be preferable to using the

WLTL to define the landward boundary of the channel zone. But as noted above, we should not accept buffer widths based on results from other basins without some evidence to support such an extrapolation.

7. **With the protective measures the THP proposes in place, I can see no geomorphically based reason to object to the proposed thinning activity.**

I think there is genuine merit to the stream corridor and wood recruitment buffer concept proposed by GRI and supported by CDF and CGS staff. But GRI has done little more than cite the literature; they provide none of the site-specific hydrologic or geomorphic analyses necessary to apply the concept in a meaningful way, or for me to use to evaluate how well the THP will protect the natural resources of the State.

Please call if I can answer any additional questions.

Regards,

Original signed by

Kris Vyverberg
Engineering Geologist/Geomorphologist
Fisheries Engineering Program
Statewide Technical Assistance Team

Attachment

cc: Department of Fish and Game
Central Coast Region
Rick Macedo, Timber Conservation Program Manager
Stacy Martinelli, Timber Conservation Program
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