

## Comments on Central Coast Regional Board Proposal for Monitoring THPs

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### Deciding on the level of required monitoring:

- An NOI is to be submitted by the applicant for waiver. This should provide sufficient information for Regional Board staff to determine which "tier" i.e., risk category, the proposed THP is in. It is unclear what responsibilities rest with the applicant versus the Board staff. In the staff report, it is stated that the necessary "data (are) available in any Timber Harvest Plan." I am not certain about that. Also, is the applicant's duty to provide the data and the Board staff's duty to conduct the required analysis?
- The information required to conduct the tiering exercise is: 1) cumulative effects ratio (CER), which is the percentage of the encompassing planning watershed (defined in CALWATER as ~5000-10,000 acres) that has been harvested in the last decade plus the acres to be harvested; 2) drainage density index (DDI), which is the sum of watercourse length in Class 1, II or III streams (weighted by multiples of three, two and one, respectively) within the THP area divided by the acres to be harvested; and 3) soil disturbance factor (SDF) which is determined by the nature of the operation (ground-based or aerial), length of existing and proposed road, number of crossings, etc.
  - I have some reservations about the technical basis for these measures. For example, how will the appropriate watershed boundary (and area) be determined for calculating CER? If a watershed is too small or too large, it could bias the results. Also, will this ratio simply reflect timber harvesting? What about other potentially deleterious land uses? For example, in a watershed with little timber harvesting, there might be substantial residential development that is having an ongoing impact on water quality. In such a watershed, I could argue for the use of percent impermeable surface area as a proportion of watershed area as a more defensible index of watershed condition.
  - Regarding DDI, it is an unorthodox version of drainage density. Drainage density is typically calculated by summing the length of watercourse in a watershed and dividing that by the watershed area. I know of no literature supporting the method proposed. I am not certain whether or not the proposed method would provide a biased estimate of risk. I do think drainage density is an important risk factor. Researchers have shown that it is (of course) correlated with the number of stream crossings by roads. In turn, these crossings are the most important points for water quality impacts to occur. I would recommend that drainage density be calculated in its usual way and then interpreted for risk. There is no scientific basis that I am aware of for interpreting this newly defined DDI in relation to risk.
    - One potential option that occurs to me would be to create a ratio of site drainage density, calculated in a normal way, to watershed drainage density. This would provide a measure of the risk at the site as compared to the risk in the watershed as a whole. An analogous index, called the

Hack Index, is used to calculate stream power at a given stream reach in a watershed. It is a ratio of channel slope at a given reach to channel slope in the stream as a whole.

- Weighting the length of stream by stream class is a bit troubling to me. I understand the intent relative to beneficial uses. My concern is that this ignores two things: where operations will occur and what protections will be provided based on watercourse class. For example, on Class I watercourses, there is a mandatory requirement for retention of 85 percent canopy within 75 feet of the stream. Less stringent protections apply to Class II and III streams. In a sense, I could see reversing the weighting since Class III streams receive less regulatory protection.
- The SDF is a potentially useful index. My questions about it pertain to two things: subjectivity in its estimation and whether or not the SDF should incorporate proposed mitigation measures. The obvious conclusion of any SDF analysis will be that aerial operations have lower values than ground-based operations. What if the ground-based operations include specific mitigation measures to offset their effects? Even though this would be a subject for implementation and effectiveness monitoring, it does seem consideration should be given to proposed mitigation measures. .
- On the basis of the values obtained for CER, DDI and SDF, THPs are placed in a Tier I, II, III or IV category. This determines whether or not the plan qualifies for a general conditional waiver (Tiers I, II and III) or individual waste discharge requirements (Tier IV). The tier designation also determines the level of required monitoring. For example, THPs in Tier I are presumed to pose little risk because they have low CER, DDI, and SDF values. They are only required to undergo standard monitoring by CDF for compliance with rules. At the other extreme, plans in Tier IV require individual permits and a customized monitoring plan. The outcomes of the tiering process are determined by the inputs to it so the questions I have about CER, DDI and SDF pertain to this as well.
- I have some other specific comments about CER. It corresponds to the equivalent road acres (ERA) concept. The ERA has been used by the US Forest Service for a number of years. Its scientific basis lies in research done in Oregon by Dennis Harr on the effects of timber harvest on the magnitude of peak flows. In its general application, it does not apply to the prediction of erosion or water quality impacts and making a scientific link between ERA and instream conditions has proven to be difficult. Also, the proposed threshold of 15 percent should be re-considered. The 15 percent threshold has been used by the Forest Service but has not been validated through research. Some research has indicated that timber harvesting causes increased peak flows at relatively frequent recurrence intervals ( $\leq 2$  year flows) when the area harvested with clear-cutting approaches  $>20$  percent of the watershed. The method of harvesting (i.e., selective versus clear-cutting) should be taken into account. Is a high CER in a watershed that is selectively logged equivalent to a high CER in one that has a significant component of clear-cutting (e.g., Freshwater Creek)? In work that I did with a modified ERA, we adjusted the acres by considering both geologic, slope and hydrologic factors, as well as logging practices. Essentially, we weighted land by risk and logging method and

produced ERA indices that we felt were more reflective of potential outcomes. It seems to me that the calculation of CER should take into consideration the location of past and proposed management and harvesting methods employed.

Proposed monitoring program:

- Implementation, effectiveness, forensic and water quality compliance monitoring are proposed. What would actually be done for a THP depends on the outcome of the tiering. Monitoring Level A would simply be compliance monitoring (no threat is posed by the plan). Monitoring Level B, implementation and effectiveness monitoring would apply to low risk plans. Monitoring Level C, forensic monitoring, would be done in conjunction with Level B to detect and correct problems. Monitoring Level D has two sub-levels depending on the presence of Class I and II streams and activities near them. It involves water column monitoring, including turbidity.
  - As evidenced by my presentation to the Board at its monitoring workshop in June 2004, I strongly support visual and forensic monitoring. It is simply a matter of good land stewardship. I would say that the majority of landowners managing for timber production exercise “forensic monitoring” as a matter of course. It is my opinion that in addition to monitoring compliance with forest practice rules, visual and forensic monitoring should be required for any waiver.
  - I am more concerned about implementation, effectiveness and water quality compliance monitoring.
    - In work that I have been doing with the Department of Fish and Game on fish habitat restoration project monitoring, we have recommended that all projects be subjected to implementation monitoring. I would say the same for THPs. I believe that is in the realm of rule enforcement by CDF. I disagree that effectiveness or water quality compliance monitoring is a necessary supplement to implementation monitoring. Good implementation monitoring coupled with visual and forensic monitoring should tell you if the rules and waiver conditions are effective. Moreover, the issue of effectiveness monitoring is vaguely presented in the proposed program description. To be useful, observations on effectiveness should be structured around very specific questions. I don't see that in the proposed program description.
    - I would recommend that both implementation (i.e., compliance) and effectiveness monitoring be performed using some tools for organizing observations around critical questions. We have developed such tools for the Department of Fish and Game. Although not directly transferable, they suggest an approach and I would be happy to share them with Board staff.
    - The proposal for water quality compliance monitoring seems to ignore a couple of things. Regarding temperature monitoring, why would it be required on Class I streams when the rules require retention of 85 percent canopy within 75 feet of the stream? I note that temperature monitoring may only be required if there is harvesting along Class I or II streams. In practice, little if any harvesting will occur on Class I streams. Monitoring

Class II streams may be excessive, since many are dry in the summer months when water temperatures are critical. Is the underlying premise that elevated temperatures in Class II streams would propagate downstream to Class I streams? That notion is not supported by scientific studies. Finally, if there are temperature issues that pre-date the THP, that would be a concern but monitoring the THP won't solve the problem.

- Regarding water column monitoring, the focus is on turbidity. My work on this and the work of many others demonstrates that turbidity monitoring can be done above and below new or reconstructed stream crossings and produce meaningful results. Monitoring THP impacts at downstream locations not associated with crossings is highly problematic without several years of pre-treatment data collection. That is why forensic monitoring of THP impacts has proven to be a superior approach.
- Generally, I would recommend the following. All THPs, regardless of risk category conduct implementation, visual, and forensic monitoring. If concerns about effectiveness of specific practices arise during the course of compliance monitoring, then effectiveness monitoring may be prescribed for those practices. In all cases, there should be tools developed for systematic monitoring based on questions to be addressed. Even forensic monitoring should be done systematically, e.g., potential trouble spots should be identified and visited after stressing rainfall or streamflow events. The key should be locating problem areas in a timely manner and correcting them if possible.
- I don't support temperature monitoring except in cases where there will be a defined impact on the riparian zones of Class I and perennial II streams. That impact has to be significant enough to pose the risk of altering water temperature. If a stream is in an impaired condition prior to timber harvesting, that should not be a basis for requiring monitoring.
- Similarly, I would not recommend turbidity monitoring except in cases where a stream crossing will be constructed or re-constructed. Monitoring should only be done above and below the crossing. We have developed methods for this type of monitoring and can provide them on request.
- Other comments on proposed monitoring program and procedures.
  - I am concerned that the Regional Board staff is taking the position that it must require monitoring and presumably conduct analyses independently of its sister review team agencies. Although it has proven exceptionally difficult to get the agencies to agree to an approach to THP monitoring, that should not dissuade you from continuing to try. At the present time there is a proposal by CDF to develop a process for multi-agency THP monitoring. Rather than pursue its own path, I would recommend that the Regional Board(s) engage in the development of this process. In my opinion, having the perspectives of all agency specialists while conducting monitoring is extremely important.
  - Photo-point monitoring, as described, could be difficult. We have developed a photo-monitoring protocol for the Department of Fish and Game. The key difficulties are: 1) locating photo-points and 2) effects of vegetation growth on visibility. We have opted for locating photo-points and re-taking photos as follows. Geo-reference the photo-point location in relation to an established

landmark such as a bridge or other permanent feature. Navigate to the photo-point location recording bearing and distance. A marker may be used but it should not be assumed permanent since they have a habit of disappearing. Also, many landowners do not appreciate having markers on their property. When re-taking photographs, use the former photograph and its specifications to frame the new picture. Regarding the effects of vegetation, this is a common problem. Returning to a photo-point location in the future, one finds that the former view is obscured. There is no simple solution to this. In our photo-monitoring protocol, we suggest various ways to overcome this problem while selecting photo-points and subjects.

- I have some additional comments on the section on “Data Logging and Reporting”.
  - Logbook is a rather generic term. As mentioned above, I think that monitoring (of all kinds) should be systematic and, if possible, involve the use of standardized forms and procedures. Otherwise, it may be difficult to conduct quality control.
  - Sediment release reporting on quantities of one cubic yard seems a bit optimistic. In our work with the Department of Fish and Game, we have found that it is difficult to estimate quantities of less than 5-10 cubic yards. For smaller quantities, measurement e.g., of voids, is necessary. I would recommend that the Board staff stipulate reporting of sediment delivery in excess of 5 cubic yards, whatever the source.
  - The road inventory program is a good idea and one that most major landowners use. We have developed road maintenance monitoring procedures and forms that might be helpful to you and can be provided on request.
  - The landowner/applicant is required to report violations, presumably on the basis of forensic monitoring. Although a good idea, I expect it will arouse some criticisms from people opposed to timber harvesting.

That concludes my comments on the proposed program. I hope you find them helpful. Please feel free to contact me for any clarification or discussion.