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TO: Tim Quinn and Members
Monitoring Design Team

FROM: Kenneth Currens, Chair

SUBJECT: Comments on the Monitoring Plan for the Forestry Module of the Governor's Salmon Recovery Plan

Thank you for giving us the opportunity to review the Monitoring Design Team's (MDT) conceptual ideas for forest monitoring under the Forests and Fish Agreement (FFA). In general, we found the approach sound, sometimes innovative, but occasionally difficult to follow because of inconsistent use of terms, unfamiliar jargon, or confusing organization. Recognizing that the document was a working draft and that both the presentation and many ideas still need to be refined and tested, we focused most of our comments below on the three general questions that you asked in your letter to us dated December 17, 2001.

One general area that the MDT could explain better is the relationship of the activities in this plan to other monitoring processes and adaptive management. We recognize that the MDT's responsibility was a specific technical framework for only part of the monitoring designed to meet the demands of the FFA. We suspect, however, that many readers will want and need to know more about the relationship of this effort to other monitoring because of the general interest in monitoring and because proponents of the FFA adaptive management approach have argued that the approach is a model for other areas. For example, although the authors of this document were not responsible for developing the compliance monitoring part, without some description of what and how compliance monitoring will occur, it is difficult to know how useful the MDT's efforts will be for adaptive management. Likewise, the document could use a better description of the connection to overall forest monitoring and the statewide comprehensive monitoring plan and salmon and watershed health. Similarly, within the FFA monitoring scheme, the coordination of MDT intensive monitoring projects with the scientific advisory groups (SAGs) needs better explanation and support.

Question 1: Is the conceptual approach of using three sampling (extensive, intensive, and BMP evaluation) scales appropriate? Do they adequately address the research questions we pose in an efficient manner? Are the sample scales clearly explained and adequately integrated?

We found the proposed use of extensive, intensive, and prescription monitoring to be sound. The geographical scales and associated sampling intensities appeared to be appropriate for the questions that the MDT is asking. No approach will be perfect, of course, and the plan provided a good discussion of the limitations of their approaches. The following changes would be useful:

- The ideas could be presented more clearly by using consistent terminology. For example, "prescription monitoring" and "BMP evaluation" seem to be used interchangeably. The document refers to "overall performance goals" but does not describe what these are or who determines them. It is not clear whether "resource areas" is a general term or has a specific technical definition. Is "DFC" (desired future condition? Acronym needs to be defined) more like performance targets or overall goals?
- Develop a graphic or table that showed the links between the questions that are being asked, the types of monitoring (compliance, effectiveness, validation), MDT approaches (extensive, intensive, prescription), scales, and variables and indicators. The connection and organization of the MDT approaches and *effectiveness monitoring* (directly related), *validation monitoring* (indirectly related), and *compliance monitoring* (unrelated), is important because most readers will be more familiar with these types of monitoring. This helps identify the relationship to adaptive management. Several graphs and tables provide different levels of detail on the questions, approaches, scales, and variables in different places in different contexts throughout the document, but it is hard work for the reader to relate all these. Connecting them all in one place would be useful.

Question 2: Do we have the appropriate type and number of monitoring variables to measure effectiveness of the new Forest and Fish rule package at appropriate spatial and temporal scales? Do we strike the right balance between monitoring types? How and where can we make improvements?

We had mixed reactions to the selection and discussion of monitoring variables. Aspects that we found encouraging were the recognition of spatial and temporal variability and the analysis of statistical power. We found the selection and organization of variables and indicators somewhat confusing. The selection also presumed a familiarity with FFA rules and the Endangered Species Act that many readers or scientists may not have. The following changes would be useful:

- Without familiarity with the FFA, readers need a better description of the expectations for these variables than "a time frame needed by regulators and politicians" (p.1). This helps us and others assess whether the variables are really appropriate. An additional problem in assessing whether these are appropriate is that the actual mix is site specific and must be tailored accordingly. This could be explained in more detail.
- Be consistent and clear by what you mean by "variables," "indicators," and "conditions." In different places in the document, variables for the same monitoring objective were presented as a general condition (e.g., "stand condition"), which is never directly measured, and at other times the actual indicators to be measured were listed. Table 2 helps but it needs to be complete. For example, variables are listed in the intensive monitoring section (p.38-50) that do not appear in Table 2 under intensive monitoring, and we suspect that some of the metrics identified in this section also explain what will be measured in extensive monitoring (Table 4). This could be better organized.
- It is very important to distinguish between real data (what is measured) versus derived data (what is calculated). Derived data have additional sources of error and they can potentially change. Derived data can also inadvertently result in circular reasoning, such as when data are derived from a model and then used to validate that or similar models.

This rarely appears important to those familiar with the origin of the data, but it can be significant when others use the data for other reasons.

- As indicated early, it was difficult to assess whether the balance between the three types of monitoring will be appropriate without more information on the compliance monitoring program. Although we recognized that the MDT was not responsible for designing or implementing compliance monitoring, a complete description of forest monitoring will need to include it.

Question 3: Do we adequately explain how to derive realistic performance targets for measuring success of rules developed from the Forest and Fish Report?

The discussion on identifying appropriate performance targets was perceptive. We supported the approach suggested by the MDT— developing a range of parameter conditions and rates of change based on comparisons with unmanaged watersheds — and for its more realistic use of spatial and temporal variability. The discussion of variability could be made stronger by reference to process domains (from David Montgomery's work) and you could take the discussion of disturbance a step further and mention that there are weather cycles that influence many subsequent events (e.g., mass wasting, fire frequency, flooding, pests such as spruce budworm, pine bark beetle irruptions). This is why succession in geomorphic, forest and aquatic faunal composition will not follow a straight path, but wobble. Concerns that we have include the following:

- The development of monitoring for biota, especially salmon, is logical but it is not clear how practical the MDT approach is. This area could use more development. The MDT identified an appropriate scale for this kind of monitoring, but the plan needs a better description of how to control (in an experimental sense) or account for human activities at this scale that could confound the results. Likewise, the analysis will need to account for density effects on productivity. Power analyses are needed to assess the suitability of data from invertebrates.
- A more fundamental concern is circularity of assuming that unmanaged watersheds are necessarily functioning properly. We do not have a good solution to this. The problem is that if you assume they are functioning properly because they have certain characteristics, then you already know the characteristics that indicate functioning watersheds and it makes no sense to measure progress based on unmanaged watersheds. Otherwise, how do you know? The same problem occurs with using models of functioning watersheds and historical reconstructions to guide development of interim standards. The expected relationship between variables such as temperature and time from which we would derive rates of change appears to depend on assumptions about how different prescriptions would work, which is also what you are testing. If the prescriptions do not attain a certain rate of change, do you conclude the model is wrong or that the prescription was unsuccessful? One of the dangers of using this for interim standards is that it may be politically more expedient to conclude the former unless precautionary management approaches are also used.

Once again, thank you for the opportunity to review your preliminary work and provide you with comments. We look forward to seeing a more developed plan.