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SUBJECT: Comments on the Environmental Impact Report for the Comprehensive Update to the Jackson Demonstration State Forest Draft Management Plan

To the Board of Forestry:

Please accept these comments regarding the Environmental Impact Report for the Draft Jackson Demonstration State Forest Management Plan SCH#2004022025.

I am founder and Executive Director of the Conservation Biology Institute (CBI) located in Corvallis, OR with a satellite office in San Diego, California. CBI is a 501(c) (3) non-profit dedicated to conduct applied conservation biology research and transfer our understanding to the greater public through education and public service. We currently have 15 staff located in the two offices with many years of professional experience in conservation science. One of our strengths is applying computer mapping technologies to assessing natural resources (particularly forests) through descriptive and prescriptive planning. My professional qualifications include a Masters in population genetics and a Ph.D. in landscape ecology and conservation planning. I have authored numerous reports and peer reviewed papers on various topics including forest conservation planning using GIS, late seral forest mapping, and forest fragmentation. I co-authored sections in a book entitled, “The Redwood Forest: History, Ecology, and Conservation of the Coast Redwoods” and provided comments on the Jackson Demonstration State Forest Management Plan and 2002 Draft EIR.

Although I provided extensive comments during the last review process, two topics were of particular concern to me at that time – lack of consideration of the regional context and the treatment of cumulative effects. In light of my professional expertise, I will focus my comments on the Biological Resources and Cumulative Effects sections in the current DEIR report with some special emphasis on the GIS mapping aspects of the reported work.

OVERALL REPORT ORGANIZATION AND CONTENT

I have reviewed numerous EIRs during my career, and this one was the most difficult for me to review to date by far. The document is incredibly long and poorly organized (e.g., content related to the same topic scattered in multiple places throughout three volumes). More importantly, the document lacks proper balance – enormous amounts of background material are provided but painfully little logical synthesis offered. EIRs are expected to be read and understood by a broad, non-technical audience. This EIR is challenging for the most experienced professional to fully understand and critique. My guess is that most in the general public would find it virtually incomprehensible. The majority of the three-volume report is jargon-filled background material, and it reads like disparate pieces thrown together in outline form with little regard for thoughtful integration or synthesis. Background material is important, but so much of it in this report is unnecessary and often presented in such raw form as to make it virtually meaningless to most readers. Instead of being educated and informed, the reader is simply bludgeoned by tables, charts and descriptions that have little bearing on the impact assessment. It reminds me of my high school teaching days when some students would virtually copy entire sections from text books and try to pass it off as a thoughtful synthesis. They thought I would give them high marks based on the sheer length and depth of technical content (whether it was appropriate or not) and overlook the lack of critical thought and organization. There was obviously some new analyses carried out (some of which I comment on later in this review), but the document largely depends on existing studies that were then cobbled together to make forest management recommendations.

ALTERNATIVE COMPARISON TABLES

I found the alternative descriptions to be quite vague, and I especially found myself wanting to see how alternatives compared to one another spatially. Maps were used throughout the DEIR that helped bring some focus for me (including a fairly lengthy Maps Section at the end of Volume 1B). It would have been more helpful to see the alternatives presented in map form as well.

Also, I found the comparison tables at the end of many of the sections of little or no value. The impact levels – beneficial to significant – gave me little information to evaluate the alternatives. Out of 96 separate items that I found in the DEIR, 63 (66%) performed identically according to the impact levels. A better evaluation model would be constructed to help discriminate alternatives. For most of the items examined, the alternative plans would actually perform along some continuum, and that would be a much better way to report and evaluate them.

If we go back to what was presented in the DEIR, 30 items showed categorical differences between the plans, and the highest performing alternatives were Alternatives E and F – dramatically so in some instances. The tables clearly show the preferred alternative was inferior to many of the other alternatives for most of these 30 items and were the same for all of the others. I fail to see the function of having the comparison tables. If an evaluation and decision framework would have been developed ahead of time and presented for review, it would have allowed the assessment team to explain the pros and cons of each alternative more clearly and explicitly. The DEIR lacks any comprehensive assessment and discussion of the alternatives. As it stands now, the comparison tables do little to help with understanding the plan differences pertaining to goals, values, and potential impacts.

AQUATIC RESOURCES

It is made clear by the background material provided that a number of the watersheds found within JDSF are experiencing serious environmental problems when it comes to overall aquatic ecosystem integrity and providing viable habitat to listed aquatic species (e.g., coho salmon) and other aquatic species of concern. The North Fork of the Noyo, the South Fork of the Noyo (including Parlin Creek), North Fork of the Big River (including Chamberlain and James Creek) and South Fork of the Big River have all been degraded significantly due to past forest practices and road building.

I found the background material in this section to be extremely erratic – for some topics (e.g., coho salmon) too much information was provided, and not always the most important pieces of information. For others (e.g., aquatic macroinvertebrates), not enough information was provided. Hard to grasp the importance of aquatic macroinvertebrates from the citation of a single paper that focused on Casper Creek. There is a good body of scientific work about the importance of macroinvertebrates and their usefulness in monitoring overall stream biological status (see Karr 1995 and Karr 1997).

There are other important omissions in the DEIR on other topics that should have been presented and considered in assessing the various alternatives. The complexity of how stream temperatures are regulated is a good example. The reader is being told that the primary driver to regulating stream temperatures is through riparian shading. While stream shading is one important factor, there are others such as ambient air temperature and ground water inflow. Bartholow (2000) found that stream temperatures are governed by a complex set of factors, not just one. So the overwhelming position taken by the DEIR that stream temperature is primarily governed by stream shading, and therefore only riparian management is required, is not accurate based on what the scientific literature states. Furthermore, Welsh et al. (2005) studying the Mattole River watershed found that the conversion of uplands to younger seral stages was likely altering ground water temperatures and thus contributing to elevated stream temperatures. Excluding these types of scientific inputs, which could have a significant impact on the final management decisions, is a serious flaw in the current DEIR. How are decision makers and the public supposed to understand the issues and fairly evaluate the merits of alternatives if all the pertinent facts are not presented.

In this section, there were approximately 90 pages of background information and 9 pages on the proposed management response which consisted of listing management guidelines within riparian strips and a very minimal discussion on monitoring hillslope conditions, stream channel conditions, stream temperatures, and selected fish and amphibian populations.

The conclusions presented at the end of this section stating project impacts would not require mitigation left me feeling like there was a serious disconnect between these conclusions and what I just read, what I know from the literature, and from my own experience. Addressing the very real issue of continuing aquatic degradation with sweeping generalizations about best management practices is totally inadequate. I would have much preferred to read a concise background section, a thoughtful synthesis of existing information with attention to spatial detail, and then a fully supported explanation about the conclusions presented. I see no meaningful watershed assessment for JDSF here.

With regard to coho salmon recovery, Bradbury et al. (1996) emphasize the need to secure existing strongholds and develop a restoration strategy anchored by these areas to bring the species back to sustainable recovery levels. Relying on data generated from KRIS projects on the Noyo River and Big River, Higgins (2002) reported that some of the last remaining regional stronghold watersheds are found inside JDSF. This type of regional contextual information helps provide guidance to any forest management plan for JDSF. Under these circumstances, any forest management activity carried out in the identified stronghold watersheds should be held to a higher standard because of its regional importance for maintaining this value. This is the kind of contextual information that I referred to that was missing in the original draft and in large part this deficiency still remains.

Using better management practices in the future will certainly be less damaging than many practices used in the past, but that does not equate to no significant impacts. The existing body of scientific literature unequivocally demonstrates that adding new stressors to already stressed systems (even if the severity of those stresses is lessened) will still result in added stress. The question is how much is too much, and too much for what? The DEIR states that State agencies (including CDF) has been directed to protect and manage California's aquatic resources through a variety of initiatives, including ESA, Clean Water Act, etc. This would be a place to start, but the DEIR lacks any clear direction about how to examine the inherent conflict between resource extraction and other values. I have intentionally focused on the biological and ecological values in my comments, but this would include other values as well (e.g., recreation, cultural, and aesthetics).

It appears from the background material presented in the DEIR that there are enough spatial databases and technical tools available to develop a functional GIS-based framework for monitoring activities on the forest, evaluating impacts of management decisions (including cumulative effects) on selected values, and for carrying out prescriptive mapping that scientifically supports and assesses the risks of activities on the forest. In my view, there needs to be some spatially explicit underpinning for managing JDSF and that foundation is currently missing. Without it, we are left with a tremendous amount of speculation that in all likelihood will later be found to be grossly inaccurate, and there will be real ecological costs associated with these inaccuracies.

BOTANICAL RESOURCES

In spite of all the background provided by the DEIR, I still do not have a good sense of what managers know about their forest with regard to the various values of interest. Does JGSF have its own species survey data? Stand-level data? I assume so, but I am not sure. If it does, why does the DEIR rely so much on the CNDDB for rare plants? Standard practice should be to do pre and post harvest quantitative plant surveys and monitor impacts for a selected set of species. Species that are known to be sensitive to logging practices such as some perennial forbs are good candidates. Plant surveys should also pay particular attention to listed species or species of concern, and carefully monitor invasive exotics. Findings from these surveys should be incorporated into a GIS database so it can be easily included with other data to determine the type and magnitude of environmental impacts from various management activities.

Old Growth and Late Seral Forests

Botanists and ecologists have attempted to describe successional stages of forest communities for a very long time. This reached a fever pitch in the Pacific Northwest during the development of the Northwest Forest Plan, particularly with regard to defining and mapping old growth conifer forests. There is no one precise definition to what old growth is between or even within different forest community types. Furthermore, old growth is not simply a function of mean forest age – it also includes aspects of structural condition – but researchers often describe seral stages by assigning approximate ages that roughly correspond to when a particular forest type is expected to possess particular characteristics for each seral stage, including old growth. For Douglas-fir, Franklin (1982) specified ranges for several seral (or successional) stages: herb and shrub (30 years), young forest (30-100 years), mature (100-200 years), and old growth (>200 years). Bingham and Sawyer (1991) characterized redwood stands in the central redwood region (the location of JDSF) as young (40-100 years), mature (100-200 years), and old growth (>200 years). With these age classes serving as approximations, it is important to point out that there is tremendous variability on the actual expression of these forests in terms of size and density of trees, amount of downed wood, and detailed expression of layered substrata. The physical expression of these forests depend upon many factors, including stand history, site condition, and disturbance history (Sawyer et al. 2000).

In the scientific literature, late seral (or late successional) usually refers to forests that are both mature and old growth (see Jiang et al. 2004 and Strittholt et al. In Press). This is pertinent in the DEIR since there appears to be considerable confusion about this issue. In order to evaluate the management alternatives for JDSF, it is important to know the approximate ages of the forest stands throughout JDSF and to have this mapped. Only then can the alternatives be compared and impacts fully assessed. The DEIR provided detailed spatial information on the size and location of the remaining old growth, and I assume data exists for other seral stages as well. One particularly important seral class to consider carefully is the "mature" category for two reasons. First, mature forests support a large number of species in their own right. Second, mature forest is the forest stage class closest in time to possessing old growth characteristics and thereby become the immediate building blocks for meeting an important regional and forest conservation and forest management objective – increasing the area of functional old growth.

This is and deserves to be a major consideration because of how far the region has diverged from natural condition. Roughly 96% of the original, old-growth redwood forests are gone (U.S. Fish and Wildlife Service 1997) and the remaining forest is highly fragmented. It is not surprising that many old growth dependent species have been greatly reduced in number and distribution with some on the verge of regional extirpation. Much of the redwood forest region today is dominated by young forest, which is favored by generalist species. These species have value too, but the plant and animal species of most concern are those that evolved with the physical and biological conditions of the old forests. Retention of existing and recruitment of new old growth is a conservation imperative for this region and should be prominently featured in the JDSF plan.

WILDLIFE AND WILDLIFE HABITAT

The wildlife habitat modeling conducted for the DEIR relies on Wildlife Habitat Relationships (WHRs) as originally attributed to vegetation databases such as FRAPVEG, which targets the entire State of California at an intermediate spatial scale. For contextual purposes it is reasonable to generate some basic potential habitat maps for species of interest, but it is scientifically inaccurate and inappropriate to rely on these relatively coarse (both thematically and spatially) relationship models to predict status or changes for the size area of JDSF or its larger assessment area. And although the DEIR states on page VII.6.6.-2 that all analyses involving vegetation found of the JDSF were done using the JDSF vegetation layer and all vegetation outside JDSF from FRAPVEG, I found the maps provided based only on the more coarse vegetation database (FRAPVEG). Having worked at producing species-habitat relationship maps throughout different regions in California using FRAPVEG, we have found it necessary to significantly modify any WHR results with additional ancillary data and occurrence records (if possible) to more accurately reflect species use of habitat. This trend of overestimating wildlife habitat has been observed across the nation through efforts such as U.S. Geological Survey GAP. All second generation products from this project are showing a dramatic reduction in habitat potential for most wildlife species.

The results presented in the DEIR indicating how the different alternatives would affect the percent of suitable habitat for wildlife species are extremely unreliable. Even as gross generalizations, they would have to be treated very carefully. There are always species who win and those that lose when conditions change on the ground, but the models presented fail to provide adequate insight into those changes under the different alternatives and fail to put the stressors that alter habitat in any logical framework to compare alternatives spatially. The quality of the models cannot be properly evaluated by viewing the tables alone, but the few sample maps provided in the Maps Section speak volumes to this problem. For example, the habitat suitability map provided on the marbled murrelet makes little sense. The map shows that the majority of James Creek is fully suitable for murrelets; however, it is unlikely that murrelets would travel that far inland to nest and when you look closely at the vegetation management classes presented in Map Figure 8 in the original draft management plan, you find that the majority of the watershed does not meet the forest structure criteria to support this species even if they did travel there. The colored polygons obviously came from the FRAPVEG database as shown in Map Figures J and K even though the DEIR states the models run inside JDSF used a different (assumingly a more spatially accurate database), the examples provided do not support this claim.

The landscape measures section (starting on page VII.6.6-21B) looks at eight species (including marbled murrelet). From the outset, it is seriously flawed because it relies (as input) results from the habitat relationship models. The assessment team then ran FRAGSTATS (a fragmentation computer software) on the polygons from the habitat models using the results inside JDSF and outside JDSF as separate landscapes from what I can tell. The different suitability classes (low, moderate-high, and fully suitable) were treated as different classes in the FRAGSTATS program. A handful of metrics out of the approximately 70 possible FRAGSTATS generates were then chosen to describe the differences between alternatives. The metrics chosen included: total class area, percentage of landscape, number of patches, mean patch area, mean nearest neighbor, and total edge index.

There are several serious problems with this approach.

1. The species inputs for the fragmentation assessments were spatially coarse and largely unreliable. Starting with solid input data is fundamentally important to gaining additional knowledge from this added assessment.

2. The treatment of suitability categories as “classes” in FRAGSTATS is interesting but fails on several grounds. It is assumes the species chosen respond to their own habitat suitability in the same way, and they do not. It assumes that the resolution of the habitat input data is at an appropriate spatial scale for each species, and I would argue that in most cases it is not.

3. There was no explanation as to why the five metrics were chosen and what bearing they have on the biology of the species in question. Why not a metric on overall landscape permeability such as contagion? Why these five particular metrics? What was the assessment team trying to understand? For example, five out of the eight species chosen were birds. How should we view mean nearest neighbor results? Does it matter if one result is 500 m and another 1,500 m? For all of the birds, this difference in distance means nothing – they could just as easily fly 1,500 m as 500 m. Does the amount of edge

change the survival of the species in some way? More edge means more competition and predation for northern spotted owls for example. Was that being tested? Rather than provide this level of thought and explanation, the reader is buried with tables of numbers that provide little meaning at all.

4. It would have been much more helpful to treat each planning unit (e.g., watershed) as the analytical landscape rather than compile results for all of JDSF as one unit and everything outside as another landscape unit. That would provide a more spatially explicit understanding of how past, current, and future projects might make the region more or less suitable to species survival and movement. For example, it is possible that a handful of watersheds or planning units, if managed heavily for a number of years, could easily fracture the larger regional landscape for some species having a greater overall impact. Not only are scenarios like this possible but likely given the history of JDSF, but none of the information provided can give us this level of information.

5. Lastly, there is no attempt to incorporate thresholds for the species for the different metrics to help guide our understanding of the alternatives. Thresholds are a major aspect of cumulative effects and for the species chosen, some guidance on landscape thresholds do exist.

With all of the page volume, background information, and modeling attempts in this section, we are left with very little information about how the different alternatives might impact wildlife habitat for targeted species or any other.

CUMULATIVE EFFECTS

According to the Council on Environmental Quality (1997), cumulative effects analysis involves assessing the capacity of the resource, ecosystem, and human community to withstand the stress caused by the combined effect of a repeated action and/or the combined effect of multiple actions. California Environmental Quality Act (CEQA) guidelines are consistent with this definition (14 CCR §15355). Although conceptually straightforward, conducting cumulative effects assessments has been proven to be extremely complex. With the inherent diversity of values and impacts, no single approach has emerged as a standard over the past 25 years. Rather, numerous approaches have been proposed and tested with varied results. Analyzing cumulative effects on ecosystems requires a better understanding of the interrelationships of the various ecological system components and is typically spatially explicit in nature. A conceptual model of how to combine primary methods of gathering and examining data and information into a cumulative effects analysis provides a starting place for new applications (Figure 1). Out of the 100 or more applications that have been reviewed by researchers, two basic approaches have been identified – (1) **impact assessment approach**, which analytically evaluates the cumulative effects of actions against an identified threshold on a stated value, and (2) **planning approach**, which sets out to optimize the allocation of stresses on values spatially over a region (Canter 1994).

I provide this background information to acknowledge the difficulty in conducting cumulative effects assessments, but also to demonstrate there is a solid body of scientific literature and government guidelines to assist in the creation of a meaningful cumulative effects assessment. This is a rapidly growing field of research, and ecological forecasting, which relies on using past and present conditions to forecast ecological condition into the future, is providing many valuable tools and approaches at addressing cumulative effects.

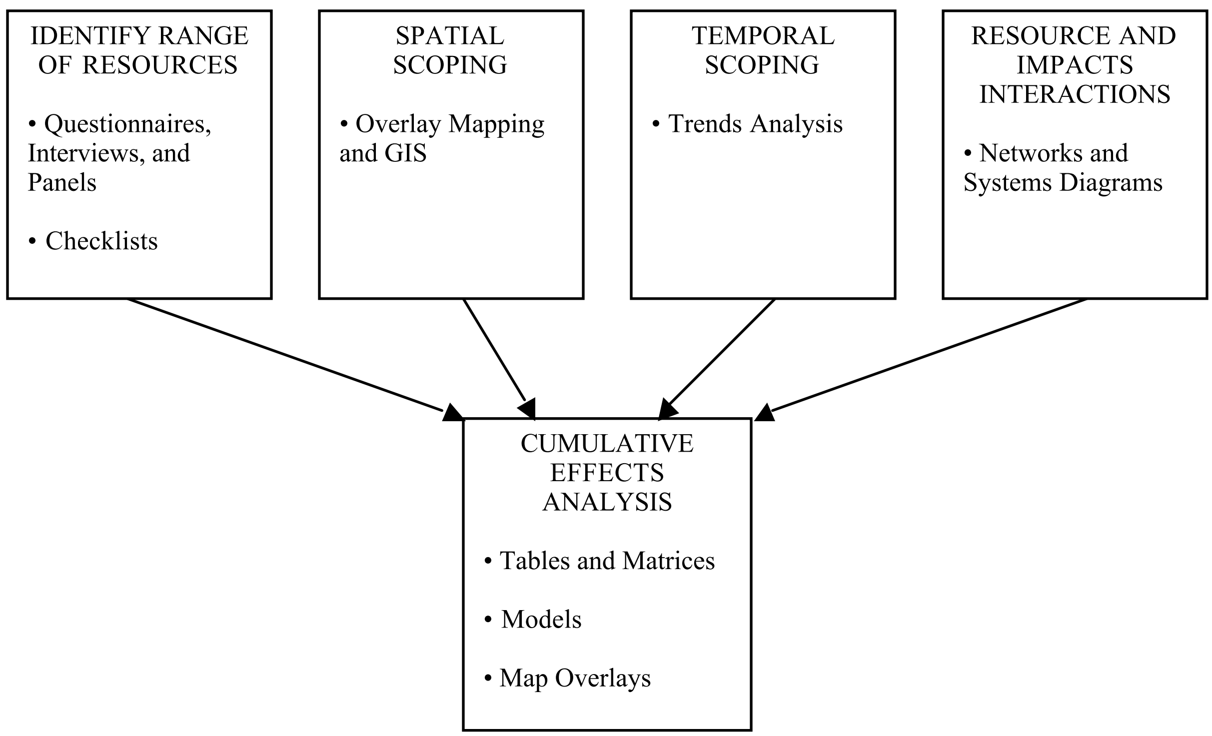

Figure 1. Conceptual model for combining primary methods into a cumulative effects analysis (CEQ 1997).

The JDSF DEIR has numerous serious shortcomings with regard to cumulative effects. First, there is no logical organizational framework presented explaining how cumulative effects were addressed in the DEIR. Instead, the topic of cumulative effects is addressed piecemeal (topic-by-topic) throughout the document without any clear attempt to combine the assessment of values [at-risk species (e.g., coho salmon, Northern Spotted Owl, Marbled Murrelet, etc.), special habitats (e.g., pygmy forest community), aquatic ecological integrity, terrestrial ecological integrity (including late seral or old-growth forests), wildlife, soil productivity, recreation, aesthetics, noise, traffic, air quality, and cultural heritage resources] with identified combined stressors [timber management, road building, water quality and quantity changes, herbicides/pesticides, and recreation]. Not even in Section VIII entitled “Cumulative Effects”, can a logical organizational framework be ascertained.

The dominant stressor discussed throughout the DEIR is forest management, which is understandable but this is not the only important stressor that needs close consideration. Roads and the use of chemical treatments are not developed properly and definitely not integrated with forest management for a more holistic view. A cumulative effects approach is supposed to consider all dominant stressors collectively in order to better understand the cumulative impacts from them.

Roads

Roads have been shown to have major ecological impacts on both aquatic and terrestrial ecosystems (Trombulak and Frissell 2000). Roads contribute more sediment to streams than does any other land management activity including timber harvesting (Meehan 1991), and examples exist in the scientific literature on how to conduct a cumulative effects assessment combining both roads and logging (e.g., McGurk and Fong 1995). According to Table VIII.6b, JDSF contains slightly over 457 miles of roads at a density of 6.0 mi/mi^2. If you assume a 20 m direct impact zone width (road surface and cleared roadsides), approximately 3,600 acres of JDSF are impacted directly by roads, which is approximately 8 times more area than the amount of existing old growth. The overall road density of 6.0 mi/mi^2 is far above thresholds established in the scientific literature for long-term persistence of certain aquatic species such as salmonids (2.5 mi/mi^2; NMFS 1996). But one needs to be very careful not to over simplify the situation. If you calculate road density on a smaller analytical unit across the forest (subwatersheds or grid cells), there are some units that are higher and some lower than the average for the entire forest. This level of spatial clarity is important to know and to monitor to help guide effective road removals and new constructions. The lack of spatial clarity is common throughout the DEIR making it virtually impossible to evaluate the various alternatives in a systematic, thoughtful way. Furthermore, special attention must be paid to roads along streamsides as these are often the most problematic roads on aquatic systems.

Based on research in the Interior Columbia River Basin, Wisdom et al. (2000) identify more than 65 species of terrestrial vertebrates negatively affected by many factors associated with roads. Specific factors include habitat loss and fragmentation, negative edge effects, reduced densities of snags and logs, over-hunting, over-trapping, poaching, collection, disturbance, collisions, movement barriers, displacement or avoidance, and chronic, negative interactions with people. Certainly not all of these factors apply to JDSF, but this research illustrates the serious impacts roads have on terrestrial wildlife species as well as aquatic ones.

Roads are also well known to be important conduits for invasive species and that risk must be considered. Roads disturb the soil, open the forest canopy, and allow more light to reach the ground. Plants seeds disperse in many ways. But the quickest route is via rapid, efficient, and pervasive hitchhiking on radiator grilles and muddy tires. Many of the same noxious invasive plants that easily use roads to disperse also do extremely well on sites impacted by logging that exposes soil and increases light availability.

Not only does the scattering of information throughout the document make it extremely difficult to understand, it also suggests the lack of understanding or lack of resources to address cumulative effects in any comprehensive way. This is further supported by the way components of the stated cumulative effects categories are treated. For example, the various subcategories in the Watershed Cumulative Effects treatment are disaggregated and addressed separately.

Cumulative effects assessments need to try to integrate the various components (flow effects, water temperature effects, sediment effects, etc.) not break them apart, because of the reasonable possibility of components interacting with each other in some additive or synergistic way. By treating each one separately and dismissing the components that are deemed not significant, the assessment team is missing the point. The serious lack of organization in the document and frequent illogical mixing of background materials, assumptions, and management generalities makes it extremely difficult to sort it all out and allow for constructive comments to be made.

The assessment team obviously did not choose to follow an impact assessment approach that would have relied on an analytical (quantitative) assessment with known thresholds even though some values stated in the DEIR (e.g., coho salmon) do have known tolerances (e.g., lethal water temperature thresholds). Also, the assessment team did not follow a planning approach, because there was no attempt to evaluate the distribution of stressors spatially over time in any optimal fashion. Some GIS modeling was performed, which I will address more later in this review, but nowhere was a framework provided to help the assessment team or reviewers understand the relative importance of specific stresses and there interaction on stated values, which is the essence of a solid cumulative effects assessment.

Rather than cobble together whatever could be found that might have some bearing on cumulative effects, it would have been far more helpful to: (1) choose the values to be evaluated in advance; (2) map the identified stressors on these values using a meaningful geographic extent(s) and analytical unit(s); and (3) build a transparent knowledge base to evaluate the interaction of stressors on the values spatially over time. Tools are available that do this well such as Ecosystem Management Decision Support (EMDS), which is mentioned in the DEIR as part of an independent In-Stream Channel Condition modeling effort, but there was no obvious attempt to employ this type of logic to the larger cumulative effects challenge before JDSF. Putting resources in building such a decision support system for JDSF would have tremendous value far beyond the immediate need for assessing the latest management alternatives. One of the many benefits would be having an ongoing logical and programmatic framework from which to organize management and monitoring for making more informed decisions and doing so in a way that is easily communicated to policy makers and the public.

According to CEQA guidelines, past, present and future project actions are to be considered in assessing cumulative effects with considerable emphasis on predicting future impacts. CEQA does not explicitly state a specific time period for past projects, but the DEIR states that 10 years is the general rule-of-thumb. It would be more beneficial to decision makers to understand as much about the history of the region of interest as possible. While there is no legal obligation to go back any particular distance in time, it would be in everyone's benefit to go back as far as data exist to support the modeling. JDSF was formed in the late 1940s and underwent considerable management between then and the 1986 threshold chosen by the assessment team. This would help explain why some watersheds received considerable forest harvest activity and why others received very little. For example, places like Chamberlain Creek watershed saw very little forest harvesting from 1986-2004. This watershed is not intact but was harvested extensively prior to the 1986 cutoff date. Chamberlain Creek was also one of the watersheds of concern with regard to some watershed quality parameters (e.g., stream temperature). This level of detail and spatial representation into an overarching cumulative effects framework is important if you are interested in becoming ecologically sustainable.

According to the DEIR, approximately 62% of the assessment area experienced some form of timber harvesting over the nineteen year window. Some of the sixteen watersheds were heavily impacted with over 80% of their area harvested over this time period (e.g., Noyo headwaters, Middle Noyo, and Big River). If you factor in the projected impacts into a ten-year future, ten of the sixteen JDSF watersheds will have greater than 20% of their areas impacted by some form of logging. Having a better understanding of when, where, and how this harvesting would be carried out is necessary as input into a cumulative effects assessment. Based on the information provided, I find it impossible to understand how anybody could conclude the combined impacts from this one activity would be less than significant. The information presented suggests otherwise.

The scattering of GIS models under cumulative effects are descriptive models not prescriptive ones, and explain nothing about how future projects are likely to impact values. Although the labels sound like they are thinking ahead by using terms like "recovery potential", there is really nothing prescriptive about these models and do not predict the impacts from future projects on values spatially over the planning period. Again, framing the overarching questions in advance would be hugely beneficial and necessary in my view to pass scientific review.

The handling of cumulative effects lacks a decision framework as well as clear statements of what is being assessed from both the value side and stress side. Without these deficiencies adequately addressed, sweeping conclusion statements, common in the DEIR, cannot be supported.

Conclusion

The question before the management board of JDSF is how to continue existing as a working forest landscape without causing further degradation to the many values present on the forest. Unfortunately the errors of the past now place an added burden and operational constraints on the future if these values are to be maintained. There are very real ecological costs to managing resources for human use, and these costs cannot be continually pushed into the future. Doing so results in many negative unintended consequences.

In spite of these constraints placed on JDSF, these issues are not unique as they pertain as much or more so to the majority of the northern California coast. This provides an incredible opportunity for JDSF to fulfill its stated mission of leading the way through demonstration and education on how to return ecological integrity to a degraded forest landscape and still maintain a steady and reliable economic return.

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