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SUBJECT: Comments on the Environmental Impact Report for the Comprehensive Update to the Jackson Demonstration State Forest Draft Management Plan, December 2005.

To the Board of Forestry:

Please accept the following comments on the 2005 Draft Environmental Impact Report (DEIR) on the Jackson Demonstration Forest Draft Management Plan. I reviewed the administrative draft EIR supplied by Vince Taylor of the Dharma Cloud Foundation, and supplemented the ADEIR review with modifications from the DEIR. These comments were prepared on behalf of the Dharma Cloud Foundation, but the content of my comments reflect my independent professional opinion as an environmental professional.

My qualifications to comment are based on my scientific, regulatory, and environmental background. I am a professional plant ecologist and botanist (Ph.D., University of Western Ontario, Canada), specializing in the study and conservation of terrestrial and wetland coastal plant species, communities, and their ecosystems, for over 27 years. My professional experience includes preparation, review, and management of joint NEPA/CEQA documents (EIR/S) for U.S. Army Corps of Engineers (San Francisco District, regulatory staff, 7 years), California Coastal Conservancy, and California Department of Water Resources; and preparation of Endangered Species Act recovery plans and Section 7 consultations and for the U.S. Fish and Wildlife Service (Sacramento Office, staff biologist, 5 years).

The primary focus of these comments concerns the EIR's treatment of (1) impact assessments for species, other biological resources, and ecological processes; (2) alternatives comparisons in terms of ecological merits and risks; and (3) adequacy of mitigation and monitoring actions linked to impacts. The standards of review applied here are for (1) CEQA compliance and (2) scientific soundness of data, methods, use and interpretation of cited or relevant scientific and technical literature, analyses and arguments, and conclusions. This scope of my review concerns the information presented in the EIR as well as potential omissions, inconsistencies, or fallacies. The scope of review is limited to the EIR as a stand-alone CEQA document (Ch. II, p. 10), and does not include the JDSF Management Plan itself. It does, however, consider the scope of the EIR in terms of public comments and response to comments of the 2002 EIR, which are properly considered part of scoping because the proposed action (JDSF Management Plan) itself has not been substantially modified. Page references are keyed to the Administrative Draft EIR.

GENERAL COMMENTS

Length, organization, and clarity of ecological information and impact assessments

Plain and technical language. EIRs must be organized and written in such a manner that they will be meaningful and useful to decisionmakers and to the public (Pub. Res. Code § 21003 subd. (b)), and they should "emphasize feasible mitigation measures, follow a clear format, be written in "plain language" (CEQA Guidelines §§ 15006, 15120, 15140), and be "analytic rather than encyclopedic (§§15006, 15141). This EIR fails all these criteria. In my professional experience with NEPA and CEQA documents, I have never encountered any that compares with this one in terms of the sheer volume of text laden with jargon, highly technical language, with highly inconsistent relevance to impacts, all placed in the body of the EIR. The EIR itself is written like a technical appendix, interspersed with short segments of a Negative Declaration. Much of the EIR text appears to employ the unmitigated technical language of the scientific literature and resource agency professionals, including profuse use of acronyms, scientific terms generally unknown to the general public (and often unavailable in most dictionaries).

Compilation of excessive background information. The EIR contains an extraordinary amount of encyclopedic background information in the body of the text, approaching 100 pages in sections on Aquatic Resources. The excessive amount of background technical information presented in the body of the EIR is entirely disproportionate with its application to the actual assessment of impacts. A very small proportion of background information is discussed in the assessment of impacts, and relatively little is indeed specifically relevant to Jackson State Forest. An outstanding example is the treatment of Aquatic Resources (Section 6.1). The discussion of background information exceeds 90 pages in length, and is composed of an indiscriminate assemblage of general studies with unstated relevance to the discussion of logging impacts in Jackson State Forest. The actual 12 page discussion of aquatic resource impacts (6.1.7) does not specifically refer to the massive compilation of background material. The problem of relevance of the background information is exacerbated by the erratic shifts in the geographic scope of background information, ambiguously varying from "the region", "study area" and "project area", depending on the scope of the various studies cited, and digression of the discussion.

The selection of technical background information in the EIR is largely indiscriminate. Long and highly technical sections lack even plain language summaries, and they generally lack an explanation of their relevance to the EIR's impact and alternatives issues. The EIR fails in its obligation to place appropriately selected technical background information in appendices. It is among the most extreme examples of this defect in EIRs that I have encountered in my professional career.

As an environmental professional with over 15 years of NEPA /CEQA and environmental regulatory experience, I found it exceptionally difficult to read and take notes on this document because of the excessive compilation (and poor editing) of technical appendix-quality background material in the body of the EIR, and the lack of relevance to the actual impact analysis. I must conclude that the general public reader of the EIR would be completely overwhelmed by this. The voluminous, jargon-laden technical background information, therefore, obfuscates the subject and precludes the general public's understanding of the context of impact assessment.

Impact assessment

The encyclopedic approach to background scientific information abruptly ends in the very brief discussions of impacts. The actual assessments of impacts are reduced to short (one to two paragraphs) and highly generalized discussions, or mere assertions of conclusions without specific reference to information specific to Jackson State Forest. The discussions of impacts generally employ a formula:

- minimize or omit reference to proposed JDSF actions, past monitoring data, or surveys, assessments, or research specifically relevant to the impact and locations in question;
- instead emphasize proposed generalized impact prevention and avoidance measures of the JDSF Management Plan, and Forest Practice Rules; and
- assert (unsupported by evidence) expectations of their success in reducing impacts to less-than-significant levels.

Again, the 13 page Aquatic Resources impacts/mitigation (6.1.7) section illustrates this formula that recurs generally in other sections. The conclusions about impacts are largely creed-like assertions rather than assessments or reasoned arguments based on evidence from JDSF data (past THP surveys, monitoring, project area-specific research) or the voluminous background information sections. This defect of vague and generalized impact assessment is particularly significant because it was one of the principal criticisms of the California Department of Fish and Game in its comment letter on the 2002 EIR. The defect was not corrected.

The conclusions about impacts generally lack any prior general discussion about the *efficacy* (track record, monitoring data, or other empirical evidence) *of management actions or mitigation measures* proposed. The overall result is a marked asymmetry between excessively technical background information, and largely arbitrary, tendentious, and subjective assessments of impacts. It appears as though a cursory Initial Study/Negative Declaration (narrative expansion of checklist impact assessment) were simply cut and pasted within a larger technical appendix of background information.

Mitigation

The EIR is extraordinarily deficient in its CEQA-required "emphasis of mitigation measures". It lacks a comprehensive mitigation and monitoring plan, or even a summary of all proposed mitigation measures associated with potentially significant impacts, and the monitoring actions associated with them. Mitigation measures of varying degrees of generality are scattered throughout the document. Section 6.6.7, Mitigation and Monitoring, consists of 3 sentences and a single mitigation measure, following all discussion of biological resources. That places undue reliance on "functionally equivalent" JDSF Management Plan measures and Forest Practice Rules as mitigation, and precludes public review of their adequacy. This certainly does not comply with the EIR's intention to function as a "stand alone" document (II, p. 10). It is a "trust us" approach to mitigation that fails to comply with CEQA's analytical requirements. Given that there is substantial legal, expert scientific and public controversy regarding the adequacy of Forest Practice Rules in mitigating impacts to aquatic resources (see Aquatic Resources, Specific Comments), and that these very same protections have failed to protect sensitive species from decline in the Forest (see discussion below on NOAA determination of "take" impacts to listed salmonid species), this results in a fatally flawed CEQA document.

Monitoring and resource management criteria for comparison of alternatives

The introduction (II) repeats many official Board of Forestry policies, goals, and objectives that are relevant to the comparison of alternatives in relation to adaptive management and monitoring of biological resources in a regulatory context. The EIR cites fundamental Board policies stating that the primary purpose of JDSF is "to conduct innovative demonstrations, experiments, and education in forest management", to "improve the amount and quality of information concerning economic forest management...", to "conduct monitoring of resource management activities to gauge their effectiveness in meeting project objectives", and "investigate methods to mitigate conflicts...in multiple use of forestland", while consulting and cooperating with "universities and colleges, the U.S. Forest Service, and other...researchers..." (II 3-4). The policies also include very specific, substantive resource and monitoring objectives pertaining to ecological processes, watershed integrity, and forest restoration. These are quite significant criteria for the basic "project" purpose, and comparison of alternatives. The comparison of alternatives in Table VI.1, however, does not include a substantive comparison of alternatives in the degree to which they meet or fail Board policies to provide innovative demonstrations, experiments, and education, and implement monitoring objectives of Board policies in JDSF. The EIR lacks a comprehensive discussion of alternatives that integrates basic purpose and policy, management, public interest values, and environmental impacts. Instead, comparison of alternatives is broken out among different chapters and resources.

Monitoring and survey data for mitigation and impact assessment

The EIR makes clear that JDSF is dedicated by Board policy to experimental, scientifically sound forestry demonstrations, aimed at generating useful data for forestry management with consideration for wildlife and watershed values. It is remarkable that the assessment of impacts do not make robust use of existing CDF data from past Timber Harvest Plans (THPs) conducted on JDSF pursuant to this mandate. The EIR does not explain and emphasize what JDSF's management has instructed about the key environmental impacts of forest practices (and in particular, Forest Practice Rules; FPRs) on stream sedimentation, stream temperatures, aquatic species, riparian wildlife habitats, and other key environmental impact issues of concern identified in scoping and in comments on the 2002 EIR. The discussions of impacts in the EIR again rely on highly generalized, speculative or arbitrary assertions about the alleged sufficiency of FPRs or JDSF Management Plan protections to mitigate impacts to less-than-significant levels, rather than on readily available data from the Forest.

The essence of adaptive management, a key policy and specific objective of the Board of Forestry for JDSF (Goal 1, objective 1-2, Goal 3, objective 3-6, and Board policies 0351.2, 0351.3) is to treat questions about natural resource management as hypotheses to be tested by data, and modify hypotheses based on data. The efficacy of mitigation measures (particularly the Forest Practice Rules on which the EIR substantially relies for determinations of "less than significant impacts"), consistent with Board Policy, should be viewed as a hypothesis in the EIR. The EIR fails to apply JDSF monitoring data or survey data to provide critical, empirical tests of its reliance on Forest Practice Rules or other mitigation measures.

The EIR generally does not cite data or analyses from past THPs on JDSF that test hypothesis with respect to assessment of specific impacts (see specific comments below). For example, there are no comparisons of pre-THP biological surveys and post-THP biological surveys to empirically demonstrate rates or patterns of post-disturbance recovery of specific plant, fish, or

wildlife species. Even when the EIR does use local data from JDSF and its adjacent watersheds on significant impacts such as logging sedimentation of streams, it misdirects study conclusions to comparisons of old and current Forest Practice Rules efficacy, rather than comparisons with current environmental baseline (existing conditions, as required by CEQA). The study design of Cafferata and Spittler (1998) on Caspar Creek (cited in the EIR in this context) does not address this deficiency: it compared sediment and water quality in watersheds affected by current logging conducted under current FPRs with watersheds subject to residual effects of logging under discontinued FPRs. It does not address comparisons of stream habitat and fish/amphibian impacts among reaches with equivalent background conditions, but differing in current silvicultural prescriptions or left as controls. The CEQA impact issue is not whether current FPR protections are significant improvements over pre-regulation logging; the CEQA issue is whether logging under current FPRs still has significant direct, indirect, and cumulative impacts that require mitigation in the context of the EIR. A comprehensive JDSF monitoring program for stream water and habitat quality with an experimental adaptive management design could, and should, yield such data in a state demonstration forest.

In the absence of systematic survey, monitoring, or research data from JDSF applied to impact assessments, the EIR assumes that FPRs and Management Plan are sufficient as mitigation, despite voluminous data to the contrary. Given the continuing decline of federal and state-listed fish and wildlife species and concerns over the adequacy of the Plan and THPs to protect the species expressed by experts tasked with the protection of these resources (note the comments from NOAA Fisheries, Regional Water Quality Control Board, on the 2002 EIR, still not addressed or rebutted in the 2005 EIR), this approach appears arbitrary and fails to mitigate the project's impacts. The EIR should be revised to apply substantive monitoring and survey data from past THPs and research in JDSF (or at least its watersheds) to explicitly inform assessments of specific environmental impacts and mitigation. Otherwise predictions of impacts and mitigation efficacy will remain arbitrary and speculative. This deficiency is *not* compensated by grossly inflating the length and technical level of background discussions about environmental setting.

The description of monitoring and adaptive management at 6.1.4 (p. 92), adapted from the JDSF management plan, is representative of scattered mitigation and monitoring discussions for specific resources in the EIR. It is reduced to statements of monitoring goals, priorities, and parameters. It does not provide any information on when and where or whether it would be applied in relation to management actions, and defers substantive decisions to "professional judgment of JDSF staff" with no reference to scientific peer review or agency reporting. Because the EIR relies on faith in the sufficiency of FPRs and management practices of JDSF to prevent significant impacts, it is essential that monitoring be conducted not "as opportunities arise" or "to the extent necessary" or "as budget allows" (frequent caveats included in JDSF monitoring provisions described in the EIR), but as an essential condition of timber harvest approval (potential impacts) in JDSF. In any case, monitoring does not substitute for, or serve as, mitigation for potentially significant impacts, so the impacts addressed by them must be considered potentially significant and unmitigated.

The EIR should synthesize its own mitigation monitoring requirements and the general JDSF Management Plan's monitoring provisions in a single, comprehensive chapter of the EIR, presented for public review and comment as part of the EIR. Currently, mitigation and monitoring provisions are diffused throughout the EIR in a way that precludes meaningful review. The mitigation and monitoring measures should be in substantive, clear, and enforceable language,

even if they are framed as programmatic. Some examples of this approach are given in Section 6.1.5, New Management Measures to Contribute to Recovery of Aquatic Resources: "The following apply to all THPs:....". The last EIR statement of mitigation monitoring (IX p. 2) consists of a single paragraph that merely identifies the incorporation of EIR mitigation and monitoring in the JDSF Management Plan, leaving the reader unaided in searching out the scattered, inaccessible component sections of mitigation monitoring discussions in the EIR. Missing in all these component discussions is a description of reporting and review requirements, responsible parties, schedule of submittal and review, duration and frequency of monitoring, and other standard features. Without these, reviewers of the EIR are unable to determine whether mitigation monitoring is a perfunctory paper exercise or an enforceable procedure.

Vague narrative description of alternatives

CEQA states that a firm, fixed project and alternative description is essential to assessing and disclosing project impacts. The descriptions of alternatives (which serves as the project description), even for programmatic alternatives, are vague and indefinite. Their component proposals are couched in indefinite qualifiers that do not indicate whether or not proposed components of alternatives are mere options, goals, exceptional or occasional actions, or typical or normal programmatic actions: "work towards...", "...as opportunities arise", "as needed", "only for research purposes", "limited to demonstration purposes" (in a demonstration forest, what is categorically not demonstration/research?) "conservation-oriented..." (what is categorically not "conservation oriented" in a demonstration forest with sustained yield as a mandatory principle?), "emphasis on....". These indefinite qualifiers should be standardized with explicit, definite statements of the criteria that trigger them, whether they are general (normal/prevalent), and the frequency and magnitude of exceptions. To the extent that alternatives can be represented graphically (labeled GIS map of JDSF for each alternative, with estimated acreages of each alternative management feature proposed), they should be illustrated to distinguish crisply the contrasts among them. Without firm, fixed descriptions of alternatives, it is impossible for the EIR to adequately assess and compare their impacts. This deficiency is apparent in the EIR's repeated failure to identify substantial differences in impact significance among the alternatives.

Need for scientific peer review or recirculation

The EIR relies on an extraordinary volume of technical and scientific background information and technical jargon for the majority of its most important arguments regarding potential significant impacts, mitigation, and alternatives. It also lacks plain-language summaries of its arguments and conclusions, leaving the general public reader no reasonably available means to assess the scientific soundness of its assertions. It places an undue burden on the public to read and comprehend the technically obscured and excessively long EIR. It is urgent, therefore, that the EIR be subjected to independent scientific peer review so the public has some reasonable means of evaluating and commenting on the EIR. The public cannot provide meaningful comments on this technically obscure EIR without a summary and assessment by qualified scientific professionals with authority and expertise in the disciplines covered in the document. I suggest that the Board of Forestry convene an independent scientific review panel, comparable to the scientific peer review teams that evaluate forestry Habitat Conservation Plans (HCPs), to provide a concise review of the information, evidence, analysis, and major conclusions of the EIR. The panel's written review should be available to the public prior to a public hearing with additional opportunity for public and expert comments, and prior to circulation of the final EIR,

and. In the alternative, a technically adequate revised draft EIR written in plain language should be recirculated.

SPECIFIC COMMENTS

Aquatic resources

Watershed analysis versus case-by-case THP proposal and review. The EIR defers analysis and mitigation of logging impacts to aquatic resources to individual THPs as governed by the Forest Practice Rules (FPRs) and the JDSF Management Plan protections that exceed them. This approach has systemic influence on impacts and mitigation to all aquatic resources. It contradicts the most basic recommendation of the Scientific Review Panel assessment of FPRs in relation to salmonid conservation (Ligon et al. 1999), which is to prepare a watershed-level analysis of hydrology and geomorphic processes to guide assessment and mitigation (including avoidance) of logging impacts to aquatic habitats in North Coast streams. The EIR instead defers analysis within the narrower, partial framework of future individual THP-proposals. The best scientific judgment available (Ligon et al. 1999) concludes that project-driven assessments of impacts and mitigation are unreliable and likely ineffective. CDF is well aware of this controversy, but the preparers of the EIR have chosen to disregard this framework without explicit justification. The EIR persists in relying primarily on the assumptions that the joint protections of the FPRs and JDSF Plan will mitigate to insignificance sediment-related impacts to aquatic resources (e.g. 6.1.7 p. 100), contrary to strong evidence of continuing decline of federally listed salmonids. This approach is not reasonable in view of the weight of scientific opinion against it, and the lack of substantive empirical arguments to support it. The inflated compilation of general technical background discussion regarding the environmental setting of aquatic resources in the EIR (6.1) does not address this defect. Background information, no matter how long and technical, does not serve as an implied watershed analysis for JDSF.

Watershed baseline for salmonid impact assessment: The EIR does contain information that provides many of the elements of a potential watershed-level analysis of impacts. NOAA Fisheries (in its comment letter on the 2002 EIR) stressed the importance of "site-specific watershed analyses" in creating meaningful timber harvest strategies that protect salmonids. The EIR shows in Map Z a precise configuration of proposed silvicultural spatial allocation across planning watersheds; Map Y shows the distribution and location of stream habitat restoration projects. Map E shows a modeled stream class and fish distribution map, but Map E and all other maps lack stream habitat typing (habitat quality) data from current field assessments representing the "existing conditions" required by CEQA as an environmental baseline. Map F, which represents riparian canopy change (crude ranking, no habitat parameters), does not provide stream habitat quality information. These maps come fairly close to the minimal database requirements for a valuable watershed-based GIS analysis of potential timber harvest impacts. Integrating and re-analyzing data sets using other large-scale stream databases and studies, such as KRIS Noyo and Big River projects, updated and supplemented to meet JDSF Management planning requirements, could generate a more robust and adequate predictive model of impacts than the EIR currently provides. This would also address fundamental deficiencies of the 2002 EIR that were not corrected in the current one (viz. valid criticisms of Patrick Higgins' 2002 comment letter), and it would comply with the authoritative recommendations of the Scientific Review Panel report (Ligon et al. 1999). The same GIS-based watershed model could also become the template for a multi-species habitat conservation planning tool.

Salmonids (coho salmon, steelhead) population status and conservation significance.

Despite the excessive compilation of technical data regarding regional salmonid population status of coho salmon (6.1.7) the EIR fails to emphasize the most relevant information for decisionmakers and the public, which is the relative conservation importance of coho populations in JDSF watersheds to the North Coast as a whole. This "metapopulation" perspective is fundamental to conservation biology of any species, including salmonids. The survival and recovery of coho in segments of its range where it has been extirpated will depend on immigrants from source populations in remaining stable, high-quality habitats. The 2002 EIR comment letter by Patrick Higgins, a regional expert in North Coast fisheries biology, establishes this point clearly and authoritatively in the EIR record. Higgins (2002) cited data from The KRIS Big River and Noyo projects (neglected in the EIR), revealing that the some of the last local streams that are still dominated by coho salmon are on JDSF. This regional significance of JDSF as a refugium for coho remains obscured in the indiscriminate technical coho study compilations at 6.1.7. The EIR cannot adequately assess impacts to the survival and recovery of federally listed coho without specifically addressing metapopulation structure of the species and the role of streams affected by logging in JDSF; therefore this information must be added to the EIR.

Equally relevant is the contrasting coho status in commercially logged privately owned watersheds. Higgins, citing 2001 National Marine Fisheries Service data, clarified that stocks of coho are also severely declining in adjacent watersheds in response to intensive land use: coho were absent from 80% of tributaries to the Ten Mile River that formerly harbored them. These Big River tributary populations have distinctive genetic significance for wild coho recovery because they were not subject to artificial genetic modification by fish hatchery operations. This relevant background about contrasts in coho population status within and outside JDSF, in conservation biology context, cannot be inferred from the encyclopedic technical information compiled in the EIR that obscures the decisive issues. Indeed, the EIR states in Section 6.1.8 (p. 74), "In the absence of evidence that conditions in assessment area streams differ greatly from other Mendocino County streams, it is reasonable to assume that salmonid populations have likely declined from pre-logging levels...". This statement gives a highly misleading impression of a general decline in salmonids, rather than retention of biologically significant population refugia in JDSF. It is more serious than an inaccuracy or "data dump" misdirection: it obscures of a regionally unique resource and suppresses public comments on potential impacts to it.

The EIR should adopt a Habitat Conservation Plan approach (consistent with the critical habitat designation of both coho and steelhead) and identify priority watershed areas within JDSF to minimize impacts of activities contributing to direct and indirect stream habitat degradation, and focus restoration efforts to benefit salmonid recovery. Indeed, the July 18, 2002 EIR comments provided by NOAA (National Marine Fisheries) state that JDSF cannot mitigate for unauthorized "take" of Federally listed salmonids, and that the management plan lacks a strategy to avoid "take". This "unauthorized take" defect was not addressed in CDF's response to comments, nor was it addressed in the 2005 EIR. Therefore, consideration of a Habitat Conservation Plan is not an optional "possibility of undertaking the...incidental take permit process by CDF in the future" (CDF's dismissive response to NOAA comments on "take"), but a legal requirement, according the lead federal agency with jurisdiction and expertise in the matter. CEQA requires disclosure, analysis, and mitigation approaches for all harm to endangered species. Clearly, this has not been achieved by the 2002 or the 2005 EIR. This is a critical defect.

A conservation planning framework for salmonids would emphasize the locations of important salmonid refugia, high quality habitats with robust remnant populations, and adjacent stream reaches and slopes. Priority areas for recovery are those which are above prime habitat or refugia where erosion will inevitably be triggered by a major storm or catastrophic event. Higgins (2002) suggested that the highest priority restoration targets should be the South Fork Noyo River (including Parlin Creek), Caspar and Hare creeks and Russian Gulch, because these areas are known to be the healthiest remaining habitats for coho salmon, and function regionally as core populations. This would constitute an adequate, scientifically sound approach to mitigating the uncertainties and impacts of the primary water quality causes of observed salmonid decline within designated critical habitats.

Herbicides, surfactants, and potentially significant aquatic vertebrate impacts. The EIR fails to identify potentially significant impacts of herbicide runoff and groundwater contamination of stream baseflow on eggs and juvenile salmonids. The EIR fails to quantify and disclose total herbicide and surfactant (spray additive; detergent-like spread-stickers) loads to streams allowed under the JDSF Management Plan. It does not address restrictions on types, amounts or timing (in relation to salmonid or amphibian reproduction) of applied herbicides. Some herbicides and adjuvants (spreader-stickers) remain biologically active for weeks or months after application, and can be detected and physiologically active in aquatic habitats after application to adjacent terrestrial habitats. Some herbicide surfactants (e.g. POEA) are known to have weak estrogenic effects on salmonid embryos and juveniles, and can significantly affect endocrine-mediated development, but this potentially significant impact is not assessed or mitigated. The EIR should include assessment of herbicide ecotoxicology on salmonids, focusing on specific herbicide formulations that have been used in JDSF, and may be used in the future. The assessment should not be speculative, but should be based on diligent review of the scientific literature.

Impacts and mitigation for amphibian species (treated in Wildlife section, 6.6.6). The EIR provides cursory and insufficient assessment of impacts to amphibian species. Most discussions merely disclose whether there are any known records (presence/absence) of amphibians species in JDSF, and add general habitat and life-history information, not specific habitat or population status in JDSF as baseline. All proposed mitigation for amphibians, based on implementation of FPRs (WLPZs) and their presumed efficacy, assumes that all life-history stages occur in the primary aquatic habitat. This is unjustified: amphibians also forage in terrestrial habitats, and some like the red-legged frog, seek refuge in mammal burrows or under logs when their primary feeding and breeding habitats become seasonally dry. The WLPZ "mitigation" approach to protect viable populations of amphibians is focused on direct logging impacts only, and does not address indirect impacts to amphibians due to adverse modification of terrestrial moisture refugia. The WLPZ "mitigation" for amphibians is unsupported by local or other monitoring data on amphibians collected before and after logging under contemporary FPRs. In addition, the EIR does not refer to any detection or survey procedures for recognizing and protecting isolated seasonal wetlands, seeps, and springs outside expected watercourse zones (see discussion of Wetlands, below). The EIR cannot reasonably conclude that impacts to amphibians in JDSF are "less than significant".

One of the primary purposes of a Programmatic EIR on a Plan is to address landscape-level impacts and identify Forest-wide mitigation strategies. However, the EIR's assessment of impacts to amphibians fails to consider larger landscape-level variables of THPs, such as geographic pattern of intact remnant habitats, distribution of high-quality refugia (aspects of metapopulation structure), and the recovery interval (rotation) between logging disturbances.

Therefore, all potentially significant large-scale indirect spatial impacts to amphibian populations are ignored. The impact assessments for amphibians focus narrowly on internal habitat impacts within THP boundaries. This deficiency precludes discussion of the basic landscape-level habitat conservation planning essential to ensure maximum likelihood of viable amphibian populations over long-term logging disturbance cycles. In the absence of geographic planning of habitat impacts and mitigation, sensitive species (such as tailed frog, which has less thermal tolerance than coho salmon) would be at greater risk of local long-term extinction. Interactions between local population declines, logging disturbances, and climate variations (droughts, hot summers) could cause significant cumulative impacts unless mitigated by landscape-level amphibian habitat planning within JDSF.

Please note that the geographic limits of the federally listed subspecies of red-legged frog, *Rana aurora draytonii* (*R. draytonii*) are now know to extent to Elk, Mendocino Co, based on molecular data (Shaffer et al. 2004).

Botanical Resources and plant communities

Incomplete scoping of rare species. The EIR states that ponds occur within JDSF (Lost Lake, McGuire's Pond). *Howellia aquatilis*, a rare aquatic plant of the Pacific Northwest, was recently rediscovered in Mendocino County at multiple locations after 1995; see CNDDB. The EIR ignored the expert advice to include this species, provided by Prof. Teresa Sholars in her 2002 EIR comment letter. This small, inconspicuous species is very difficult to detect without focused searches in appropriate seasons. It was erroneously omitted from the Jepson Manual. Although accurate modern records of the federally endangered *Arenaria paludicola* are lacking in Mendocino county, its historic range included wetlands of the North Coast forest region, and like *Howellia*, it could be rediscovered there. It should be included in the scoping list as a low-probability endangered plant. The EIR fails to assess potentially significant direct and indirect impacts to this aquatic species that could result from logging activities, such as excessive sedimentation in wetlands and ponds originating from erosion above WLPZs. .

Scoping misuse of floristic databases as surrogates for surveys

The EIR commits the same misuse of the database searches for rare plants that is prevalent in poor quality THPs. The EIR relies on the California Native Diversity Database (CNDDB) and California Native Plant Society Inventory (CNPS Inventory) as "scoping tools" to determine likelihood of occurrence of sensitive plant species, but it does not commit to standard, routine CDFG or CNPS protocol-level surveys (with coverage and survey intensity sufficient to detect actual sensitive plant populations in THP areas) as mitigation/monitoring measures to prevent potentially significant impacts to sensitive plant species.

The EIR, following CDF practices, is using CNDDB and CNPS inventories in reverse: these databases are not original sources of survey data, but repositories dependent on field data generated by land managers and plant experts. The lack of reported occurrences in remote or inaccessible extensive timberlands is more a function of past survey intensity than actual probability of occurrence. Database searches are useful in well-botanized, publicly accessible areas near trails, parks, or other publicly accessible sites, but are an inherently weak tool in remote, extensive timberland tracts. Therefore these databases would not generate meaningful numbers of reported past occurrences from remote timber harvest plan areas in JDSF unless CDF itself performed such surveys. The emphasis on database searches in the absence of firm

commitment to site-specific, protocol-level plant surveys provides a false cosmetic appearance of diligence in mitigation and monitoring. The EIR should expressly identify pre-THP floristic surveys with CDFG protocols as the primary standard for scientifically adequate detection of sensitive plant species.

Instead, the EIR describes only (non-mandatory) goals for plant surveys: "A qualified botanist *or trained staff* will conduct seasonally appropriate rare plant surveys, *as necessary*, to assess plant occurrence...survey designs will be *based on the concepts* contained in the DFG guidelines....will follow the *practices commonly accepted* by DFG and CDFG *for THP review*". It is no exaggeration to state that this is a formula built on equivocation, aimed at allowing the same low standards for incomplete and erroneous botanical surveys by non-expert forestry technicians or RPFs that are routinely accepted in THPs. I have reviewed numerous THPs in the Mendocino-Sonoma coastal forest region, and found most to contain basic and obvious deficiencies: errors of identification and nomenclature, erratic seasonal timing for detection of sensitive species, and likely omissions of less familiar species (particularly graminoids).

The EIR's misplaced reliance on database searches has significant potential consequences because it states that the "current population status and trend" for many sensitive plant species that may occur in JDSF "are unknown" (e.g. *Boschkiana hookeri*, *Carex livida, C. arcta, C. californica, Erythronium revolutum,* and others) or "location, rarity, and endangerment information are needed" (e.g. *Carex comosa*). The EIR states that multiple sensitive species "could be adversely affected by timber harvest and road construction", but with no determination of "significance", for example *Campanula californica*. The EIR makes a reasonable argument that potentially significant impacts to these species could occur precisely because species may occur in THP areas but remain undetected because crude CNDDB database searches and inadequate (or lacking) surveys are the standard protocol in JDSF. Yet the EIR arbitrarily concludes that there would be no significant impacts to botanical resources.

The EIR should include requirements for plant surveys as part of a comprehensive and mandatory mitigation and monitoring program. The survey methodology should cover qualifications of surveyors, survey intensity, seasonal timing based on expected/known plant community composition, and coordination/review procedures by CDFG. Given that "inventory [of plants] is planned to occur on a project-by project basis through surveys ..." and "an extensive inventory of botanical resources at JDSF has not been conducted" (6.2 p. 24), this is an essential mitigation and monitoring element to include.

<u>Lack of paired pre- and post-THP surveys to verify impacts and mitigation efficacy</u>

As noted above, THP plant surveys, regardless of adequacy, generally are supposed to precede timber harvest. The EIR does not discuss or recommend post-THP surveys to determine whether plant species become extirpated within THP areas, or whether they recover over time. The EIR does not recommend specific population re-surveys to monitor whether sensitive plant species "protected" by avoidance measures in fact are protected successfully, or whether their demise occurs through indirect impacts of logging rather than direct impacts. No post-THP surveys or monitoring results are discussed in the assessment of impacts and mitigation to enable the public to review their efficacy and reliability. Post-THP plant surveys and monitoring should be recommended by the EIR, and included in the mandatory mitigation and monitoring program to ensure implementation.

The discussion of general biological surveys at 6.6.3 (p. 115-117, in context of wildlife, but applicable to plants) is largely editorial and apologetic in effect, reflecting current policy rather than programmatic proposals to evaluate. It provides a rationale for non-systematic, minimalist survey efforts. This discussion has no place in an EIR. The EIR should describe a comprehensive biological survey framework and protocol in the context of a comprehensive mitigation and monitoring plan pursuant to CEQA, clearly written for public review.

Cumulative impacts on declining, uncommon to rare plant species. The scientific literature, in addition to state and CNPS lists of state-rare plants, provides substantial evidence regarding range contractions, range collapse, and significant declines of some plant species over major portions of their ranges. Some of these species are clonal perennial forest forbs, mycotrophic ericads or orchids, or woody plants that regenerate poorly after major disturbances, or take long periods to recover populations. The flora of Mendocino County enumerates many plant taxa of extremely limited distribution, often disjunct populations or species occurring near their range limits. Such "non-listed" species have conservation significance because of their precarious population status and biogeographic patterns (Lomolino and Channel 1998). For example, Pacific yew (*Taxus brevifolia*) is in widespread decline because of slow growth and reproduction, and poor regeneration after timber harvest (Busing et al. 1995). The EIR arbitrarily assesses only impacts to taxonomically rare species, and ignores potentially significant impacts to plant biodiversity based on regionally declining, slow-growing, uncommon plant species that are not necessarily globally rare. The EIR should adopt an ecologically based rather than administrative, list-based plant conservation perspective on impacts to native species diversity. It should assess the Management Plan and alternatives' impacts to native species richness and diversity based on currently available scientific evidence, not just legally or administratively listed species. This is particularly important for impact assessment of even-age timber management that depletes soil seed banks and clonal bud banks of species with poor colonizing ability. The assessment should be based on evidence, not speculation and generalization.

Cumulative, long-term herbicide impacts on viability of small plant populations
The EIR does not adequately address (and scarcely discloses) the potentially significant impacts of broadcast broad-spectrum herbicide applications on non-target plants, particularly uncommon or rare plants (either mature plants or seedlings recruited from seed banks following timber harvest disturbances). Many plant populations survive logging disturbances by vegetative regeneration or seedling recruitment. Broadcast application of herbicides can severely deplete seed banks after flushes of germination, and can cumulatively enhance mortality due to disturbance. The interaction of post-disturbance recovery of plant populations and herbicides (applied to control brush, weeds, or hardwoods) can result in significantly increased risk of population extinction. Rare or uncommon plants would be particularly at risk of such cumulative herbicide impacts. Because survey efficiency (detection probability) is low at the spatial scale of herbicide application, particularly in disturbed ground with seedlings and suppressed individuals, mitigation of herbicide impacts by detection and selective avoidance would be extremely difficult. The EIR also fails to disclose the potential off-target transport of active herbicides in runoff and groundwater. (See comments on aquatic resources regarding potential significant indirect impacts of herbicide/surfactant mixes on juvenile fish and amphibians.). The EIR's conclusion that there are no potentially significant impacts to plants is unreasonable and unsupported in the absence of an analysis of herbicide effects on sensitive plant populations. No such analysis would be possible without survey data (see preceding comments on plant surveys)

Impacts on epiphytic plant communities. The EIR focuses narrowly on individual special-status vascular plant species, and fails to consider impacts to highly diverse epiphytic plant communities associated with old tree canopies, composed of lichens, mosses, ferns, liverworts, and some forbs. These communities are not treated in classifications of terrestrial vegetation, but are nonetheless significant botanical resources.

Cumulative and indirect impacts of even-age management, invasive species, and herbicides

The EIR fails to disclose or analyze basic interactions between even-age management and invasive plants, and herbicide use. Most of the most noxious wildland weeds identified are most invasive in disturbed ground lacking forest canopy. Timber harvest activities can not only open forest to new invasions, equipment can readily spread seeds. Invasive plants that rapidly dominate post-harvest sites can suppress seedling growth of desirable conifer species as well as native flora. There is ample evidence in the scientific literature about facilitation of plant invasions in disturbed plant communities, including forests. The EIR should assess the potentially significant impacts of even-age management (compared with other silvicultural treatments) on plant invasions and demand for herbicide use.

The EIR's sweeping reference to Integrated Weed Management (IWM) as a philosophy or approach does not substantively address the nature of interactions between weed invasions and silvicultural treatment, nor does it substantively address issues of herbicide impacts. The EIR's reference to the IWM emphasis on weed prevention makes is disingenuous and misleading in the context even-age timber management and spread of significant wildland weeds such as *Rubus discolor, Genista monspessulana*, and *Cortaderia jubata*: the spread of these species is facilitated primarily by disturbance, and timber harvest provides more disturbance to the landscape than any other activity. The EIR fails to disclose potentially significant impacts of ground-disturbing timber harvest practices on the invasion of forestlands by these weeds.

The EIR does not distinguish herbicide loads that are specifically justified by wildland weed management objectives, and herbicide loads justified by hardwood management objectives. It would not be possible to evaluate minimization of herbicide use (impact reduction) without an account of what herbicides are used for, and in what quantities, in JDSF.

The EIR offers no examples (i.e. monitoring data) to support the broad assertion that "Project-specific THP and CEQA analyses can identify and mitigate potentially significant cumulative effects resulting from multiple effects" (6.2, p. 42) with respect to herbicides. The EIR's statement thThe EIR should specify programmatic actions to minimize cumulative and indirect impacts of herbicide use on native plants. Such measures should include pre-THP reduction of invasive plant propagules sources, and must include adequate pre-THP native plant surveys, restrictions on the timing and amounts of herbicides.

Potentially significant effects of fertilizer application

There is no mention in the botanical section (6.2) of the potential effects of fertilizer applications described in the timber resources section (6.3). Elevated levels of soil nitrogen from fertilizer application can have persistent and significant impacts on native plant diversity, mediated by competitive interactions. Many invasive plant species with high potential relative growth rates gain competitive advantage over slower-growing native plants in nutrient-enriched soils. Many rare, stress-tolerant native plants are also at a competitive disadvantage to dominant native

species in productive soils. Some rare plant communities are essentially oligotrophic (dependent on extreme nutrient-poor conditions), such as sphagnum bog and pygmy forest. Surface runoff or groundwater containing even a single pulse of high soil nutrient levels from fertilizer can have effectively irreversible significant effects on community dominance and persistence of rare plant populations in oligotrophic plant communities, particularly those with impeded drainage (nutrient sinks). The EIR should disclose the likely locations and application rates of fertilizers, and soil types to which they are likely to be applied. It should propose mitigation including minimization and avoidance of fertilizer near invasive plant populations and unique or rare native plant communities and populations.

The cumulative effects of fertilizer applications and the nutrient flux (primarily nitrogen) that follows logging (Dahlgren 1998; cited in EIR) are not analyzed. The combined effects of these two silvicultural impacts on plant communities, invasive species, and also aquatic resources may be potentially significant, particularly for sensitive oligotrophic (naturally nutrient-poor) habitats.

Deferred, programmatic, essentially administrative "mitigation" of invasive exotic species.

The bulleted items of 6.2 p. 20 are mostly administrative actions, not substantive programmatic protection measures. Stating that impacts of weeds and re-establishment of native vegetation "will be considered" is not meaningful or enforceable. Training staff in weed identification has no substantive value unless weed management programs are implemented; similarly, cooperation (vague) with other agencies has no meaning unless it is linked to specific categories of substantive actions to implement. Updating staff on weed information and supporting (actions?) weed control initiatives outside the jurisdiction of JDSF are similarly attenuated from connection to substantive actions that affect weed invasions. The EIR should identify substantive programmatic actions that reliably contribute to reduction of forestland weed spread. These purely procedural and vague, unenforceable "mitigation" measures are unacceptable for CEQA, and are ineffective. Note that invasive exotic species control programs should not include native post-logging invasive species in their objectives.

Narrow and insufficient mitigation for direct impacts to sensitive plants

The only substantive mitigation identified for impacts to sensitive plant populations is survey detection followed by unspecified avoidance measures. There are no quantitiative buffer specifications assigned to different slopes, soils, population structures, or community types. There are no buffer provisions that address retention of pollinators or seed dispersal vectors (biotic or abiotic). There are no measures that specify consultation procedures or scientific peer review of protection measures, or monitoring and reporting requirements for protection measures. The mitigation measures do not even commit to criteria for enforcing implementation of protection measures, and for what species. The mitigation does not address compensation for potential failure of protection/avoidance measures, nor does it assess efficacy of protection/avoidance measures from past THPs. All this can and should be treated at a programmatic level, but the EIR improperly defers all mitigation to project-specific THPs. This is invalid under CEQA.

The EIR lacks any mitigation provisions to cover contingencies of under-performance or failure of proposed plant protection/avoidance measures. It is reasonable to assume that there would be at least some failure rate (local population extinction) of avoidance/protection measures, especially given that there are no scientifically based criteria for detection of populations or buffer guidelines, and given the large scale of timber harvest activities (especially even-age

prescriptions). The most reliable scientifically accepted approach for conservation of rare plant populations is establishment of designated refugia (blocks of self-sufficient habitat containing all ecosystem support for life-history needs) within managed, working timberlands. Currently, all consolidated set-aside areas within JDSF are based on old-growth, late-seral forest stands, "owl circles" (programmatic buffer areas to avoid legal exposure to risk of unauthorized "take" of federally listed species), pygmy forest, and selected wetlands. Smaller reserves based on "hot spots" of rare plant species locations, or large "core" populations of rare plants, should be included as EIR mitigation for potential significant unavoidable impacts to sensitive plant species, following the same principles as a Habitat Conservation Plan and basic tenets of modern conservation biology. The selection of priorities for species and designated refugia should be developed in consultation with CDFG botanists.

"No significant impacts" to botanical resources. The EIR's conclusion that there are no significant impacts to botanical resources is not supported by the information and proposals of the EIR. As described above, the critical omissions of adequate scientific survey protocols, botanical inventory or reconnaissance-level original contemporary baseline data on the flora of the JDSF, and substantive, effective mitigation (including contingency and preventive measures for rare plant protection) make the "no significant impact" conclusion unreasonable and arbitrary.

Wetlands

As described below, the information the EIR provides on the distribution, extent, and types of wetlands within JDSF, and potential impacts, is flatly inadequate inadequate for meaningful public review or review by resource agency professionals. Wetlands are described in cursory text (2 paragraphs) under Wildlife (6.6 p. 20), and list in one sentence "...sphagnum bogs, a few isolated ponds, stream margins, and several springs and seeps" to describe the wetlands occurring in the nearly 50,000 acres of JDSF. The subsequent paragraph discusses only sphagnum bogs in general, not the local features. P. 21 erroneously states that "coastal salt marsh, coastal brackish marsh" occur in JDSF. Coastal salt and brackish marsh are limited to the immediate coast where daily ocean tidal flows occur. P. 21 also states that "coastal and valley freshwater marsh" occurs in JDSF, but provides no information about their composition, distribution, or abundance. Given that this chapter is about wildlife, it is a gross deficiency of the discussion that no wetland-dependent wildlife (waterfowl, amphibians, etc, including sensitive species such as red-legged frogs, salamander species) are identified in relation to these habitats.

The EIR fails to disclose in this discussion of wetlands (p. 20) the widespread but localized occurrence of wetland sedge and rush communities, riparian backwater marsh patches, marine terrace hardpan wetlands (pygmy forest and raised bog), hillslopes seeps and springs with wetland shrub thickets, and other widely distributed small wetland features. These are in fact the types of wetlands most likely to occur within timber operations, and are most likely to be directly impacted. These wetland types are partially listed in the botanical resources section (6.2; see table VII 6.2.3.), but are not described (or mapped) to emphasize their wetland habitat status or explain their distribution, abundance, species composition, hydrology, and wildlife habitat functions. A laundry list of wetlands that includes some that do not occur within JDSF is not an impact assessment.

The EIR describes no mitigation survey protocols for advance identification of wetlands. Many wetlands, particularly sedge/rush meadows and seeps, are seasonal wetlands, and are recognizable as wetlands by non-experts only in the winter-spring months. Many riparian wetlands are difficult

to identify in the dry season (summer-fall) unless they support dense stands of perennial marsh plants. Rare plants difficult to recognize in low-intensity surveys, such as *Campanula californica, Calamagrostis bolanderi*, *Carex* spp., *Glyceria grandis*, *Lilium maritimum* (especially non-flowering), *Lycopodium clavatum*, *Pleuropogon hooverianus*, *Rhynchospora alba*, Sidalcea calycosa ssp. *rhizomata* and others, are most likely to occur in seasonal wetlands within forests and forest gaps. Therefore, impacts to under-identified seasonal wetlands are likely to be the coarse controls for significant impacts to many rare plants. Seep and spring wetlands are the most likely types to be associated with rare plants such as *Cypripedium montanum*. The EIR should include at minimum reconnaissance-level surveys of wetlands to reflect at least typical wetland conditions (distribution, abundance, composition, hydrology) within each soil series wherever timber management operations may occur.

The EIR should be revised to accurately and fully identify the potential impacts of all Plan timber management activities to wetlands. Minor alteration of topography and drainage by ground-based equipment (tractor logging) can cause major hydrologic changes in wetlands, and their functions in supporting wildlife and flora. Protecting wetlands through avoidance requires (a) accurate detection of wetlands; (b) accurate understanding of local wetland hydrology and soil characteristics, geomorphic processes, especially controls of drainage, transport of sediment and organic matter, and water sources; (c) expert judgment on setting effective wetland buffers. The EIR should include programmatic wetland identification (not formal delineation of federal jurisdictional wetlands) and planning protocols to ensure that there are no significant cumulative impacts to wetlands in JDSF.

"Significant impact" determination for wetlands. Without adequate assessment and programmatic mitigation for wetland resources in JDSF as described above, the EIR must conclude that there is unmitigated potential for significant impacts to wetlands. The EIR preparers should consult with wetland experts from CDFG and USFWS or USFS, or other qualified experts to re-assess wetland resources and mitigation planning.

Terrestrial Wildlife

Habitat modification impacts assessment (6.6.6, p. 121). This single paragraph discussion of habitat modification impacts includes no impact assessment at all. It simply states that a short list of categorical impacts (direct mortality, permanent habitat loss or modification, reduced reproductive success) "are considered significant", and are more significant for habitats of rare species. It states only that rare habitats are not proposed for removal, and some habitats, depending on their location, "could be at risk". This is merely a declaration, not an analysis of habitat modification. Habitat modification impact assessment is the cornerstone for predicting viability of wildlife populations, so this deficiency is not trivial or local. This section does not cross-reference to the comparison of alternatives (6.6.8) that generates a series of coarse numeric index habitat capability (potential habitat quality; California Wildlife Habitat Relationships System) predictions for all alternatives. These model predictions are non-spatial, lacking in any biological dimensions dependent on habitat patch size, configuration, life-history, and population distributions. The results are presented essentially as scorecards, without interpretation; it contributes minimally to the EIRs assessment of long-term habitat modification impacts in JDSF. The numeric WHRS results, as the EIR notes, are not particularly accurate or ecologically meaningful predictions. The discussion includes no information in a spatial context (Map Z) about the timing or rate of timber harvests, block size, and their dispersion over vegetation and

soil types (Maps J, U) and landslide risk zones (Map W). It is therefore impossible to evaluate mitigation for this significant impact on wildlife habitat.

Only internal small-scale habitat mitigations, such as snag retention, exclusion or buffer zones, etc. are discussed. These mitigation measures are important, but they are subordinate to the larger-scale habitat modification impacts. Despite over 50 years of timber harvest and inventory analysis in JDSF, the habitat assessment does not even provide a local conceptual model for forest habitat successional development to inform assessment of impacts. With widely available GIS capabilities, at least a crude spatially explicit model of dynamic (successional) habitat modification over time would be feasible and appropriate for impact assessment; and in the absence of any adequate assessment at all, it would be necessary. Again, it should be noted that the primary biological focus of a programmatic EIR is the larger—scale habitat issues. Additionally, because many of the mitigations for these large-scale impacts can only successfully be identified and implemented at a program level.

Rare, threatened or endangered terrestrial wildlife species

Marbled murrelet impacts and mitigation

The discussion of marbled murrelets in JDSF includes excessive and extraneous information that obscures the salient facts that (a) JDSF was designated *critical habitat* for this federally listed species; (b) the recovery plan for the marbled murrelet identifies the Mendocino Zone (in which JDSF occurs) as at high risk of local extinction, but "highly recommended" for conservation measures to benefit the species (p. 116, USFWS 1997); (c) Russian Gulch is considered to be occupied habitat by CDFG (S. Martinelli). This last point is somewhat confused by the contradictory statement on p. 127 that the species "has not been determined to use stands on JDSF". The EIR defers mitigation to individual projects in the impacts discussion. It does not cross-reference to the earlier discussion at 6.6.8, "New Management Measures" including an assessment of what areas offer the greatest potential for marbled murrelet habitat. This generalized programmatic mitigation is a raw concept, and does put mitigation ahead of impacts, but at least it (potentially) offers a substantive and significant contribution to the recovery of the species within JDSF. The EIR needs to reformulate this proposal as an enforceable (mandatory) proposal or mitigation measure for implementation, and link it to a valid assessment of JDSF Management Plan impacts to the species. Otherwise, it would be merely a sketch draft of paper mitigation. The proposal should specify scientifically sound spatially explicit conservation planning methods and principles, agency and expert coordination and review, and a time-line for implementation.

The EIR lacks basic ground-truthed (field-verified) habitat suitability classification for the marbled murrelet in JDSF, and relies on surrogate vegetation and timber data to assess marbled murrelet habitat distribution and abundance. Like the lack of habitat typing in the assessment of JDSF aquatic resources (stream habitat quality), the absence of accurate empirical habitat assessments and adequate surveys for the species precludes a meaningful analysis of impacts for a federally listed endangered species in a designated recovery area. This deficiency is likely to cause inaccurate assessments of impacts.

Northern spotted owl

The EIR does identify competition with invasive barred owls and predation by great horned owls as potential threats to the viability of habitat occupied by the federally listed northern spotted owl (NSO) in the lengthy species account. Great horned owls are known to significantly constrain the occupancy by NSO in otherwise suitable habitat (Zabel 1995). Predictive models of NSO habitat must consider spatial distribution of habitat structure that influences NSO foraging and breeding, refuge from predators, as well as habitat that favors predators (Zabel et al. 2003). The EIR does not, however, identify interactive (cumulative) effects of habitat modification from logging and the spread of these competitor and predator owl species in the cursory 2 paragraph impacts section (6.6.6. p. 128). Unlike the EIR's approach to marbled murrelet impacts and mitigation, the treatment of NSO is essentially the same as a 50,000 acre THP: following the FPR requirements that establish minimum, isolated "owl circle" buffers around known occupied habitat in THP areas, while landscape-level habitat structure suffers long-term degradation by logging. The EIR does offer snag protections, retention of some late-seral and old-growth stands over some portions of JDSF, but the larger matrix of forest will be managed according to standard silvicultural prescriptions, with no additional spatially distributed refugia or reserves for NSO. This is a formula for the same decline in NSO in privately managed commercial timber land, and is less protective than voluntary interim guidelines for NSO protection by some private timber companies. The impact analysis and mitigation for NSO is grossly deficient, and falls far below the current scientific standards of analysis for NSO conservation (Zabel et al. 2003).

Strong, substantial, indirect adverse impacts or injury to NSO may occur through interference with essential foraging, and elevated risk of predation. Recent evaluations of NSO foraging ecology, prey use, and home-range characteristics in California have suggested that NSOs use a wider variety of forest habitats (including younger forests) for foraging in relatively drier conditions in California compared with the Pacific Northwest, especially where woodrats are the principal prey species. The high affinity for old growth may be due to refuges from predators such as great horned owls (Solis et al. 1990, Blakesley et al. 1992, Hunter et al. 1995, Zabel *et al*. 1995, Ward *et al*. 1998, Thome *et al*. 1999). Structural habitat restriction of great horned owls in late-seral coniferous forests is one of the principal factors affecting the functional characteristics (quality) of NSO habitat. Franklin *et al*. (2000) found nonlinear relationships between traditional "suitable" (mature forest) habitat and NSOs, indicating that a range of forest habitats, not just old growth forest, are needed for all life-history stages and needs in California. The EIR's assessment of impacts to NSO is incomplete and unreliable without consideration of indirect impacts of habitat modification on predation and competition.

Therefore, the DEIR must be revised to include a well-tested, calibrated NSO habitat models to JDSF (comparable to Zabel et al. 2003) to assess long-term impacts of the management plan, with due attention to indirect and cumulative impacts related to habitat modification, prey availability, competition with barred owls, and great horned owl populations. It should then develop a system of managed reserves (analogous with the 'new management measures' for marbled murrelet conservation and old-growth/late-seral reserves) within JDSF. In essence, this effort would be equivalent to a Habitat Conservation Plan (HCP) for JDSF. Indeed, it would be both consistent with Board policy and prudent to develop an HCP for both the murrelet and NSO, as a "demonstration" for private forest landowners and the general public in California. A system of reserves within a working timber landscape would probably be the only viable long-term mitigation approach to conserve the NSO under the JDSF Management plan.

Like the management plan's effects on listed salmonids, its actions would cause reduction of population, habitat, and unauthorized "take" (prohibited by the Endangered Species Act) of endangered NSO. This would be significant and unmitigated, in the absence of an approved HCP. Unauthorized take of an endangered species amplifies the CEQA threshold for mandatory findings of significance based on "reduction in numbers or range". The management plan and its derivative THPs evaluate impacts to endangered NSO as though only direct, lethal impacts mattered. Even the narrowest legal definitions of "takings" of federally endangered or threatened species ("harass, *harm*, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct") address injury or death due to indirect causes, under the interpretation of "harm" in case law, which includes any "act which actually kills or injures wildlife" – not restricted to direct death or injury. In the preamble to the final regulatory definition of "harm", the U.S. Fish and Wildlife Service expressly rejected the limitation of "harm" to direct physical injury. "Harm"..."may include significant habitat modification or degradation, where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (Babbitt v. Sweet Home Chapter of Communities for a Greater Oregon). Proximate indirect causes of injury or death, such as complete removal of habitat around an "activity center", plainly meet the criteria for "take", as long as it is "sufficiently imminent or certain" that take (harm) will occur. (North Slope Borough v. Andrus). In the absence of a final HCP, there is no mechanism for authorization of "takings" of NSO.

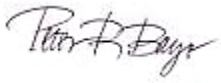
Because long-term impacts of a management plan are forest-wide issues, this program-level EIR is the CEQA-mandated vehicle for providing adequate impact assessment and mitigations. Deferral of this to the THP-stage would be both inappropriate under CEQA, and ineffective.

Conclusions

The EIR is basically inadequate as a CEQA document, and as a scientific assessment of forestry impacts and mitigation in Jackson Demonstration State Forest. As a CEQA document, it fails because it is unintelligible to most intelligent public citizens, burdened by extraordinary length of extraneous and highly technical background information in the body of the EIR. Even as an environmental professional, I found it unusually difficult to review this cluttered and discursive EIR. It also fails because despite its excessive technical length, it does not apply relevant information and arguments to its relatively cursory assessment of impacts and mitigation. There are widespread cases of unsupported conclusions of "less than significant impact", often in contradiction to information in the EIR. The environmental baseline information in the EIR specific to JDSF (empirical habitat typing, assessment, species surveys) is woefully deficient, and the lack of even minimally adequate baseline survey information about aquatic and terrestrial biota precludes meaningful assessment of significant impacts. The EIR makes substantial errors in its conclusions about potentially significant impacts to botanical resources, wetlands, federally and state listed salmonid species, and federally listed wildlife species. The EIR should be revised and recirculated, and a preliminary or administrative draft should be subject to independent scientific peer review before public circulation to ensure that scientifically sound methods and reasonable interpretations support its conclusions.

I look forward to reading a substantially improved recirculated draft EIR for Jackson Demonstration State Forest, and without prejudice to the selection of the Board of Forestry's preferred alternative. I would encourage the EIR preparers to develop alternatives that adequately reflect the Board's admirable policies for "innovative demonstrations, experiments, and education in forest management", to "improve the amount and quality of information concerning economic forest management...", to "conduct monitoring of resource management activities to gauge their effectiveness in meeting project objectives", and "investigate methods to mitigate conflicts...in multiple use of forestland". If these principles are faithfully followed in the JDSF management plan, there should be no difficulty in preparing an adequate CEQA document.

Respectfully submitted,



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