Friends of the Wild Swan
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December 20, 2024

Swan Lake Ranger District
200 Bigfork Ranger Station Road
Bigfork, MT 59911
Attn: Jeff Durkin and Clayton Cornwell
Via: https://cara.fs2c.usda.gov/Public/CommentInput?Project=64924

Please accept the following comments on the Rumbling Owl Fuels Reduction Project on behalf of Friends of the Wild Swan. We incorporate by reference the comments submitted by Swan View Coalition.

We believe it is premature to release the Environmental Assessment (EA) for this project prior to complying the the June 28, 2024 District Court Order. On April 9, 2024 Anthony Botello, Flathead Forest Supervisor submitted a declaration to the Court in the case against the Flathead Revised Forest Plan that stated, "Plaintiffs requested relief...would impact three planned projects under the challenged Forest Plan provisions -- Dry Riverside, Rumbling Owl and Mid Swan. If the Court approves the merits recommendations and remedy recommendation, none of the three planned projects will be approved until the U.S. Fish and Wildlife Service has revised its Biological Opinion for the Forest Plan."

On June 28, 2024 the District Court wrote: "Plaintiffs argue that the three projects that would be affected by vacatur—the Mid-Swan Project, Dry Riverside Project, and Rumbling Owl Project—have not yet been approved by the Forest Service... Regarding the three projects identified by Plaintiffs, it appears that the Forest Service has already elected not to move forward in anticipation of remand."

In that Order the Court granted:
1. Plaintiffs are entitled to summary judgment on their ESA [Endangered Species Act] claims regarding grizzly bears insofar as FWS failed to address the exclusion of unauthorized motorized use from road density calculations and, to the extent the agency did address this issue, failed to articulate a satisfactory explanation regarding its decision;
2. Plaintiffs are entitled to summary judgment on their ESA claims regarding grizzly bears insofar as FWS offered an explanation for its decision to exclude impassable roads from TMRD [Total Motorized Route Density] that runs counter to the evidence before the agency;
3. Plaintiffs are entitled to summary judgment on their ESA claims regarding bull trout and bull trout critical habitat insofar as FWS failed to address its decision to abandon the culvert removal requirement with respect to impassable roads;
4. Plaintiffs are entitled to summary judgment on their ESA claims insofar as the Forest Service relied on the flawed provisions of the Revised BiOp.

The Rumbling Owl EA is scant in its analysis of roads and grizzly bears, culverts and bull trout and doesn't even mention or attempt to comply with the Court's Order. To make matters worse you are using an Emergency Action Determination issued under the Infrastructure Investment and Jobs Act to exempt this project from the pre-decisional objection review process thereby cutting the public out of an important part of the NEPA process.

The Flathead also continues to add documents to the Rumbling Owl page on its website including a 60 page Carbon Assessment posted on December 19th a mere 4 days before the comment deadline and the weekend before Christmas! However, the Flathead has not posted the Biological Assessments even though we requested them at the start of the comment period.

The Flathead does not have a valid Biological Opinion on its Forest Plan for roads, grizzly bears and bull trout so it is baffling that this project is being pushed forward without the essential elements in place to protect threatened species given that it adds 5.4 miles of roads to the forest system road network, constructs 4 miles of temporary roads and obliterates/restores 2.8 miles of roads.

• The proposed action will log in approximately 37% of the scant 2,566 acres of old growth forest habitat using commercial thin, improvement cuts fuels treatments and pre-commercial thinning. In addition, 38 logging units share a boundary with one or more old growth stands.

• The Environmental Assessment fails to analyze the impacts of these treatments in and adjacent to old-growth forest habitat on:

Old-growth associated wildlife
Weed spread
Connectivity between old-growth stands
Soil trampling
Mychorrizal fungi and other fungi necessary for a healthy forest

Old growth patch sizes are not even disclosed. Logging will diminish their function as habitat for old growth dependent wildlife.

The EA is totally devoid of any analysis of the impacts to wildlife that are dependent on old growth habitat. How large should old growth patch sizes be to maintain viability? How much edge is too much?

Corridors of interior forest habitat between old growth habitat with a minimum width of >100 meters have been recommended by scientists. All corridor habitat in the project area should be mapped and both current and long-term objectives defined for maintaining these corridors over time. This was not done so the EA is inadequate in analyzing the impacts to wildlife connectivity.

Equally dismissive are statements on blowdown, such as "Old growth bordering treatments with trees in the seed/sapling and small size classes would be at an increased risk of windthrow, but, given Swan Valleys location and surrounding topography it is not likely there would be enough windthrow to change the character, quality or characterization of the existing old growth." Blowdown is a reality in the Swan, and by subjecting old growth forest to these edge effects (that are not analyzed) you are degrading old growth habitat which directly impacts birds, wildlife, native plants, mychorizal fungi and other attributes that are necessary to these species survival and old growth attributes.

Soil disturbance on 4,937 acres will spread weeds. Weeds replace native plants that provide food/forage for wildlife. Weeds degrade old growth habitat. Yet there is no analysis of these impacts.

• The Flathead has no plan for retaining old-growth forest habitat on the landscape and allowing stands to develop into old growth. Instead this project will fragment old growth, create abrupt edges from roads and cutting units adjacent to it, and degrade the habitat quality for old growth associated birds and wildlife.

Pfister, Baker, Fiedler and Thomas lay out considerations for designing old growth networks:

> "Interior" old growth habitat (>100 meters from edge of an opening or stand of lesser age or a road) is the most important component of old-growth habitat (Baker and Knight 200). I.e., in general, larger stands are more effective as habitat than smaller stands. Fragmentation of existing patches of old growth by roads, timber harvesting, or other created openings will decrease effectiveness of the patch as habitat due to the reduction in amount of interior old-growth conditions (Baker and Knight 200). I.e, in general, non-fragmented stands are more effective as habitat than smaller stands. To decrease or avoid fragmentation, roads can be designed to avoid large patches, harvest units can be placed on or near existing roads, and roads can be closed where no longer needed.
>
> Stands of old-growth forests will function best as habitat when they are connected to other stands. Connectivity can thus be achieved by corridors of actual old growth or by suitable closed-canopy or mature condition of the matrix between old-growth stands (Thomas and others 1990, Bennett 1999). Stands designated as future old growth that are presently mature may be suitable. Linkages should, when possible, contain a large fraction of interior forest (i.e., >100 meters from high contrast edge) (Bennett 1999).
>
> When designating old-growth patches (whether extant or planned) it is important to span a representative cross-section of sites, rather than to concentrate them in streamside areas or on poorer sites.
>
> Place longer-rotation or less intensive uses adjacent to designated old growth, so that a lower intensity managed zone serves as a buffer for old-growth system (Noss and Cooperrider 1994). Avoid placing high intensity land uses (e.g., clearcuts, roads) next to designated old growth.
>
> Don't worry about the appropriate mix of stand structures and compositions within old growth, because the science has not yet provided that kind of resolution.

> Other things being equal, big old-growth reserves are better than small ones, unfragmented reserves are better than fragmented, reserves closer together are better than reserves far apart, reserves connected to others are better than those not connected.
>
> Integrate future replacement old growth into the network. Where otherwise equivalent replacement stands exist, choose those adjacent to designated old growth as future old growth.
>
> Designate the existing old growth and future old growth and place them on maps.

The Flathead must develop an old growth network to ensure viability of old-growth associated wildlife rather than the current piecemeal encroachment on old growth from logging and roads.

• The EA does not analyze the impacts to Region 1 Sensitive Species such as bald eagle, black-backed woodpecker, common loon, harlequin duck, bighorn sheep, fisher, wolf, bats and toads. Since sensitive species are designated because population viability is a concern on National Forest lands it is imperative that impacts to them be analyzed to ensure that numbers and population distribution are adequate so they are not extirpated on Forest Service land.

• The EA is conflicting because it uses the term "multistory" which is not consistent with the NRLMD/Forest Plan's "multi story mature or late successional forest" in VEG-S6. The EA defines multistory structural stage as many age classes and vegetation layers with sufficient density to provide winter foraging habitat and may provide denning habitat. So, multistory in the context of the EA's analysis does not have to include mature or late successional forest only forest with different structural stages. This is an important distinction that allows younger stands to replace the mature or late successional forest that lynx require. This project will reduce multistory habitat (however it is defined) in the Buck LAU from 30% to 11%! There is already scant habitat to begin with and this will reduce it even more.

Furthermore, the EA essentially ignores the openings that will be created or the narrowed connectivity between stands. There is no analysis of lynx avoiding these openings, there is no analysis of roads running through or adjacent to old-growth forest habitat, there is no analysis of logging in or adjacent to late successional forest and there is no analysis of lynx being displaced from key habitat in one of the essential travel north-south corridors for lynx.

• The EA's assumptions about regeneration fail to consider climate change and the possibility that the logged forest will not regrow in the future as it may have in the past. It also fails to factor in the inevitable fires that still will occur and are additive to the logging that is proposed.

• The project results in openings greater than 40 acres in size. Regional Forester policy (FSM 2471.1) directs the size of harvest openings created by even-aged silvicultural practices (e.g. seed tree, shelterwood, and clearcut harvest prescriptions) would be normally 40 acres or less. The National Forest Management Act at 219.27(d)(2)(ii): Size limits exceeding those established in paragraphs (d)(2) and (d)(2)(i) of this section are permitted on an individual timber sale basis after 60 days public notice and review by the Regional Forester.

Units 141 (73 acres), 142 (43 acres and 161 (73 acres) are seedtree cuts that exceed 40 acres. The EA does not analyze the impacts to wildlife of exceeding the opening size, it instead tiers to a generic Forest Plan standard that states that exceptions "may" occur (although these exceptions are now occurring in most timber sales on the Flathead). The impacts to wildlife must be analyzed on a site specific level and not rely on aspirational desired conditions.

• The EA does not analyze the impacts from reduced thermal cover for ungulates. Dense forest canopy limits snow depth allowing animals to move through deep snow in the winter. In winter and summer dense forest canopy provides thermal regulation, it is warmer under the canopy in the winter and cooler under the canopy in the summer. The additional stress of reducing thermal cover by 11% (elk), 7% (mule deer), and 20% (whitetail deer) was not evaluated in the EA. Nor does the Forest Plan contain standards for ungulate thermal cover.

• The EA failed to analyze the cumulative impacts to bull trout (foraging, spawning, rearing) from this project and invasive lake trout. The decline in bull trout redd counts in the Swan is alarming, there should not be any logging in bull trout habitat until there is an improvement in the status of bull trout in the Swan watershed. They do not need the additional stress of increased sediment on top of invasive lake trout.

• The EA failed to analyze the economic impacts. How will the Flathead maintain the proposed new bloated road system in the project area? What is the road budget? How is enlarging the road system a wise use of taxpayer money? Why are culvert removals dependent on funding yet road construction is a blank check?

• The EA failed to address the issues raised in our scoping letter.

• The EA fails to consider a reasonable range of alternatives in violation of the National Environmental Policy Act. It's either all logging or none. Select the No Action alternative.

/s/Arlene Montgomery
Program Director

Contract Review of Old-Growth Management on School Trust Lands:

Supplemental Biodiversity Guidance 8/02/00

By

R. D. Pfister, W. L. Baker, C. E. Fiedler, and J. W. Thomas

November 30, 2000

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1. Introduction

We were contacted by Mr. Tom Schultz and Mr. Scott McLeod of the DNRC[1] and invited to participate in a team effort to provide scientific review of current status regarding implementation of the OMEGA alternative. We agreed to participate as a group effort and attempt to provide a consensus evaluation report with recommendations. Materials for review were provided to each of us and we were asked to address a set of 11 specific questions (Appendix A) relative to implementation of the Record of Decision (ROD) for the State Forest Land Management Plan (SFLMP).

Our contract specified the following items:

- ***Review and comment on three Options presented in Old Growth Management on School Trust Lands, Supplemental Biodiversity Guidance. (8/02/00)***
- ***Review as necessary additional documents supplied by DNRC.***
- ***Present results in written form to DNRC.***
- ***Present results in a seminar to be held in Helena, Montana.***

After preliminary discussions within our team and with Mr. Schultz and Mr. McLeod, we proceeded to independently review the materials and write individual responses to each of the questions. Once we were all done with this task, we shared our question responses and documented areas of agreement and disagreement for further discussion. Sharing information via e-mail, telephone visits, and conference calls facilitated communication among our team.

During this interaction, it became clear to us that simply providing consensus answers to the specific questions would not necessarily help resolve the many conflicts that have arisen internally and externally over the "Old-Growth Issue". Based on the material provided and the current state of knowledge, we felt it was not in anyone's best interest for us as scientists to serve as "referees" or "judge and jury" regarding three specific Options, each with strong and weak points. Polarization is well established and we felt that we should try to contribute constructive criticism in a format that might help promote conflict-resolution and enable the DNRC to move forward to implement the established goals of the SFLMP. We all agreed that our professional responsibility under the terms of the contract would be to collectively seek procedures that would help resolve the conflicts efficiently with professional credibility.

Therefore our report presents Synoptic Answers to the 11 Questions (#3) and a General Critique Overview (#4). This is followed by a Summary (#5) and Recommendations for Needed Actions (#6) that seek to abstract from the best information we found in each of Options 1, 2 and 3.

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1 *Abbreviations Used Throughout:*

DNRC = Department of Natural Resources and Conservation, State of Montana
DFC = Desired Future Condition
OG = Old Growth
OGG = Old Growth Guidance (8/02/2000)
MOGP = The Montana Old Growth Project
SOGI = simple-old growth index
FOGI = full old-growth index
Final EIS = Final Environmental Impact Statement
SFLMP = State Forest Land Management Plan,
ROD= Record of Decision (1996)

2. List of Background Material Provided by State for Review

Appendix B contains the list of material provided for our review in addressing the set of 11 specific questions. We found this material invaluable to provide background and context. As stated in Appendix A, "The purpose of the review is to comment on the scientific merits of the Options presented in the Old Growth Guidance (2000)." However, we found that each of the three Options contained apparent deviations from the intent of the SFLMP and the ROD. Therefore, our answers to the questions will also address material from the earlier documents that we feel is essential to implementation of the SFLMP.

3. Consensus answers to the 11 Questions --

Question1.a. Is one of the approaches in the Old Growth Guidance (2000) clearly more supported by science than the others in its ability to meet the Biodiversity Resource Management Standards (RMS) 1, 3, 4, and 6 identified in the SFLMP? In answering this question, please compare the relative strengths and weaknesses of each option in meeting the aforementioned Resource Management Standards. They can be found in the Record of Decision (ROD), pages ROD-12 and 13.

Question1.b. Are any, or all, of the Options presented in the Old Growth Guidance (2000) reasonable as a means to meet the Biodiversity RMS 1, 3, 4, and 6 in the SFLMP (pages ROD-12 and 13)? If any of the approaches are deemed unreasonable please explain why.

1.A.1 -- General: "Options Supported by Science"

1. None of the approaches are "clearly more supported by science than the others".
2. All approaches (Options) are sincere attempts to define "one-half of historic old growth".
3. However, the science of old growth is not sufficiently well developed to provide clear guidance for forest managers. Debate continues among the scientific community, and managers must adopt practical operational criteria based on a balance of disparate opinions.

1.A.2. – Detailed: "Options Supported by Science"

All Options are interesting attempts to define the undefinable – "one-half of historic old growth". Many references are quoted and studies have been contracted (e.g. - Losensky, Harris) yet the three Options present widely differing viewpoints of what "old-growth" is, how much should be protected, and how much exists. Science (the state of knowledge and data) can help inform management decisions.

However, the "science of old growth" is not sufficiently well developed at this time to provide clear direction for managers. Management decisions must still be made in the face of current scientific uncertainty. All of the Options are inconsistent in the use of terms to describe old forests, creating apparent differences. For example "Old Forest" and "Late-Seral Forest" are not really "Old Growth" once specific definitions are applied. Green and others (1992) suggest their criteria are useful to define "Potential Old Growth", yet users have nothing better at this time as a general guideline to identify "Real Old Growth". Many of the tables and discussions in the Options do not make clear distinctions among these related, but not equivalent terms. We must conclude that none of the Options is "clearly more supported by science than the others".

1.B. 1. General: "Option Comparison

1. All Options start with Losensky summaries of 1930 Inventory Data to identify "historic old forest" for western Montana.
2. Option 1 -- Identifies a larger area of "old forest", but provides minimal protection.
3. Option 2 -- Identifies a smaller area of "old growth", with more protection, but both Options rely on a new, untested index to characterize "old growth".
4. Option 3 -- Identifies a larger area of "old forest", with more protection and emphasis on maintaining larger numbers of large trees, and recommends using Green and others (1992), but appears to go well beyond the implied intent of the SFLMP and ROD with a different interpretation of "historic old growth".

1.B. 2. Detailed Answer: Option Comparisons:

Option 1 Strengths – Starts from the best information available (Losensky 1997) relevant to real inventory data and ability to cross link with existing State inventory data. Initially identifies a larger acreage of "potential old growth" and develops a new Old-Growth Index as an intended improvement over the existing minimum criteria approach (Green and others 1992).

Option 1 Weaknesses – Old growth indexes are not yet supported by science, especially relative to the weighting of factors. For example, if a high index is mathematically possible with few large trees, then the index would be judged unacceptable based on OG literature to date. Since Option 1 allows harvesting in a large proportion of the acreage, the possibility of removing too many large trees does not provide credibility for the DNRC.

Option 2 Strengths – Starts from the best information available (Losensky 1997) relevant to real inventory data and ability to cross link with existing State inventory data. Applies a new Old Growth Index screen to identify "high quality" OG. Although a smaller acreage of "old-growth" is identified, the quality of that "old-growth" is presumably higher and a higher number of acres are protected from harvesting. The resultant acres targeted for OG is remarkably close to preliminary estimates in the SFLMP.

Option 2 Weaknesses -- Shares the same weakness of reliance on the old growth index as described above for Option 1. Since Option 2 still allows harvesting in a considerable proportion of the OG acreage, the possibility of removing too many large trees does not provide credibility for the DNRC.

Option 3 Strengths – Option 3 seeks to establish minimum quality criteria for OG beyond that of the OG Index. The use of USDA Forest Service minimum criteria (Green and others 1992) represents an expert opinion quantitative definition based on OG literature to that date and analysis of a large body of data. Although needed adjustments are evident (such as recognition that data used were individual plot data rather than stand data resulting in too many trees for some types), this document is still the most widely accepted professional working standard to define OG in our region.

Option 3 Weaknesses – This option places undue emphasis on large trees as a criterion for identifying old growth, when other attributes have been identified by science as important. Option 3 apparently seeks to increase the DNRC "Old Growth" acreage commitment to greater than intended allocation (SFLMP-Final EIS and Appendix). Option 3 appears overly cautious regarding implementation of ecological restoration treatments in low-severity and mixed-severity fire regime environments. Option 3 calls for specific local OG commitments that are not in keeping with a long-term goal of developing a coarse filter as a regional guideline.

1.C.1. General: "Relationships to RMS 1, 3, 4, and 6"

1. The 1998 Biodiversity Guidelines address 1, 3, 4, & 6.
2. However, RMS 1, 3, and 4 cannot be implemented until RMS-6 is clarified.
3. The Coarse Filter approach (demonstrated by Haufler and others 1996) is gaining general acceptance among wildlife biologists and is appropriate for RMS 1 & 3.

1.C.2. Detailed: "Relationships to RMS 1, 3, 4, and 6"

The OG Guidelines provided for review represent a supplement to the 1998 Biodiversity Guidelines specifically dealing with RMS-6. Technically, the Old Growth Options do not directly (and should not) address RMS 1, 3 and 4. OG Options should be judged on RMS 6 first and foremost, recognizing they will eventually be part of RMS 3 and perhaps part of RMS 4. Therefore, it is confusing to try and address all four standards in the OG Guidelines. The Old Growth issue needs to be resolved at the State level before it can be addressed at unit levels. It also needs to be resolved before RMS 1, 3, and 4 are addressed.

The Coarse Filter approach (RMS-1) for managing landscapes is becoming increasingly recognized as a practical approach to sustaining Biodiversity (Haufler and others 1996, Baydack and others 1999). Practical application to blocked ownerships (RMS-2) requires using a bioregional level of knowledge to establish targets of Desired Future Condition (DFC) for successional stages. It would be impractical to research each individual third order watershed to increase the specificity of DFC. Furthermore, large-scale disturbances historically and in the future would make local coarse filters exceedingly complex.

There may be inherent misunderstanding of one statement in the 1998 Biodiversity Guidelines (BIO-6) and RMS 3 *"...areas of large, blocked ownership we would manage for a desired future condition characterized by the proportion and distribution of forest types and structures historically present on the landscape."* This statement is apparently interpreted in Option 3 as a requirement to identify the proportion and distribution of historic types for each local landscape as the basis for defining DFC. However, this would require a major research effort (impractical) and is counter-intuitive to the broader coarse filter concept. We feel that the best means of implementing the coarse filter is to base the DFC for OG on a specific quantitative acreage commitment for RMS-6 which is then distributed by the relative amounts of cover types historically present on larger landscapes (e.g. regions or climatic sections).

1.D.1. General: "Reasonable or Unreasonable"?

1. Each of the Options is deemed reasonable to some people and unreasonable to other people.
2. Option 2 appears most reasonable relative to implied intent of SFLMP RMS-6 from data provided in the Final EIS, but the OG Index used to reach the final numbers is new and untested.
3. "Old Forest" and "Old Growth" must be clearly distinguished!

1.D.2. Detailed: "Reasonable or Unreasonable"?

Each of the Options may be reasonable to some people and unreasonable to other people. The real problem is to clarify intent of RMS-6. Furthermore, a clear distinction must be made between "old forest" and "old growth". Unfortunately, as illustrated by current lack of consensus within the DNRC and among concerned publics, the original definition of RMS-6 is "not reasonable". We conclude that, "one-half of historic old growth" is not definable! The best estimate of "historic old forest" comes from Losensky's studies, but only a portion of that would meet various quantitative criteria for "old growth".

Clear management guidelines are not possible until a "reasonable" target" of "old growth" stands are specified (acres, %, and distribution among management units). Once these are specified, reasonable guidelines to reach the target can be developed. Much of the background work is documented in various places, but a clear, straightforward direction is not evident. Having three Options only confuses the fundamental management issue of how many acres will actually receive an administrative definition of "old-growth".

RMS-6 may have sounded great at the time, but opened Pandora's box. European landscape ecology literature on planning suggests a general principle of keeping 10% of the land in a managed landscape as "natural" preserves (Haber 1989). The original Forest Service approach to OG in the 1980's established a general 10% OG retention guideline distributed across the landscape; individual administrative Regions wrote guidelines on how they would accomplish this in relation to wilderness, natural areas, part of active management areas, and use of uneven-aged management (e.g., R-2 & R-3). In National Forest Plans of the 1980's, OG allocations were generally considered acceptable if the old-growth areas were identified on the map. But, if the OG allocation were only an acreage target, the public did not accept (or trust) that any OG would be preserved. If RMS-6 differences of interpretation and quantities can be resolved, the resultant product will be "reasonable" to meet RMS-1, 3, and 4.

Question 2. Given the lack of long-term repeated measurements of age class structure on DNRC lands, is it reasonable to use broad scale assessments, made at the climatic section level prior to widespread Euro-American influence, to estimate long-term average proportions of old growth in relation to Biodiversity RMS 6? If not, is it reasonable to use single point-in-time observations from DNRC lands to determine long-term average conditions? Please compare the strengths and weaknesses of the two approaches as described in the Biodiversity Implementation Guidance (1998:Bio-24 to Bio-35) and Old Growth Guidance (2000) – Option 3.

2.A.1. General: Broad Scale Assessments and Point-In-Time?

1. It is virtually impossible to define long-term averages!
2. Losensky's (1993, 1997) Point-In-Time Estimates are the best available from existing data.
3. Regional or section levels are more reasonable for assessment and defining OG targets (Options 1 & 2) than smaller, local landscapes (Option 3).

2.A.2. Detailed: Broad Scale Assessments and Point-In-Time?

Yes, but the first question needs clarification. We do not believe it is reasonable to call one point-in-time (Losensky 1993,1997) an estimate of "long-term average proportions". Too many changes in climate, native populations, natural and human (native and non-native) disturbances influenced historical amounts of OG. Finding a "representative" point in time, (prior to fire suppression, with a similar climate to today, with a source of reasonable inventory data) seems the best empirical approach.

Therefore, a "point-in-time" estimate such as 1900 appears to be reasonable as a benchmark representing historic conditions for a region (e.g. western Montana or climatic section) because we have some historic inventory data (1930) to work with (Losensky 1993, 1997). Since this rationale was actually presented in the SFLMP Final EIS and was the basis for RMS-6 in the ROD, it is reasonable to continue on that basis as documented in the 1998 Biodiversity Implementation Guidance (or revise the SFLMP).

For initial assessment, a large enough area must be used to avoid local effects of "above" or "below" historic major disturbances (e.g., fires) to determine a reasonable average target. The SFLMP is for all lands and the climatic section level seems appropriate scale to start with. The long-term goal should be to distribute these targets proportionately across all state lands, but short-term adjustments must be considered because of existing conditions (inventory). The SFLMP does not require targets be met for all individual units in the short term. But, implementation requires coordination among various units to individually and collectively work toward the goals.

We do not believe that more detailed or alternative analysis of the Losensky (1997) data to estimate the amount of old growth is warranted. More precise estimates or estimates based upon local data as opposed to the whole climatic section will not resolve the need for DNRC to simply decide upon the amount of acres they are planning to manage as old growth in reference to RMS-6. Climatic section level averages provide a more reasonable OG target than attempting to reconstruct historic conditions (1900) for specific units of State lands. We know that large-scale disturbances (e.g., major fires) historically had a major impact on 1900 conditions with non-uniform distribution across a region (or climatic section). Basic coarse filter concepts and general OG guidelines seek to establish a balance of successional stages distributed across the entire landscape. Establishing unique targets for each smaller landscape runs counter to general "distribution" concepts. Since the ROD clearly established a commitment to some OG, then it should follow that a reasonable contribution would seek to distribute that OG across the entire ownership in the long run.

Question 3.a. Are there clear thresholds/definitions distinguishing old growth from non-old growth in Montana (independent of political and social influences)? If not, then do any of the Options presented in the Old Growth Guidance (2000) represent reasonable approaches to doing so? Is one approach to defining old growth more clearly supported by science than the others? Please compare the strengths and weaknesses of the three approaches for defining old growth when responding to this question.

3a.A.1. General: Thresholds -- Reasonable Options?

1. There are no clear thresholds.
2. Operational thresholds are commonly adopted for practical reasons
3. Green and others (1992) provide acceptable interim standards
4. Green and others (1992) criteria should be revised based on systematically placed plots to determine appropriate stand estimates.
5. Current index methods do not express attributes on a comparable basis, or weight large/old trees adequately.

3a.A.2. Detailed: Thresholds -- Reasonable Options?

No, there are not sharp thresholds as to what is or is not old growth. Hunter and White (1997) evaluated the published literature on old growth, but found no clear thresholds for determining whether a given stand is, or is not, old growth. Rather, there are a number of attributes that old growth stands manifest in varying amounts or degrees that make them old growth.

However, thresholds as to what is or is not old growth are commonly adopted for practical reasons, based on plot studies and consensus of scientists and managers. For example, Green and others (1992) provide tables of average old-growth characteristics by forest type, for both eastern and western Montana. While Green and others (1992) do not recommend that these tables be used as absolute minimums, they do suggest they are appropriate for screening stands to identify potential old-growth, indicating that most stands that meet these criteria would meet most other definitions as well.

An approach that can identify stands with old-growth characteristics from among the many stands on the landscape would likely be useful to the DNRC for the matters at hand; and the tables by Green and others (1992) provide that capability for major forest types in Montana. However, the numbers in Green and others (1992) are averages generated from plots that were selected from a stand-exam database based on some minimum criteria, rather than on averages of systematically-sampled plots in potential old-growth stands. That said, Green et al's (1992) numbers are the current standard in the region, and appear to be an acceptable working alternative.

One problem with approaches (such as Option 3) that strongly emphasize numbers of large trees, is that stands with only modest numbers of large trees may support high levels of other attributes, making these stands of higher functional value than stands with many large trees but shy on other attributes.

An attractive potential of index methods (such as Option 1) is the flexibility they afford to deal with the tremendous variation in old-growth conditions. Stands perceived as having value as old-growth support some mix of components that collectively provide the values, functions, characteristics, or habitat diversity associated with old growth. Index methods might be developed in the future to accommodate (and perhaps weight) a range of attributes, such as large trees, old trees, snags, coarse woody debris (CWD), canopy structure, etc. -- attributes associated with old-growth stands, but that vary in scale of importance among forest types.

Conversely, a weakness of index approaches (such as Option 1) is that they are still relatively new and untested. Furthermore, attributes are not expressed on a directly comparable basis. Another problem with indexes comprised of numerous factors is that a stand can have a relatively high overall index value, yet support very few large trees. However, these are not necessarily insurmountable problems. For example, an index could consist of fewer factors, preferentially weight large/old trees, and scale variables on a consistent basis. Such an index does not yet exist for Montana.

In summary, Green et al's (1992) minimal criteria can provide an interim basis for identifying old growth in Montana. The representativeness of these numbers could be improved if based on estimates from systematically sampled plots within potential old-growth stands.

The DNRC currently has inventory data of sufficient specificity to apply Green and others (1992) on only about 40 percent of their lands in western Montana (Personal communication--Scott McLeod, DNRC, 11-28-00). Therefore, the SOGI index could provide an interim basis for identifying "designated old growth reserves" on the remaining 60 percent of lands until improved inventory data are available for those lands.

Question 3.b. Is it reasonable for the DNRC to quantify broad-scale old-growth amounts (in accordance with Biodiversity RMS 6) with the working definition used in the SFLMP (p. IV-64) and used currently in Option 1 (Old Growth Guidance - 2000)? Discuss the relative strengths and weaknesses of inclusive (Option 1) and exclusive (Options 2 and 3) old growth definitions.

3b.A.1. General: "Old-Growth Amounts"

1. An inclusive screen for "old forest" is a good starting point, but should not be called "old growth".
2. Option 1 targets 82,492 acres (18.7%) as "old growth", but really should be called "old forest". However, only 14,386 acres are protected from harvesting.
3. Option 2 targets 43,744 acres (9.9%) as "old growth" with 25,101 acres protected from harvesting.
4. Option 3 targets 84,014 acres (19.0%) as "old growth" with presumably most protected from harvesting.
5. A clear connection to the SFLMP Final EIS and ROD is difficult to make.

3b.A. 2. Detailed: "Old-Growth Amounts"

It is reasonable to establish a broad screen (inclusive) as a starting point. However, it is not reasonable to call that broad screen "old growth" when it is only "old forest". The critical point is not "inclusive" vs. "exclusive" in the process, but in the final acreages that will be identified and protected in each option. Scott McLeod provided the updated amounts shown in Table D-3 to us on 10/31/00 in response to our request.

Option 1 identifies 132,468 acres of "old growth" (really just "old forest") in their inventory for lands west of the Continental Divide and targets 82,492 acres for some level of protection (8/2/00 OGM p.25). But, if only 14,386 acres are protected from any and all harvesting, then we cannot make any direct connection to RMS-6, "one-half of historic old growth". (P IV-63 gives Losensky (1993) estimates with a weighted average of 23.4%. Option 1 is weak because the index spans a lot of stands that most people interested in biodiversity and wildlife would not call old growth. In addition, harvesting is allowed in a high percentage of "old forest" stands. Therefore, many would feel that the general concept of OG, or commitment to protect a significant amount of OG is not being met.

Option 2 appears reasonable relative to the SFLMP Final EIS. Option 2 identifies 60,888 acres (8/2/00 OGM p.25)(51,990 acres correction per McLeod memo of 8/8/00) of "old-growth" west of the Continental Divide and targets 43,744 for some level of protection. Only 25,101 acres would be protected from harvesting. (It appears that an average of 53% of the Losensky (1997) "old forest" was judged to be "old growth" based on evaluation of the old, unentered stands database.) The main Option 2 weaknesses are lack of scientific support for the proposed index (not available at this time), and public trusts concern about use of the index to allow harvesting of too many large trees.

Option 3 offers the generally accepted minimum criteria (Green and others 1992) to gain credibility and only stands meeting that can be counted toward target (with a few special exceptions that would need to be individually justified for specific stands). Option 3 targets 84,014 acres for "old growth" with more protection from harvesting. This is strength for those advocating a larger amount of "old growth", but a weakness in requiring more tradeoffs of trust revenue generation than identified in the SFLMP Final EIS.

The bottom line is that none of the Options is clearly tied to SFLMP Final EIS and ROD regarding the nebulous "one-half of historic OG". The Options should be based on the SFLMP Final EIS as a starting point and it appears that all three Options were hampered because a specific amount of "old growth" and defining criteria were not established at the time the ROD was issued.

Table D-3. Summary of western Montana old growth commitments and current amounts, in acres, for Option 1 and Option 2. (Option 3 estimate and acreage figures for calculating percentages provided by Scott McLeod 10/31/00)

Table D-3. Summary of western Montana old growth commitments and current amounts, in acres, for Option 1 and Option 2. and Option 3 estimate (Provided by Scott McLeod 10/31/00)

NWLO & SWLO SUMMARY by OG Commitment Acres for Option 1, Option 2, and Option 3

LOSENSKY TYPE	Option 1 OG Commitment Acres	Option 2 OG Commitment Acres	Option 3 OG Commitment Acres	Option 1 Current OG Acres	OPTION 2 Current OG Acres	OPTION 3 Current OG Acres
PP	37,548	17,889	34,870	27,936	13,414	18,895
Douglas-fir	1,767	754	1,658	15,239	6,251	10,389
L-DF	32,421	18,214	35,551	33,514	12,024	19,517
LP	700	476	624	1,694	300	299
WP	2,378	1,879	2,867	10,085	4,183	3,975
MC	4,609	2,855	4,988	27,359	9,607	10,470
ALP/NC	3,048	1,677	3,456	16,642	6,211	8,024
TOTAL	82,492	43,744	84,014	132,468	51,990	71,568
	18.7%	9.9%	19.0%	30.0%	11.8%	16.2%

Western MT Losensky in EIS 23.4 × ½ = 11.7
Western MT using Losensky (1997) 37.4 × ½ = 18.7

Western MT acreage	441,716
Remainder of state	175,109
Total	616,825

10/31/00

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Question 4. Which option provides the best framework for providing for the range of wildlife habitats associated with old growth forests in accordance with Biodiversity RMS 1 (ROD-12), Sensitive Species RMS 1, 3, & 4 (ROD-31 and 32), and Big Game RMS 1 & 2 (ROD-33)?

4.A.1. General: Wildlife, Sensitive Species, and Big Game?

1. Amount, sizing, spacing, and connectivity are more important than differences in Options.
   A. Large patches better than small.
   B. Many patches better than fewer
   C. Closer together better than farther apart
   D. Connected better than disconnected.
2. How would these vary between Options?
3. Scientists differ in regard to stand manipulation
4. Ability to contribute to OG will vary by ownership location
5. Proximity to other ownerships with old-growth is important
6. Widely scattered small stands lacking connectivity will contribute little over time.
7. Concentrate efforts where there is best chance of success.
8. There are reasons other than biodiversity to maintain OG --aesthetics, etc.
9. Omega seems to provide best framework
   A. Uses Coarse Filter
   B. Provision for fine filter for T&E and endangered species
   C. Commitment to a specific amount of old growth
   D. Provision for replacement stands
   E. Concentrates efforts on large blocked ownership
10. Fine filter approaches will entail very expensive and continuous effort.
11. Likely little difference between Options for big game species.

4.A.2. Detailed: Wildlife, Sensitive Species, and Big Game?

It is well to note that ecological response, including that of vertebrate wildlife species, will also be guided by amount, stand size, stand proximity, and connectivity between old-growth stands as well as the differences among Options. In other words, old-growth patch size (bigger is better), number of patches (many is better than fewer), distance between patches (the closer the better), and connectivity (connected, whether by corridors or condition of the matrix between patches, is better than no connection).

There is no discussion of how these factors would vary between Options. That makes it difficult to evaluate the Options with any degree of certainty.

In addition, there is the question of the appropriateness of management manipulation of old-growth stands - both those extant and those in process of development toward old-growth condition. Opinions of well-qualified experts vary in this regard. As long term results from active management lie in the future - likely quite far in the future - considering such manipulation as appropriate and relatively certain to yield anticipated results is an informed guess at best and, therefore, encompasses some unknown level of risk. In other words, producing "old-growth" habitats through active management is an untested hypothesis. Scientists vary in their degree of faith in such manipulations being successful in mimicking natural processes. Adherence to the precautionary principle (and the probability of losing in court when dealing with threatened or endangered species) have produced the more common approach of "reserve strategies" considering the above mentioned variables of numbers of old-growth patches, stand size, juxtaposition with other stands, and connectivity. See Spies and Franklin (1996) for a summary treatment of this issue.

The ability of the individual State Forests to contribute significantly to the retention of biodiversity will, likely, vary considerably. The welfare of sensitive species wholly or partly dependent on old-growth habitat condition (a significant contribution to retention of biodiversity) will vary with the location of the Forest within the landscape (i.e., what forest condition surrounds the Forest) and the condition of the Forest within the property boundaries.

If commitment to maintaining some percentage of the State Forests in old-growth condition results in widely separated, disconnected patches of old-growth forests in a "sea" of much younger stands there is likely to be little long-term contribution to biodiversity. Populations of species dependent on such habitat conditions tend to "wink out" over time with small probability of successful long-term recolonization.

Given these considerations, it may be well to focus attention to old growth and associated species and concentrate efforts and investment where there is the best chance of desired results. In other words, some tracts would have no old growth and others would have more than the overall agreed upon percentage of old growth.

If, however, the management desire is retain old growth - even in small isolated stands -for other reasons such as aesthetics or social reasons, that is a different matter. But, it should be realized that such would not provide significantly for biodiversity over the long term.

The Omega alternative seems to provide the best framework for providing for the range of wildlife habitats associated with old-growth forests. Biodiversity retention is addressed, in general, through the coarse filter approach. However, provision is made for the use of a fine filter approach applicable to threatened and endangered species and sensitive species (Noss 1996). A specific commitment is made to maintenance of a specific amount of old growth (though it is not clear what that amount is in terms of a percentage of the forested landscape). Provisions are made for retention of replacement stands for old growth lost over time. Clear distinctions are made for concentrating old growth management on large, blocked ownership (at the expense of smaller, scattered ownerships) to get the best results for old-growth associated species in exchange for the timber yields forgone. A full discussion of conserving biodiversity in managed landscapes can be found in Miller (1996).

However, it should be clear that the fine-filter approach for threatened and endangered species and for sensitive species will, ultimately, require population viability analysis (Marcot and Murphy 1996). And, that analysis will, of necessity, be done considering State Forests as part of the habitat of the species in question.

It is not clear what the differences would be between alternatives related to big game welfare. There would appear to be an adequate mixture of cover stands and forage areas produced under all scenarios presented. Appropriate road management could be part of any scenario presented and would be apt to be the key management factor.

Question 5. Given the DNRC commitment to adaptive management (ROD-10) is it reasonable to adopt interim definitions and guidance while pursuing better information and processes?

5.A.1. General: Adaptive Management, Interim Guidelines?

1. Adaptive management--current actions provide information on which to adjust course in the light of new knowledge.
2. The answer is "YES"!
3. At this point, that means using the Green and others (1992) approach until something better has been tested and proven superior.
4. The DNRC index has not yet attained that status.

5.A.2. Detailed: Adaptive Management, Interim Guidelines?

DNRC is committed to "adaptive management." However, it is well to note that "adaptive management" is a new buzzword to apply to age-old human necessity to adapt to change. The concept is simply that a plan of action is formulated on the basis of current knowledge and experience and, then, changes are routinely formulated on the basis of accumulating experience and new information. And, clearly, the Land Board must make decisions that balance scientific, social, and regulatory concerns in their considerations for preservation of biodiversity (Clark and others 1996).

Given that background, it can be said that all current definitions and guidance, no matter what the enterprise, are temporary in nature. Changes are made as new experiences and new knowledge come to bear.

The brief answer is "yes." It is reasonable, as a matter of course, to adopt interim definitions and guidance while pursuing better information and processes to address the "old growth" issue on State lands.

However, at this point in an evolving process, that means using the Green approach until a better method is developed and tested. The DNRC index approach is in the process of development and has not yet been demonstrated as superior to the Green and others (1972) approach.

Question 6. What factors should be considered when developing old growth management networks? Which, if any, of the three Options will best aid in the identification and management of an old growth network that provides for an appropriate mix of stand structures and compositions utilized by old-growth associated species, that is consistent with the coarse filter approach identified in Biodiversity RMS 1?

6.A.1. General: Factors for Old Growth Networks

1. Interior old growth habitat is important
2. Fragmentation of old growth decreases effectiveness
   a) Roads, b) Harvest units, c) Created openings
3. Connectivity increases habitat value of old growth
   a) Streamside areas, b) Closed-canopy stands, c) Relatively well-stocked stands with mature component, d) Future old growth
4. Networks must be established over time, so planning is essential
5. If concentrated in parts of ownership, need to span representative sites.

6.A.2. Detailed: Factors for Old Growth Networks

The following are considerations for the design of old-growth networks:

"Interior" old growth habitat (>100 meters from edge of an opening or stand of lesser age or a road) is the most important component of old-growth habitat (Baker and Knight 2000). I.e., in general, larger stands are more effective as habitat than smaller stands. Fragmentation of existing patches of old growth by roads, timber harvesting, or other created openings will decrease effectiveness of the patch as habitat due to the reduction in amount of interior old-growth conditions (Baker and Knight 2000). I.e., in general, non-fragmented stands are more effective as habitat than smaller stands. To decrease or avoid fragmentation, roads can be designed to avoid large patches, harvest units can be placed on or near existing roads, and roads can be closed where no longer needed.

Stands of old-growth forests will function best as habitat when they are connected to other stands. The SFLMP Final EIS states that:

"Corridors should be provided between old-growth blocks, to the extent this is within the State's control. Corridors may be streamside areas, closed-canopy stands, or other relatively well stocked stands with a mature component. The specific locations of these corridors may change over time as stands grow and are harvested. Streamside areas are especially desirable as corridors." (SFLMP Final EIS Appendix RMS-30 to 31).

Connectivity can thus be achieved by corridors of actual old growth or by suitable closed-canopy or mature condition of the matrix between old-growth stands (Thomas and others 1990 Bennett 1999). Stands designated as future old growth that are presently mature may be suitable. Linkages should, when possible, contain a large fraction of interior forest (i.e., >100 meters from a high-contrast edge) (Bennett 1999). At least initially, ability of managers to establish networks of old-growth patches and maintenance of connectivity will be significantly limited by the location and size of extant old growth, mature forest, and suitable streamside areas. Therefore, retention or establishment of connectivity may have to be established over time with careful planning and execution of forest management activities.

Given the limited amount of anticipated old growth, it may be advantageous to concentrate networks in portions of State Forest lands due to minimization of roading and reduction of interference with management elsewhere on the tract in question. When designating old-growth patches (whether extant or planned) it is important to span a representative cross-section of sites, rather than to concentrate them in streamside areas or on poorer sites.

Place longer-rotation or less intensive uses adjacent to designated old growth, so that a lower-intensity managed zone serves as a buffer for the old-growth system (Noss and Cooperrider 1994). Avoid placing high-intensity land uses (e.g., clearcuts, roads) next to designated old growth.

Attempting to design an appropriate mix of stand structures and compositions within old growth is problematical because science has not yet provided that kind of resolution.

Other things being equal, big old-growth reserves are better than small ones, unfragmented reserves are better than fragmented, reserves closer together are better than reserves far apart, reserves connected to others are better than those not connected.

Integrate future replacement old growth into the network. Where otherwise equivalent replacement stands exist, choose those adjacent to designated old growth as future old growth.

Designate the existing old growth and future old growth and place them on maps. Also, map the areas in which restoration harvesting will occur. These will tend to increase public trust and support.

Question 7. Given the disturbance driven nature of Montana's forests, is it reasonable to expect some level of harvesting could serve to help perpetuate or enhance some types of old growth? In what types of old growth would some level of management be appropriate?

7.A.1. General: Harvesting to Perpetuate OG

1. Restoration cutting is appropriate to reduce unsustainable post-settlement density increases in OG pine/fir stands.
2. Prescribed fire is preferred treatment to sustain OG pine/fir stands after initial restoration cutting.
3. Cutting is still an option if fire ineffective or poses high liability.
4. Thinning may be useful in WL or DF types to enhance large-tree future OG; however cutting should cease several decades before "potential" OG stands qualify as OG.
5. Cutting appropriate to enhance OG objectives, but not to reduce density to minimum OG criteria
6. Cutting inappropriate in stands currently meeting Green and others (1992) criteria, with exception of PP/fir OG.

7.A.2. Detailed: Harvesting to Perpetuate OG

Timber harvesting is inappropriate in designated old-growth forests except for restoration harvesting in low- to mid-elevation forests adversely affected by fire suppression and/or livestock grazing. Timber harvesting is not appropriate in old-growth forest types historically renewed by stand-replacement fires.

There are two conditions where restoration may require harvesting. First, initial restoration cutting treatments appear necessary to restore old-growth stands historically sustained by relatively frequent low- to mixed-intensity fire. The most extensive example would be old-growth ponderosa pine and ponderosa pine/Douglas-fir stands. Overstocked stands with sapling/pole understories are at high risk to stand-replacement fire, and may not have the capacity to regenerate themselves following such fires. The appropriate treatment is to significantly reduce the density of understory and overstory trees established since Euro-American settlement, and remove them from the site. Following cutting, restoration of fire, through prescribed burning, is necessary if such stands are to perpetuate themselves in place, consistent with historic disturbance processes, intervals, and intensities.

Second, somewhat increased densification has also occurred in the overstory of some old-growth stands in the absence of low intensity fire, because the surface fires that were suppressed would have resulted in some mortality of overstory trees. For example, Arno et al (1995; 1997) generally show an increase in relative density (i.e., site occupancy) of both post-settlement and pre-settlement trees in the mid-story and overstory. To address this, restoration of fire through prescribed burning may produce sufficient mortality in canopy trees to lower density over the initial decade of burning. Single prescribed fires in ponderosa pine forests, for example, often lead to modest mortality of canopy trees within 5-10 years after the fire (Gaines and others 1958, Harrington 1993, Swezy and Agee 1991). Where reintroduction of fire alone fails to re-initiate regeneration, some overstory trees (Douglas-fir and/or pine) may need to be killed to reduce hazard and open stands sufficiently for shade-intolerant pine to regenerate and develop, and to remove the seed source of shade-tolerant species. The fires that were suppressed would likely have killed some of these trees and left them standing as snags or on the ground, where they may have been partly or wholly consumed by subsequent fires, rejuvenating soil nutrients. Thus, some killed trees should be left standing or down on the site as snags and coarse woody debris that will provide temporary wildlife habitat and eventually replenish the soil, since stands suffering from fire suppression may be deficient in snags and down wood, although these stands historically had low volumes of each because of frequent fire. While cutting is appropriate to reduce density as needed to secure regeneration if fire alone fails to accomplish this, it is not appropriate to reduce large tree numbers down to some minimum threshold level. Instead, where cutting is used, the target density of overstory trees in the restored stand should be the estimated density of similar stands at the time of Euro-American settlement, based on the scientific literature (e.g., Arno and others 1995, 1997).

Other benefits of treating old-growth pine stands include increased uptake of nutrients and water, with associated increases in leaf nitrogen content, leaf toughness, growth increment, and resin flow (Feeney and others 1998; Stone and others 1999, Fiedler 2000). Collectively, these chemical, structural, and physiological effects of treatment limit the severity of biotic (e.g., western pine beetle) and abiotic (e.g., fire) disturbance processes to levels that promote stand sustainability, rather than replacement.

Prescribed burning may be sufficient to maintain old-growth ponderosa pine stands once density and/or shade-tolerant species composition have been addressed through initial restoration cutting. Cutting of non-old-growth trees should remain a restoration and maintenance treatment option in the ponderosa pine type if prescribed burning alone fails to achieve restoration, or in areas where burning is problematic because of adjacent ownership liability issues (e.g., scattered Section 16s and 36s). Periodic prescribed burning will likely be required in old-growth stands on Douglas-fir/true fir habitat types to keep fir composition at acceptable levels.

Thinning treatments may be used in the western larch or Douglas-fir type for the purpose of accelerating large tree development in stands that will become old growth in the future. Long-term research at several locations in the Inland Northwest shows that thinning can speed large-tree recruitment and apparent succession from early to mid-seral conditions. However, such treatments are only appropriate where they are specifically designed to enhance old-growth objectives, and not for the purpose of reducing density to the point where a stand might still just qualify as old-growth based on Green et al's (1992) criteria. Such harvesting should cease several decades before the stand is expected to reach old-growth status.

Question 8. In your judgement, to what degree is resolution of the controversy regarding old-growth management addressable through science, or to what degree is resolution a politically driven decision where science plays a subordinate role?

8.A.1. General: "Science vs. Politics"

1. Both Science and politics have a legitimate role
2. Scientific knowledge comes in pieces -- each with stated confidence intervals (CI).
3. The amount of acceptable risk is a management decision.
4. Application of such information usually requires synthesis.
5. Synthesis removes mathematically-derived CI's -- i.e., risk assessment becomes intuitive.
6. Synthesis is not science *per se.*
7. Technicians propose and managers dispose.

8.A.2. Detailed: "Science vs. Politics"

Both factors (science and politics) should, and will, come to bear on the decisions made in addressing the management of old-growth forests. "Science" provides scattered pieces of information related to question at hand. Some of these individual pieces of information are, individually, directly applicable to management decisions. Commonly, individual bits of information from well-conducted studies are expressed with varying degrees of confidence, which may be expressed as "risk" levels. Designated decision makers decide on what risk levels they find acceptable. The science describes results and levels of associated risks and the manager decides.

However, such pieces of information usually require synthesis to be maximally useful in making management decisions. In that case, the synthesis is not "science" per se. Rather, it is simply a synthesis of information, whether done by scientists or not. In such cases, there will be a merging of risk assessments that can only be intuitively evaluated. The resultant risks, while difficult to quantify, are very real and must be considered. But, again, the scientists describe and the manager decides.

How the necessary synthesis is conducted and the conclusions reached can be expected to vary, at least somewhat, depending on the individual scientist, or group of scientists, producing the synthesis. There is, however, probably much less risk in the synthesis itself relative to its application in decision making. Given the fact that old growth is believed to be in short supply relative to past centuries, those concerned with the ecological consequences of current and future management decisions will opt for application of the "precautionary principle." In such cases, decisions are made with the acceptance of potential error on the side of caution. Conversely, those concerned with the economic and social consequences of production sacrificed for the sake of precaution will likely opt for less caution as related to ecological consequences.

Such arguments are, at their core, political in nature. And, because of that political nature, decisions fall within the purview of managers or managerial bodies to which technical experts and scientists are advisors. Again, science informs and technicians propose. Legally designated decision makers decide.

It should be noted that the more rigorous application of "adaptive management" as defined in the management literature - action, monitoring, and appropriate adjustment - has been adopted. A word of caution is in order. There has been a formal commitment to monitoring - both performance and results monitoring. There needs to be full understanding as to what such a commitment entails in added costs (Dallmeier 1996).

Such monitoring is expensive, tedious, and requires persistence. As a result, such monitoring is seldom carried out. However, in another sense "adaptive management" can be done at a much less rigorous level through cursory observation. It is essential that the level of monitoring be clearly defined, cost estimates derived, and commitment of the Board to a level of monitoring be attained (Dallmeier 1996).

The very nature, and history, of the development of an approach to the old-growth management issue has significant political aspects. The primary example is the political commitment to the retention and maintenance of fifty percent of the estimate of historical levels of "old forest" or "old-growth" suggested by Losensky (1993). Clearly, Losensky's estimates are lacking defined confidence levels - but, at least, the method is clear and we concur that the estimate of "old forest" is reasonable. Then, a deal was apparently struck between the Board and old-growth proponents to maintain 50 percent of the Losensky estimate. Fifty percent is an arbitrary, politically driven decision only marginally related to "science." Oddly enough, given the attention to application of "science" in this ongoing drill, there seems to be little debate over that number. The debate centers over how to determine and reach that contractual commitment.

The Land Board should come down on a target percentage of "old growth reserves" of the forested acres on State Lands. Jack Losensky's estimates were of acres in "old forest" and only a portion of that acreage meets the definition of "old-growth." Various estimates can be derived by different assumptions and from different data sets. It is essential that the Land Board make a clear decision as to what the target number is to be. That, most clearly, is a political decision that will have significant effect on both status of the forest and the ability of the forest to produce revenue.

Neither "science" nor synthesis of knowledge from science alone can resolve the controversy surrounding the old-growth management issue. The bottom line is that the pending decisions related to the management of old growth cannot be resolved solely through the application of science.

Question 9. Regarding the fundamental philosophy of the SFLMP from ROD-1 that reads: "Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests." Do any of the Options seems to most faithfully adhere to the premise?

9.A.1. General: Which Option best meets Quote? "The best way to produce long-term income is to manage for healthy and biologically diverse forests."

1. The premise is invalid unless "biodiversity retention, aesthetic values, spiritual values, etc. are "income".
2. "Healthy" implies a question -- healthy enough for what?
3. Monetary income, over the long term, will be inverse to the number of acres devoted to old growth due to revenue foregone (I.e., opportunity costs).
   A. Any stand carried beyond financial maturity will reduce income
   B. Any stand carried beyond culmination of mean annual increment will reduce wood available.
4. There is a clear distinction between Options related to economic yield.
5. The Board's "decision space" is bounded by:
   A. Commitment to old-growth retention.
   B. Acceptable level of opportunity costs.
6. The point of compromise is strictly a management decision.

9.A.2. Detailed: Which Option best meets Quote?

In order to answer the question as presented it is necessary to accept the premise as valid. The premise is flawed. Long-term income to the trust will be inversely correlated with potential economic productivity foregone to maintain old-growth forests. Any use of the term "forest health" requires definition - i.e., the question to be answered is "healthy enough for what?" If the answer is "healthy enough to maximize economic return to the trust," the premise itself makes no sense. If that is true, the question makes little sense. Only the Land Board can weigh the relative merits of the trade-offs between income to the trust and retention of varying levels of biodiversity. Clearly, the more old growth that is maintained and the better the network of old growth the better for old-growth associated species. Equally clearly, the more land that is tied up in old-growth management schemes the higher the costs in revenues forgone as stand ages go beyond economic rotation age (the age at which the stand produces maximal economic return).

For the premise to be correct it would be essential for "income to the trust" to be inclusive of other values than economic return. These other "returns" could be inclusive of aesthetics, maximization of biodiversity, spiritual values, etc. If that is the case it is essential for the designated decision makers (in this case, the Land Board) to define the appropriate mix of management objectives - the acceptable loss of potential revenue to achieve the "income" of biodiversity retention, aesthetic values, spiritual values, etc.

From examination of the alternatives displayed in the State Forest Land Management Plan - Final Environmental Impact Statement it is possible to discern clear differences in economic return to the trust relative to the attention paid to old-growth retention and other management actions (i.e., grazing and recreation). There is no way for advisors to determine "which option most faithfully adheres to stated premise." The "premise" is too general to be of much definitive use. The decision space is bounded on one side by the Board's commitment to maintain 50 percent of the Losensky estimate of old growth (though the estimate of old growth to be maintained requires the choice of an exact percentage by the Board). The bound on the other side is the acceptable opportunity costs (potential revenue foregone) or, conversely, the targeted revenue from timber production.

4. General Critique Overview

A. 1. General: General Critique Overview

1. Various estimates of "Old Forest" and "Old Growth" in various documents cause considerable confusion.
2. Several estimates from SFLMP are illustrated in Table 1.
3. Estimated acreages for Options 1, 2 and 3 were illustrated in Table D-3

A.2. Detailed: General Critique Overview

We appreciate the opportunity to participate in the review of the OGG, and commend the DNRC for its efforts to develop a science-based approach to define and manage old growth on Montana State forestlands. However, we recognize the difficulty in making management decisions in the face of scientific uncertainty and lack of sufficient inventory data to proceed with management decisions and implementation. The following quote seems appropriate; *"Conservation of biological diversity is emerging as a major societal goal. Because natural processes are so complex, can we wait until science finds answers before we begin managing for biological diversity? A definitive answer to this question may be impossible to find, but the need for one is gaining in importance and immediacy. To the research scientist the idea of proceeding without adequate information is unthinkable, but to the resource manager it is a fact of everyday life, now and for the foreseeable future."* (Trauger 1999).

The OMEGA Alternative, as documented in the SFLMP and ROD was a management decision with considerable scientific input and review and public involvement. We feel it was a reasonable attempt to implement 1990's concepts of Ecosystem Management, Sustainable Forestry, and Biodiversity within the guiding principles and requirements of School Trust Lands and existing conditions of State Lands. Nevertheless, it was still a compromise management decision and the OG Guidelines should simply help implement that decision rather than kindle controversies representing different competing objectives and values.

The OGG report is unnecessarily complex and difficult to follow, requiring frequent reference to other memos, reports, and appendices. It should be a simple supplement to the SFLMP rather than a replacement for parts of it. Clear linkage to the numbers of acres in the SFLMP-Final EIS is not provided. The three Options tend to confuse and complicate the issue, rather than providing straightforward guidelines to implement the intent of RMS-6.

The current old-growth indices (FOGI/SOGI) may be useful in the future, but need modification and further testing to be consistent with current literature. All three Options use these indices. Because of this, none of these Options is presently appropriate, reasonable, or justifiable without considerable modification.

Timber harvesting, as such, should not be encouraged in designated "old growth retention" stands. Rather, any cutting should be based on ecological restoration prescriptions designed to maintain or restore old growth characteristics. These are obviously appropriate and becoming well supported in the literature for restoration of pine forests within the natural "light severity" fire regime. Recent studies by Arno and others (1997) and Elzinga and Shearer (1997) suggest that ecological restoration prescriptions may also be necessary to restore western larch within natural "mixed severity" fire regimes. However, these prescriptions for cutting trees must be justified either for developing old growth or to meet old growth maintenance objectives, if a credible commitment to RMS-6 is to be maintained.

Because RMS-6 makes a commitment to "one-half of historic old growth", a problem has been created for writing any guidelines for implementation. Until that figure is translated to a specific quantity of forest land allocation (acres, percent of forest land) managers hands are tied in trying to implement direction of the SFLMP. Much of the current debate focuses on this problem that cannot be resolved by science. It requires a management decision to clarify intent and provide a quantitative commitment for land allocation to the purpose of old growth retention. None of the Options provides clear guidelines on how to ALLOCATE & IDENTIFY:

1) A specific amount (acres) of OG for protection until year 2020, and
2) An allocation of where within DNRC lands it will be done.

The Green and others (1972) OG criteria are the closest thing to a "professional consensus" for identifying old growth, although they need to be applied with professional judgement, and modification may be needed for certain types based on research conducted since they were finished (1992). E.g. new information on PP and WL fire ecology by Fiedler, Arno, Harrington, etc.

A clear distinction is needed between "old forest" (age), "possible (or potential) old growth" (meets screening criteria but not certain if meets "old growth" criteria), and "replacement old-growth" (expected to qualify as OG at some specified time in future)

There is a need to clearly tie the OG Guidelines to the EIS data associated with the OMEGA alternative to ensure that the OMEGA alternative is implemented. If the Guidelines deviate from OMEGA assumptions, the SFLMP probably needs to be amended or revised.

We have compiled data from several documents in an attempt to determine if the overall “old-growth” target acres described in the SFLMP-Final EIS can be compared with those in the three Options. Table 1 is a summary of what we found. Table 1 reveals enough difference among various estimates to understand why the OG issue cannot be resolved by simply choosing one of the three Options at this time. Use of the different terms, “Old Forest”, “Potential Old Growth”, and “Old Growth”, make direct comparisons difficult.

On the other hand, from Table 1, it appears that the SFLMP Omega alternative documented that the expected amount of old growth dedication (one-half of historic old growth) would be between 7.2 % and 11.7 %. Furthermore, Remington's Biodiversity Strategy recommended a 10% minimum. From this, a reader would logically interpret that the range would be from 10% to 11.7%.

However, reanalysis of Losensky data to apply more directly to State lands resulted in a refined estimate of 18.7 % as one-half of historic old forest used for Option 1. Option 2 reduced this target to 9.9% "old growth" based on controversial analysis of percentage of "old forest" that qualifies as "old growth".

At the present time, interpretation of "one-half of historic old growth" appears to lie within the range of 10 % minimum "old growth" (SFLMP) to 18.7 % "old forest" (Option 1) and 19.0% "old growth" (Option 3). Further data analysis will not likely help resolve the issues of: a) what percentage of "old forest is "old growth", and b) various interpretations of what is "one-half of historic old growth".

An administrative decision is needed on the specific amount (acreage, percent of land) that will be protected as "designated old growth reserves".

Table 1 – Documentation of various estimates of "Old Forest" and "Old Growth" relative to the Record of Decision (ROD) -- RMS – 6 "one-half of historic old growth". Figures obtained from SFLMP-Final EIS, OGG and table D-3.

Source (Chronologically)	Historic Old Forest	Target Old Forest	Inventory Old Forest	Target Old Growth
SFLMP-EIS 5/96				
P. IV-63 (Table IV-20)	23.4%	11.7%		
P. IV-62 (Table IV-19) (Harvest 30 – 50% of OF)			14.6%	
P. IV-67 (Table IV-21)				7.2 - 9.9%
SFLMP-EIS-Appendixes p. RMS-30 (Remington Biodiversity Strategy)				10% min.
Losensky (1997) revision for DNRC	37.4%	18.7%		
OGG Option # 1 – acres W. MT			132,468 (30.0%)	82,492 (18.7%)
Protected from harvesting				14,386 (3.3%)
OGG Option # 2 – acres W. MT			(Old Growth) 51,990 (11.8%)	43,744 (9.9%)
Protected from harvesting				25,101 (5.7%)
MOGG Option # 3 –acres W. MT				84,104 (19.0%)
Protected from harvesting				Most

5. Summary

1. ROD established "one-half of historic old growth" without knowing what it would be.

2. The Final EIS suggested that it might be:
   a) IV-67 -- Target Old Growth 7.2 to 9.9 %
   b) IV-63 Losensky (1993) western Montana Old Forest -- 23.4% X 1/2 = 11.7%
   c) Appendix RMS 30 (Remington) -- minimum of 10%

3. The DNRC conducted appropriate analyses to revise Losensky's estimate of historic "old forest" to DNRC lands as 37.4%. (X 1/2 = 18.7%)

4. The DNRC recognized that all "old forest" is not "old growth" and estimated OG as a proportion that averaged out to about 53 %. (Based on OG Index threshold of 18.)

5. Option 1 earmarks 1/2 of "Old Forest" as 18.7 % and allows considerable harvesting.

6. Option 2 earmarks 1/2 of "Old Growth" as 9.9 %, with less harvesting allowed.

7. Option 3 challenges methodology of determining OG, prefers Green and others (1992) criteria, seeks larger acreage committed and less harvesting.

8. The "one-half of historic old growth" ROD has created a major roadblock to implementation of SFLMP. Years of inventory and research would be needed to perhaps establish non-controversial numbers.

6. Recommendations

Based on our review, we feel that the Options approach to writing guidelines was a self-defeating strategy for implementation of the SFLMP. Although the Options permitted exploration of alternative ways to interpret "one-half of historic conditions" the three Options should now be put in the files to avoid further unresolvable debate. One new straightforward set of simple guidelines should be written to implement RMS-6. Do not write guidelines until a "hard target" of "designated old growth reserves" acres is established. Then select a set of stands to meet that target based on desired specific criteria that can be applied in the field, to some existing inventory data, and eventually for confirming all designated stands. Identify the first approximation of these stands on maps, based on the best inventory information available. Stay out of those stands for current harvesting and check them out for confirmation as soon as feasible. Recognize that those acreages designated to meet the OG commitment should not be expected to yield any significant amount of revenue for School Trust Lands; conversely, OG not reserved to meet the commitment (or needed for replacement) would be available for harvest.

Based on this general recommendation we have listed specific recommended items that need to be accomplished to implement RMS-6 and establish a clear relationship to RMS 1, 3, and 4:

1. DNRC needs an upper-level decision on the specific amount of **"designated old growth reserves" (acres and percent of land) to supercede the "one-half of historic old growth".** This quantification must be clearly tied to: SFLMP Final EIS and ROD, reports, and literature. Guidelines are then appropriate for implementing that decision, rather than trying to use guidelines to make the decision.

2. We cannot specify the percentage, as it is a policy decision. Based on planning literature (see response to question 1b.) and the materials we have reviewed, that amount would likely be within the range of 10 to 19 percent. We recommend starting from the Target identified in RMS-6 and clearly

documenting the estimated percentage of land in the SFLMP-Final EIS. (This includes acknowledging the Remington strategy and figure of 10% minimum as a starting point.)

3. Decide within the organization (and document in the new guidelines) on how to meet that target (allocation) as a shared responsibility among the various "units" and "offices". Document what is possible in 2020 based on current inventory relative to assigned Unit commitments as proportional geographic allocations among cover types from Losensky (1997). State clear current targets (2020) and longer term targets (2050 or 2100) for each Unit. This allocation responsibility is critical to ensure that the State will implement their SFLMP. Document the shorter-term adjustments needed for each unit to meet total Statewide commitment in consideration of current unbalanced inventory. Then need to allocate short-term requirements and long-term targets to management units to achieve balanced distribution. This appears possible for western Montana in the near future. Eastern Montana could probably follow the general state standards (overall state percentage) for the near future.

4. Make a commitment to ensure that old growth reserves will meet Green and others (1992) minimum criteria (or documented exceptions with justification) in a sincere effort to gain public trust. Where insufficient inventory data currently exist to make that determination, use the best available information to identify "potential old growth" stands and field check them as soon as feasible to determine if they meet the quantitative criteria.

5. Identify on maps (available to public) all old growth stands that are dedicated to meeting RMS-6 (or will meet by 2020) to demonstrate DNRC commitment to RMS-6.

6. Identify adequate replacement stands on the map to ensure meeting long-term commitment. Make a clear statement that you cannot harvest designated "old growth reserves" until qualified replacement is available from the replacement pool.

7. Develop a clear RMS-3 quantitative coarse filter Desired Future Condition (DFC) (for year 2050 or 2100) that starts with the amount of "designated old growth reserves" commitment to meet RMS-6. Recognize, based on existing inventory data, that some Units may not be able to achieve their DFC by 2020.

8. Develop a clear RMS-4 strategy for the scattered sections to help achieve RMS-6 targets. Describe a process to provide flexibility to leave more old growth in landscapes with major harvesting activities (more important for State contribution to biodiversity goals) and less old growth in landscapes with little harvesting activities (less important for State contribution to biodiversity goals).

9. Do not allow harvesting in "designated old growth reserves" (RMS-6 commitment) unless it is a byproduct of a written ecological restoration silvicultural prescription with the primary purpose of restoring or maintaining old growth characteristics.

10. Monitor Unit and Land Office compliance in delineating "designated old growth reserve" and replacement stands as soon as feasible.

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