Question 2

1. What are the scientific and technical strengths and weaknesses of the approaches described in Sustainable Forest Ecosystem Management Strategies 1-6? Please discuss the merits and weaknesses of each individual strategy. Are there alternative strategies that better meet the management goals?

In General:

Reviewer	Comments
Ohmann	In general, I think the key *ecological* components of sustainable forest ecosystem management are addressed well by these six strategies, with one exception. I would like to see greater consideration given here (and elsewhere in the FMP) to the species composition of forest stands. The focus of strategies 1-4 is on structural features of forest vegetation. An additional strategy could be 'stand species composition,' which would refer to something akin to forest series or zones (potential vegetation). This component would recognize the range of variation in environmental gradients and associated vegetation gradients across the ESF. A management strategy could be to aim to distribute the different stand structures, reserves, and legacy components among the different forest zones. In other words, each forest zone would contain the range of successional stages, including complex stand structures, and would contain reserves. Candidate forest zones for ESF would be Sitka spruce forest, western hemlock forest, dry western hemlock/mixed evergreen forest, and riparian hardwood forest. These tend to track the primary gradient of distance from the coast, which is discussed in chapter 2. A related concern is that hardwoods are given relatively little attention in the FMP. This component of vegetation is often but not always associated with disturbance, and also could be incorporated into a 'stand species composition' strategy.

Ecosystem Management Strategy 1 – Actively manage for a diversity of stand structures

Reviewer	Comments
Bisson	It was not entirely clear how the percentages allocated to the three major

	"landscape types" (reserves, complex stands, and non-designated stands) were derived. However, placing approximately 50% of the landscape in reserve or complex stand conditions seems like a reasonable management compromise. I think it would be helpful (1) to explain in a bit more detail how these numbers were derived, and (2) to describe what strategy will be employed in the event of an unforeseen large natural disturbance that might make attainment of these landscape goals unattainable in the short term. This is particularly relevant to the goal of realizing a "sustainable, even flow of timber and revenue", since a large windstorm, wildfire, or disease outbreak may render the even flow of timber objective impossible. In the event of such an unanticipated surprise, how much of the landscape will be actively managed to restore landscape objectives and how much will be left to recover on its own?
Emmingham	**Strengths:** The section has a good clear layout. Giving the range of percentages is good, but this guideline seems to be an exception to most of Chapters 4 and 5 which are surprisingly non-quantitative. I like the idea of having brief descriptions of the three landscape types, but I think there are too many different forest conditions in some categories. More categories would be helpful. **Weaknesses:** Page 5-8, table 5-1. Non-designated stands is not descriptive as a term except in this table. Non-complex stands is used in the text, but it is not descriptive either. Isn't simple equal to non-complex? Or, why not use a term that is more descriptive of what these stands will be e.g**. evenaged plantations with legacy features**, if that is what they will be in fact. Page 5-8, Mgt in reserves: the term reserve usually means a place where no management activity occurs, but in the ESF plan it means little or no mgt activity. I agree with the concept that some active management activity is necessary to manage reserves to achieve plan goals and objectives, especially in the long term. I found it hard to determine how much and in what context active management in reserves would be initiated. Because this is bound to be a very contentious issue with certain publics, the concept should be explained in more detail early on. Perhaps a footnote here and a full explanation elsewhere would solve the problem. Page 5-8, last paragraph: a small percentage of non-complex stands will be placed: What is a "small" percentage (2-5% or 10-20%)? How many acres would be converted, and over what time period? These may be details that show up later in the plan, but at least some idea of what is "small" would be good here. Page 5-9, last paragraph: "continue using good business practices" seems to be code for something. It raises all kinds of possibilities in my mind and could be interpreted in many ways by others. Best explain and give brief examples here. Page 5-9, last paragraph; "approximate a sustainable even flow of timber and

	revenue". Variable market value of timber means that even flow of timber would produce fluctuating revenues. Even flow of revenue would mean that lots more timber would be cut when markets are down, which could deplete growing stock. Obviously you cant have an even flow of both timber and revenue. I suppose that these forces are balanced in a very complex way – but some explanation would be in order here.
Gresswell	Although concept of managing for a diversity of stand structures across the landscape is intuitively appealing, it is important to display changes in the arrangement of structural types across the landscape through time. For example, the Tool for Exploratory Landscape Scenario Analysis/Vegetation Dynamics Development Tool (TELSA/VDDT), and the Landscape Management System (LMS) (Kurz et al. 2000, Barrett 2001, McCarter 2001) are two spatially-explicit forest landscape models that have been applied to areas in Oregon to examine alternative scenarios, and they are available for general use. Extending potential outcomes beyond a single 10-year planning period to at least a century is also important. Specific scenarios should include the potential for natural disturbance to alter the proportion and distribution of major landscape types in the Elliot State Forest. This exercise can evaluate the probability of meeting the goals of the plan at a variety of time scales. Furthermore, it will promote a long-term vision rather than a strategy based on individual 10-year planning periods with little temporal continuity.
Irwin	*Strength*: This seems a reasonable distribution of stand structural conditions, each of which will provide important values to reach goals for various elements of biological diversity. *Weakness*: the reader is left in a lurch, wondering what the starting points are, what their distributions are, and how long it will take to reach the targets. I suggest to develop some graphics (such as LMS) that depict the conditions in each types and what they will look like, perhaps in decadal increments.
Ohmann	A large body of science and expert opinion supports use of stand structures as an organizing strategy for management. However, the use of different terminology in this section hindered my understanding of how this strategy is being defined for the ESF. There are references to 'approaches' (reserves, management for complexity, management for revenue), 'stand structures,' 'major landscape types' (in Table 5-1), 'stand conditions,' and 'allocations.' 'Non-designated stands' and 'non-complex stands' appear to refer to the same thing. It would be very helpful to see in one place, ideally in a table similar to Table 5-1, a listing of all landscape components and their target percentage ranges (i.e., the desired future condition). Furthermore, I'd like to see a more detailed enumeration of the landscape components. For example, are old growth and riparian areas

	included within the 'reserves' landscape type in Table 5-1? I would like to see them shown separately. Ideally, percentages would be shown for all of the stages of stand development described in the concepts chapter (p. 4-15-17). I don't think I saw this presentation of landscape composition elsewhere in the FMP document.
Teensma	Unless one has made an assumption that only large scale disturbances are natural in the area, and that wildfire are specifically adapted to these disturbances, this strategy is very sound, in general. Besides the benefits to wildlife habitat, a diversity of stand structures should make the ESF more

	resilient to most disturbance events – across all scales. One might question the allocation amounts (percents) to major land types in Table 5-1. The numbers appear within reason, however, when others types of reserves or retention are added (riparian, snags, live trees, etc.), the amount of land actually reserved may be significantly greater than the table implies. Certainly, this will complement other components of species habitat management, but it might be in conflict with the plan's goals of following State mandates related to timber production and with State economic development and labor market management goals. The adaptive management practices described in the final paragraph of the strategy may not be sufficient to mitigate an excessive amount of land area, or constraints on the use of timber resources on non-reserved landscape types

Ecosystem Management Strategy 2 – Design a functional arrangement of stand types, including patch-size, distribution and connectivity outside reserves.

Reviewer	Comments
Emmingham	**Strengths**: This section seems weak. **Weaknesses** – 1. This really does not seem to be a strategy. It has a partial list of things to "consider" or what might be good, but there are not detailed strategies for how to retain all 2. There seems to be little connection between this section and the good discussion of landscape design principles in Chapter 4. There are a number of good ideas in Chapter 4 that don't show up here in Chapter 5. A good strategy would have some idea about what to do and how much of it to do. 3. Since the District Implementation Plan is where the actual landscape design is set down, judging the degree to which a strategy is effective, will depend on where and how much it is used in the Implementation Plan. I would expect that the long-term part of the landscape design would be here in the ESF Management Plan. The landscape design is perhaps the most important part of any plan especially under the new sustainable ecosystem management principles.
Forsman	Page 5-10. Patches that are circular may have more interior, but I do not think they necessarily mimic natural conditions that were produced by fire and wind. Therefore, I think that some combination of large patches, long stringers, and small patches would be more like historic conditions.
Gresswell	Preceding comments are especially relevant to designing a functional arrangement of stand types. It is difficult to imagine that this strategy will be successful without some type of modeling exercise to evaluate potential alternatives.

Irwin	*Strength*: This general approach seems reasonable because of the great deal of variation in patch-size distribution. Over time, this translates into variable sizes of each seral stage, which undoubtedly will accommodate a great deal of animals. *Weakness*: It would be nice to know the current distribution of patch sizes for each stand type, and to see a map of their spatial arrangement. No one knows what a "functional" arrangement is or looks like, and to my knowledge, there are no indicators. Will there be a target landscape arrangement, or will the arrangement emerge by default over time? If there is no goal, how will the managers know when a functional arrangement has been provided? There are metrics for estimating connectivity of old patches (and by implication, for young patches); perhaps it would be useful to mention that they will be used.
Ohmann	Essentially, the FMP proposes to focus on two spatial scales, the stand and the landscape. I think this is an appropriate and useful framework. The fact that this strategy addresses the landscape scale could be clarified by naming it 'stand arrangement in the landscape' or something similar. Landscape strategies will be much more challenging than stand-level ones to translate into specific management actions, since there is relatively little field research on wildlife (or other species) response to landscape pattern. I suspect this is why this section is written in more general terms than some of the other strategies. In the first paragraph and second heading, patch *shape* should also be mentioned. The guidelines in this strategy seem to be focused specifically on high-complexity patches. Principles and guidelines should be provided for all patch types, including early-successional forest.
Oliver	**Connectivity** Be aware that "smaller reserves" and "corridors" should not just apply to "old growth." In fact, species depending on openings can also require corridors—and may also benefit by these patches. It is, of course, difficult to maintain connectivity of openings and closed forests at the same time. One thing to keep in mind is that literature is suggesting that roadsides can act as corridors for small animals (e.g., butterflies) that need openings (stand initiation). See pg 4-30 and pg 4-26 (First set of bullet points, 2nd bullet). Pg. 4-31: Next to last paragraph. Last sentence in this paragraph implies a goal is to reduce edge effects. Keep in mind that some species are "edge species" while others are "interior species"—with interiors of closed forests and interiors of openings important for different species (see Hunter 1990). There will need to be some edge maintained if the edge species are to be

	maintained.
Teensma	The functional distribution of stand types is probably the most important factor in "successful" wildfire habitat management and effective mitigation against disturbance events through both active and inactive management. If larger patches are more beneficial to some species, this plan may not be adequate. It appears from the map of old growth areas, that these patches are relatively small, and relatively well-distributed throughout the ESF. I believe that this is actually a strength of the management plan. Perhaps that presence of larger reserves on the Federal lands is sufficient for those species which benefit from larger reserves. Without maps of the surrounding lands in the province, it is difficult to make this assessment, which I would then approach from a landscape ecology perspective. Naturally, for listed species, more specific knowledge and assessments of wildlife biologists specializing in the management of these species would also be required.

Ecosystem Management Strategy 3 – Establish reserves to protect special resources

Reviewer	**Comments**
Bisson	The use of a 100 ft. streamside buffer should cover most of the ecological functions identified in the draft. Within the scientific community, it is my opinion that there is still some uncertainty that a 100 ft. buffer will provide the full complement of ecological structure and functions provided by a fully intact, natural riparian zone.
Emmingham	**Strengths:** page 5-11, Paragraph 1 is a good statement of what reserves can provide, and on the positive side it does specify that there will be one in each basin. It does not specify what kind of reserve will occur in each basin. I did not find anywhere (Chap 2) how many basins there are in the ESF or how a "basin" was defined? More information would make the more understandable. **Weaknesses:** This strategy leaves a lot of questions unanswered. Page 5-11, Mgt in Reserves - Red flag issues of regeneration, road maintenance and salvage in reserves are not explained or modified in any way to avert criticism. It should be explained that some management actions would better serve keeping reserves that serve their intended purpose better than a strict no-active-management policy. Page 5-12: It would be informative to clarify how much and what type of management activities can occur, and under which circumstances they will occur in the different types of reserves.
Forsman	You say that "very little management is expected in reserves.." Does this mean that you don't plan on cutting them? If you do plan on cutting them at some point, then I think it is misleading to say that very little management will occur in those areas.

Gresswell	The inclusion of reserves is a critical component to the success of the plan. Modeling exercises, as suggested above, would provide information that would be useful in determining where individual reserves should occur on the landscape and how reserves would be connected.

	My primary concern about reserves involves postfire management. Although postfire salvage logging in reserves may provide some economic return, there is no evidence that it is ecologically justified. For example, the review of disturbance and stand development in Chapter 4 states that: > The species and density of remnant legacy trees and other vegetation greatly influence the density and distribution of new seedlings. Large down wood is one of the more persistent legacies, influencing the site for hundreds of years (Spies and Cline 1988). Except in extreme cases, fires generally increase landscape heterogeneity, not reduce it (Wright 1974; Baker1989, 1994). Intensive salvage harvest will decrease habitat complexity and remove many structural elements that provide postfire habitat for terrestrial and aquatic biota, and that may reduce negative consequences of fire in streams (Gresswell 1999; Beschta et al. In press).
Irwin	*Strength*: Of course, a network of inter-connected reserves comprise a time-honored (but little tested) and socially accepted means of protecting valued resources. And our research information suggests that reserves that include riparian areas will be important elements for accommodating northern spotted owls. And a range of sizes of reserves seems a reasonable way to minimize the impacts on the fiduciary responsibilities. *Weakness*: There will always be questions about the sizes and geographic distribution of the reserves (sufficiency), and whether late-successional associates, in fact, can be maintained. For example, reserves in high-site conditions along riparian zones are likely to be quite different environments than reserves in steep, rocky, inoperable areas. These should become important topics for adaptive management research & monitoring. It will be useful to map the reserves, showing their current conditions and describing when management is anticipated to create target conditions. It probably will be important, at least in initial stages of the plan, to emphasize a close association between reserves and stands proposed for creation of complex structure. I suggest to present maps so that readers can understand how the landscape might look over time.
Ohmann	Reserves are a widely accepted and important component of strategies to conserve biological diversity, and to provide reference conditions for evaluating management effects. However, I have one major criticism with how this strategy is conceived. As written, reserves are focused on late-successional forest and unique or special habitats, especially for T&E species. I would like to see the reserve concept expanded to apply more generally to include areas where active management (specifically tree cutting) is not practiced, and to include

	forest in all stages of development. Perhaps most importantly, unmanaged reserves would include young natural forest – i.e., young stands initiated by natural disturbances such as fire and wind that contain abundant legacy live and dead trees and shrubs. Diverse young stands provide important habitat for many species in westside forests, and are now quite rare due to decades of fire suppression, and salvage logging of burned areas. Although ample early-successional forest will be provided through active management on the ESF, examples of young unmanaged forest are sorely lacking as references for the kinds, amounts, and dynamics of legacy trees that might be retained in managed stands where an objective is to mimic natural disturbances. Because (I suspect) few or none of these young unmanaged forests currently exist on ESF, this strategy would involve establishing new reserve(s) in areas of future wildfires that would not be salvage logged. In fact, I do not think that salvage logging in general is compatible with the reserve designation. The rationale of salvaging to recover economic value doesn't make sense for areas where revenue generation already has been foregone. Implications for insect infestations still would need to be considered. But in the end, a policy of salvage logging all wildfire and windthrow areas guarantees that no young natural forest will exist on the ESF. Some of the information included here under heading 'Types of reserves' is what I was looking for back in Table 5-1.
Oliver	Pg. 5-11: next to last paragraph. In such cases of catastrophic losses of reserves, you may consider "relocating" reserves in managed, complex habitat and beginning to manage these areas, where salvage, etc. has taken place.
Teensma	Again, maps of the distribution of the reserves, and of the habitat of species and their ranges, would be very useful in judging this strategy. I believe that is imperative to allow for some management within even the reserves – and you have done so. I would specifically add forest restoration and wildfire hazard mitigation to those activities which may be permitted in the reserves – not to plan for them everywhere, but to allow them to occur as they become necessary or are found to enhance habitat potential or reduce unacceptable levels of risk.

Ecosystem Management Strategy 4 – Actively manage to provide key legacy structural components outside the reserves.

Reviewer	Comments
Bisson	I had the feeling from reading this section that the emphasis will be on meeting generalized tree retention targets, but the spatial arrangement of residual trees, e.g., their location in clumps on the landscape, did not get much attention. What is being done to assure that retained trees function in a way similar to those that survive natural disturbances? Additionally, under Strategy 4d, it will probably be beneficial to retain more down wood in riparian areas for amphibians. Some species of salamanders, for example, only nest in large, rotten logs. Such provisions are written into the draft, but it might help to make this point more explicit. As well, large down logs are usually important germination sites for some conifers and provide a certain amount of browse protection for young trees.
Emmingham	**Strengths:** This section contains several positive guideline and action statements (e.g. strategies 4a, 4b, etc), but only by implication are the features listed in paragraph 1 identified as key legacy structural components. I suggest a positive statement such as; "The following components are considered key legacy features: remnant old growth, large living trees and large defective trees and snags. I like the guidelines set down for retention of green trees and snags and their distribution, at least in part, in upland areas. **Weaknesses/ Questions**: 1. We need a better definition of what features are really wanted. I'm not sure what is meant by herbs and shrubs. Which species? All species? In what configuration will herbs and shrubs be favored; e.g. in seral communities, in the understory or in gaps? I assumed this to mean herbs and shrubs in seral communities, but that would not be considered a "legacy feature". In 4b the guideline is to "consider" retention of several kinds of live trees without mention of species or whether conifer or hardwoods. This might be interpreted that mostly hardwoods could be left. It would certainly help to specify large "healthy" green conifer and hardwood trees as being of value for long life and growing to large size. Live large defective trees are also certainly highly valued as wildlife habitat. Large hardwoods, either defective or healthy have been shown to be highly valued for birds and small flying squirrels. On a landscape basis what hardwood species are will be given a place and how much? Will cherry and myrtle or others be included? I consider gaps to be key landscape features, but are they legacy? **Paragraph 3**: The terminology here is confusing. There is reference to "standards", but there are no standards stated, and there is no reference to where they might be stated. Those closely associated with the ODF planning process may understand where these standard are (if they exist), but those outside will not. There are lots of places where this same difficulty was apparent. Best check the whole document for places where insiders would comprehend, but those outside ODF would not.

	Paragraph 4: no numerical standards ---. Admittedly, it will be difficult to quantify some of the desired features, but without any kind of a target, how would one judge whether or not the objective is being met? Why not set up standards for the most uniform type of forest being managed, because these are the forests that are most likely to be devoid of the "important" features. **Last paragraph** and page 5-14: Guidelines for special circumstances: I agree that these "caveats" about safety, insect and disease outbreaks, etc should be included. The caveats are better stated than strategies designed to avoid the

	need to use them. For example the safety concerns suggest stating a strategy for snag retention in clusters or in created gaps where herbaceous vegetation, shrubs or natural regeneration are allowed to flourish. **Page 5-14** Sustainable Strategies – suggestion: The cheapest way of accumulating legacy features is to let them accumulate as they occur, rather than spend management resources to create them. In many cases, salvage of mortality is not highly profitable because it occurs in scattered patches. Live green trees that are low grade or cull because of deformity or rot are preferred candidates for retention because they provide good wildlife habitat. Why not state this as a strategy for obtaining desired legacy without great expense. **For example,** a strategy might be stated as follows: Avoid high cost (or low return) salvage operations as a strategy to accumulate forest legacy features. Where the value of salvaged timber is low and, or where logging operations are difficult, retain legacy features after mortality events. Non-removal of dead trees avoids operations where safety hazards are high. Forest health issues need to be monitored to identify early signs of a serious insect or disease problems that would require salvage actions. **Strategies 4e**, f, g. and h are weak – and need some targets especially for the 40-60 percent of the area to be managed primarily for timber production. Page 5-18, 4e: What is the minimum standard for a stand to qualify as multi-layer? Page 5-19, 4f: Does "retain a level of scattered native hardwoods," mean they will be introduced or planted in stands where they should occur naturally, but they have been removed by past management practices? What species? 4h: What is a reasonable number of gaps especially for the 40-60 percent of the area to be managed primarily for timber production? Can the gaps as here defined be easily recognized and tallied on air photos, and put into GIS for quantification so that future plans can have some reasonable targets
Forsman	5-18. A 20" log is not a very big log, and will not persist very long. Hopefully many of the logs that are left will actually be large logs that are comparable to the big logs that are produced in natural old-growth stands in the coast ranges (3-6' in diameter)?
Gresswell	I fail to see how post-disturbance salvage logging will have ecological benefits, especially moving "areas on a pathway toward complex habitat." The removal of standing and downed logs will reduce habitat complexity, not increase it. Furthermore, salvage logging appears to nullify management for "hard snags" and down wood. This strategy may be especially questionable in reserve areas.
Irwin	*Strengths*: the scientific record clearly shows that structural components of forest stands are important to maintaining biotic diversity by maintaining various ecological functions and structural diversity. Maintaining floristic diversity should promote diversity of other elements of biodiversity. Emphasizing leaving 12 large live, and defective 12-20 inch trees per acre in

	riparian zones (75%) and retaining 4 trees per acre that are > 20 inches in diameter for stands averaging 24 inches dbh should promote current occupancy by many species and future occupancy by many others in managed stands. For example, it has been demonstrated that old-remnant stands provide important foraging habitat for northern spotted owls. The variation in the standards for green-tree, snag and downed wood retention provides an effective mechanism for adaptive management: each density and distribution (clustered vs. scattered) could be considered a "treatment" for statistical analyses. Leaving 50% of the snags in upland areas should promote continuous occupancy by various species of forest bats. *Weakness*: Technically, the strategy seems great, although demonstrating the values and benefits of various combinations will be challenging. I suggest that the final plan exhibit LMS graphics to display the conditions of future stands, perhaps including a graph showing the landscape distribution. This will help readers as well as district forest managers. Also, it will be helpful to explicitly describe adaptive management experiments that will test the cost effectiveness and biotic benefits of the various combinations. For example, a sampling design (including frequency of measuring) will be needed and specific response measures should be identified.
Ohmann	There is a huge body of science supporting the overall strategy of managing for legacy components, although technically some of the items in the bulleted list aren't 'legacy' *per se* (a more accurate title for the strategy might be 'Within-stand structure and legacy components' or some such thing). 4a. Remnant old-growth stands. – If remnant old growth is retained, but no new old growth will be developed, this means that old growth on the ESF will steadily or suddenly (e.g., by large wildfire) be lost until eventually none exists. It's not clear to me why some of the areas managed as complex stands can't be designated for future old growth replacement. It's difficult to distinguish the three mapped classes in Fig. 5-1. 4b. Large trees and defective trees. – The organization of this strategy made it a bit confusing to discern its intent. Specific stand-level numbers are given first, but later it states that the numbers refer to the average of all regeneration harvest units in a given annual operations plan. It seems that the spatial and temporal scale that these guidelines are applied will have a huge impact on managers, so should be stated clearly. Also, I think riparian management areas are mentioned for the first time here – how do they differ from core riparian reserves referred to

	previously? 4c. Snags. – Direction here is ambiguous: the boldface heading says to retain all existing snags, yet under 'Guidelines...' it says at least 50%. 4d. Down wood. – I suggest using information in the newly available DecAID Decayed Wood Advisor in formulating guidelines for down wood (see: http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf). DecAID was conceived and developed for exactly this kind of application! DecAID contains a synthesis of data on wildlife use of dead wood, and on amounts and distributions of dead wood in unharvested stands. DecAID contains advice on possible ways to interpret the wildlife and inventory plot information for application to landscape- and watershed-level management. Information for the wildlife habitat type 'westside lowland conifer-hardwood forest, Oregon Coast' would be relevant for the ESF. The first item in the bulleted list of guidelines implies that down wood can only be provided for at the time of harvest. I can see why this would be economically efficient, but does this preclude down wood creation at other times? Re. the list of guidelines, DecAID also contains a summary of tree-level characteristics to consider in selecting down wood, in the section titled 'Ancillary information on wildlife species use of decayed wood elements.' 4e. Multi-layered forest canopies, 4g. Herbs and shrubs, and 4h. Gaps. – Consider combining these into one section called 'vertical and horizontal complexity.' 4f. Multiple native tree species (conifers and hardwoods). – There's not enough information given here to convey the intent of this strategy, which I think is an important one. Please refer to my earlier comments on adding a strategy specifically to address stand species composition. In addition to considering hardwood vs. conifer composition, the diversity of conifer and hardwood species should be considered.
Oliver	**Snags & logs:** You state that snags and down logs should be everywhere (e.g., pg. 4-16); however, are sure that there is unbiased evidence that they were consistently present? For example, after multiple burns?

	Pg. 4-17. 2nd paragraph. Minimum levels of down wood in the early successional structures. (A doctoral thesis at UW by Pil Sun Park recently found that the amount of down wood in young stands depends on when snags created by previous stand-initiating disturbance fall—so there could be a lot left over from the previous stand. (Are you sure you agree with Spies and Cline 1988?) Pg. 4-19: Also, might want some with & some without snags, logs, and residual live trees. Pg. 4-32: Paragraph beginning "Snags--.." Please check to be sure that the statement beginning "Large snags are particularly important…" I was under the impression from ornithologists that snags of different sizes preferentially used by different bird species—that in fact some bird species actually preferred smaller snags to larger ones. Also, I'm not sure a large, old snag is particularly desirable to a species of bird feeding on bark beetles, that would prefer a new snag—with the bark still on it, and perhaps with thin bark so the insect would be easier to get to. Pg. 5-17: Guidelines for snag management. See comment on Pg. 4-32. Pg. 5-18: In general, the same issues apply to down wood as to snags. Be sure there are some areas without them. Pg. 4-31 & 32: Again, it may decrease the diversity if these legacies are left consistently in all stands.
Teensma	In general, this appears to be a useful strategy. If numerical standards are provided, they might become too rigid duration implementation, however, without quantifiable levels with which to compare performance, it becomes difficult to assess success. Strategy 4a: Retention of remnant old growth stands. From the general discussion under Strategy 4, it appears that these old growth stands that are to be retained are in addition to those in reserves. Then, it looks as if these remnants will, in essence, be additional scattered reserve areas. It would be useful if this is made more explicit in the text. Again, a map of the distribution of reserves would help the reader to assess the usefulness of retaining additional old growth stand fragments. While these are likely to be useful to some species, a comparison of the benefit of stand retention to the impact of reduced commercial timber production (and receipts) is probably warranted. Strategy 4b: Large tree retention. It is not clear why conifers retained to meet the requirements of the inner zone of streams managed for mature forest condition (under Management Standards) should not count towards the landscape standard for retention (under management Guidelines).

	Strategy 4c: Retention of snags. No specific comments. Strategy 4d: Retention of downed wood. Regarding the specific amount(s) of downed wood to be retained – the authors may wish to contact the U.S.D.A. Forest Service Pacific Northwest Research Station in Portland (Dr. Bruce Marcot was a lead researcher) for the applicability of a wood/habitat prediction model (DECAid) that was completed within the past two years. It should be noted that while retention of large-diameter material will benefit wildlife and does not contribute to the rate of spread of wildfires, that during a wildfire this material will contribute to fire severity. Strategies 4e-4h: various. No specific comments.

Ecosystem Management Strategy 5 – IPM

Reviewer	Comments
Emmingham	This section is a compendium of IPM techniques. As stated in this section, IPM is not really a strategy. Important questions remain unanswered. What are the thresholds for pest management when much of the diversity desired in Sustainable Ecosystem Management could be provided by insects and diseases that kill or damage trees creating snags or defective trees that provide valuable wildlife habitat for free. What levels of mortality will trigger pest management actions? How do the thresholds for pest management action differ in the two actively managed forest types?
Forsman	Page 5-20. Although the words sound nice, I think it is arguable whether active management of stands is always the "most effective way to improve forest health…" The world is full of examples where active management of forests created unhealthy forests, introduced unwelcome exotic species, etc. I can't fault you for wanting to be optimistic, but I tend to be more cautious about touting the wonders of active management as a panacea for forest health issues. Page 5-20. A single-minded focus on eliminating "pests" and disease in forests can produce sterile forests like we currently find in much of the northern coast ranges of Oregon. The trees are straight and tall with little defect. The result is stands that have almost no tree voles. Pests and disease are part of the system, and I assume you will not be too exuberant in your efforts to eliminate them?
Gresswell	I do not feel technically qualified to comment on this strategy.
Irwin	*Strength*: This seems quite reasonable and is consistent with goals of active, responsible forest management. However, I am not qualified to address this

	topic in detail.
Ohmann	In 5a., active stand management is one way -- but certainly not the only way -- to maintain or improve forest health, as stated here. Principles of integrated pest management suggest using the most appropriate method to fit the situation. In many cases this will involve active management, but I can imagine situations where taking no action would be more effective and less costly. In section 5a., item c. – It's not clear what structures contribute to forest health, since species and stocking have already been listed elsewhere. Please be more specific. Item j. doesn't add anything as worded (manage for forest health by maintaining healthy areas?). Section 5e. – I was disappointed to see this section left blank, as I'd been wondering which insects and diseases are particular threats for major outbreaks on the ESF.
Oliver	Pg. 4-34 & 35: The Integrated Pest Management section needs some references to show that the ODF in fact knows the specifics of IPM. This is a very important and well thought out tool—but needs to be done correctly. There need to be some specific descriptions of how the management teams will use this.
Teensma	The general and specific guidelines presented in this strategy and subsections should be effective and `successful.

Ecosystem Management Strategy 6 – Implementation plan

Reviewer	**Comments**
Bisson	Here and in Chapter 6, I thought there should have been a more thorough and detailed discussion of the monitoring program; specifically, who will do what, where, and when?
Emmingham	As noted earlier, this is the really important step, but this is a huge "strategy" and doesn't fit into the same category as the others.
Gresswell	I believe that this is the most critical element influencing the success of the Elliot State Forest Management plan. It seems imperative, however, that planning, at least in a general sense, should extend beyond the 10-year management period. This could be accomplished by using landscape modeling exercises that would be continually updated to reflect current forest structure in the district.

Irwin	*Strengths*: Coordinated implementation planning at the district level, consistent with overall goals for the Elliott State Forest provides for flexibility in the field and allows for managers to use their experience, knowledge and ingenuity to reach the intended goals. *Weaknesses*: It would be nice to ensure a centralized GIS database manager connection so that information flows among districts. This will provide opportunities to map the distributions of important resources. It would also improve public relations and intra-agency communications and provide consistency in data gathering to monitor results in adaptive management experiments. Such experiments must be carefully planned in advance to link district managers with scientists.
Ohmann	It seems a bit odd to have a strategy that is to develop a plan.
Oliver	**Specific Chapter on How the Implementation will be done by the districts and coordinated by the ESF?** I suggest at this point that you put together a chapter describing how all of this will be done. It is not at all simple or obvious. For example, (Pg. 4-5), there are problems with setting "allowable cut" numbers that end up actually discouraging thinning. There are quite sophisticated ways of doing this. They all involve developing a series of "silvicultural pathways" for your different stand types—and they comparing different pathways for different stands. This can be done through such things as "optimization programs," the LMS "toggle" program, and others. (I would be glad to discuss these in more detail.) (For example, see the University of Washington Pack Forest Management Plan—on the web.) Another problems will be that, if you just develop a 10-year plan, you will begin harvesting the best stands during this ten year plan—and eventually "back yourself into a corner." I suggest you develop a 50- or 80-year plan—of course it would be updated during your "monitoring" periods—5 or 10 years.
Teensma	This plan would likely address many of the questions that I have raised in my responses above. Although ten years is not a long time period in forest management, there could be some monitoring results which may lead to refined implementation as part of the identified adaptive management approach presented in earlier sections.