Comments on the Elliott State Forest Draft Management Plan

Submitted by:

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Jim McCauley and Mike Miller, Associated Oregon Loggers, Inc.; Cary Jones, Douglas Timber Operators, Inc.; Ross Mickey and Ralph Saperstein, Northwest Forestry Association; Linc Cannon, Oregon Forest Industries Council and; Bob Zybach, Oregon State University.

Greg Miller
State Timber Purchasers Division of OFIC
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EXECUTIVE SUMMARY

Comments on the Elliott State Forest Draft Management Plan

Introduction
The Department of Forestry (herein referred to as Department) submitted, for public review and comment, the Elliott State Forest Draft Management Plan (herein referred to as the Draft Plan). We commend the Department for developing a management plan that examines all resources on the Elliott and attempting to integrate sustainable resources over a long time frame. The concepts contained in the plan adopt the approach that forests are dynamic; they cannot be preserved in a single condition. Managing biological processes as opposed to setting aside "natural reserves" recognizes that northwest forests are a result of natural disturbances, are resilient and are adaptive to change.

We appreciate the cooperation extended to us by the Department staff. Without their assistance we could not provide substantive comments. The following comments are offered in the spirit of continuing cooperation and a recognition that working together within the planning process will produce a workable plan.

The objective driven plan with its guiding principles places proper emphasis on the Elliott as a working forest. There are, however, base assumptions that could be changed which achieve similar wildlife objectives and provide more timber harvest. Our comments will present rationale to provide the decision-makers with a wider range of alternatives from which to formulate an ecologically sustainable, legally defensible and socially acceptable management plan.

Forest Policy Shift
The Draft Plan is a dramatic shift in forest management policies from those that have guided the Elliott in the past. Acceptance of the recommended Alternative 6 is difficult in light of the tremendous success past forest management activities have achieved. The Elliott is unique due to its origins as a natural second growth forest born out of the ashes of the 1868 Coos Bay fire. The Department's forest inventory indicates there are very few forest stands (about 307 acres) older than 155 years old. The forest has sustained an annual harvest of about 48 to 50 million board feet (mmbf). Moreover, the forest remains healthy after forty years of sound forest management. Reforestation is successful and forest sites are productive.

In spite of fires, wind storms and harvesting, a variety of wildlife use the Elliott. Some of these wildlife species are listed as threatened or endangered. The forest is within the range of the northern spotted owl and the marbled murrelet both of which are on the federal endangered species list. Based on Department surveys for the spotted owl and marbled murrelet, these two species persist even though their "preferred habitat," mature and old growth forests (200 years and older), are virtually absent on the Elliott. Their presence in this 93,000 acre forest is contrary to popular biological theories that state each of these species is old growth dependent.

More importantly, there has been cumulative work on a federal recovery plan for the spotted owl that includes: 1) Interagency Scientific Committee Conservation Strategy for the northern spotted owl; 2) U.S. Fish & Wildlife Service designation of critical habitat; 3) Scientific panel on Late Successional Forest Ecosystems; 4) Draft Recovery Plan for the northern spotted owl; 5) Scientific Analysis Team report; and 6) Forest Ecosystem Management Assessment Team report.

The central theme contained in all of the previously listed federal documents is that non-federal lands must comply with the Endangered Species Act's (ESA) prohibition against take of a listed species. State officials should remain firm in their position that all conservation strategies proposed to date discount non-federal land for recovery and rely upon the federal forest land base as a dominant component for conservation and recovery of the spotted owl. (See Appendix C for a chronology.)

On a regional landscape scale there are literally millions of federal forest acres that will contribute toward recovery of the owl and murrelet. Moreover, on a coarse scale, the contribution of the Elliott to owl and murrelet recovery is minimal. Because of the large geographic range for each species, management activities on the Elliott (that are also sensitive to these species habitat needs) are largely a "no effect." The Elliott could be off limits to harvesting forever and it would not marginally improve the population levels of owls or murrelets throughout their entire range.

It is our belief that past conservative forest management activities and natural disturbances (fire and wind storms) have created forest habitat conditions allowing both species to maintain viable populations.

More importantly, it was our understanding that a retrospective study was to be conducted in conjunction with the Draft Plan. The retrospective study would have determined some of the reasons why owls and murrelets persist in a second growth forest. Furthermore, such an analysis should have revealed data supporting past forest management activities contributing toward suitable habitat and providing direction for appropriate changes to silvicultural practices.

The Department accurately portrayed the history of the Forest. However, the plan falls short of connecting its past natural and forest management history to the persistence of "old growth" dependent species. If that connection was made, then different assumptions may have been used which would provide more harvestable volume than proposed in the recommended alternative. For more detailed discussion see Section 7.

Federal and State Endangered Species Act(s) Changes Legal Landscape

We acknowledge that the federal ESA is a law that must be obeyed by all land owners. To the extent that the Department must comply, it is only to avoid the take of a threatened species. The recently proposed ESA section 4 (d) rule for incidental take of the spotted owl for non-federal land owners has surfaced a wide disagreement over those obligations to avoid a take, the definition of take, definition of suitable habitat, and a safe harbor from take liability upon compliance with a section 4 (d) rule. In the Governor's comments on the proposed section 4 (d) rule the state correctly interprets its federal obligation is only to avoid a take and not recover a threatened species.

We also acknowledge the Department must comply with the state Endangered Species Act (ESA) for the spotted owl. While the state ESA requires survival and recovery of a state listed species, according to the Attorney General opinion (#8223) the state ESA cannot unduly burden the trust obligation to maximize revenue from Common School Fund forest lands. Therefore, state recovery measures for the spotted owl cannot jeopardize the Common School Trust. It appears that Alternative 6 goes well beyond avoiding incidental take and appears to be implementing federal standards of recovery for both spotted owls and the marbled murrelets.

Unfortunately, the Draft Plan falls short of committing the plan to the "maximization of income" as legally required by the State Constitution. In fact, the guiding principles recognize "that there will be tradeoffs between revenue producing activities and non-revenue producing activities." Elliott State Forest Plan II-1.

Moreover, all of the seven alternative management strategies include either land allocations or silvicultural prescriptions that directly conflict with the "maximization of income" mandated by the State Constitutuion. For more detailed discussion see Section 6.

Alternative 6 Innovative but Could Use Other Assumptions
The recommended Alternative 6 is well crafted. It divides the forest into 17 management basins along natural (hydrological) boundaries that approximate federal guidelines for spotted owl home ranges, retains core habitat areas for nesting,roosting and foraging and uses long rotations for harvest schedules providing older forest conditions. Nevertheless, the base assumptions used to develop the alternative minimize previous forest management successes, rely upon dated spotted owl research, use controversial marbled murrelet data, use untested conservation biological theories and unduly restrict timber harvesting. To the last point, the restrictions to timber harvest also place timber revenue returned to the Common School Fund at risk.

Changes and Improvements to the Draft Plan are Needed

The Draft Plan fails to deliver an acceptable alternative because there are a number of key issues that need to be carefully addressed and resolved. Resolution of the following issues (I-V) are critical to support of any alternative that may be adopted:

I. Expand the range of alternatives using scientifically defensible assumptions:

The range of alternatives should be expanded. A number of alternative management strategies can be developed that achieve the goal of threatened species protection which produce more harvest volume if different assumptions are used. This would be in line with State Land Board support for a target of 36-38 mmbf. <u>For example, a brief description of the alternatives and their scientific justification follow. The alternatives are presented in order of increasing variance from the recommended Alternative 6:</u> Section 1 has a more detailed discussion of the rationale and description of the research and review of the alternatives.

#1. Reduce the time needed to reach suitable habitat (nesting, roosting and foraging)

This alternative would maintain all aspects of Alternative 6 but reduce the time needed for a managed stand to reach suitable habitat. Instead of the 80 years used in the Draft Plan, a figure of 50 years is justifiable.

#2. Maintain a maximum of 40% of each home range in suitable habitat (nesting, roosting, and foraging)

The Draft Plan calls for some basins to contain 66% suitable habitat. The 66% figure used by the Department has no scientific basis and may not provide any additional benefits for the owl. This alterative would reduce the amount of suitable habitat to 40% and reduces the age of suitability to 50 years.

#3. Maintain at least 21% of each home range in suitable habitat (nesting, roosting and foraging)

The scientific research shows that after a stand reaches 21% suitable, it will provide the same occupancy and reproductive rates as a stands with 80% habitat. This alternative would maintain 21% of each home range in nesting, roosting and foraging habitat, 20% of the home range in dispersal habitat and reduce the time to nesting suitability to 50 years. A managed stand using the standards of Alternative 6 of the Draft Plan will become suitable for dispersal in 30 years.

#4. Maintain 500 acres of suitable habitat

Recent research indicates that the most important habitat for successful reproduction and occupancy lies within a 500- 750-acre core around a nest site. Within this area, the data suggests that 50% should be suitable habitat. This alternative would maintain 500 acres of nesting, roosting and foraging habitat around each nest site, 40% of the home range in dispersal habitat and time to suitability of 50 years for nesting habitat and 30 years for dispersal habitat.

Considering any number of combinations, the above assumptions would produce different alternatives that provide for multiple species protection and may produce more harvest volume.

To illustrate the potential for alternatives to provide more volume while meeting wildlife goals, we asked the Department model the above alternatives. The results are as follows:

An Alternative - Nesting, roosting and foraging (NRF) habitat is reached at age 50, maintaining the same NRF percent as in Alternative 6 and maintain the 50-11-40 rule.

Harvest volume for the first decade would be 27 mmbf per year. In addition, if 3 mmbf of thinning volume is included, the total annual harvest would be 30 mmbf.

Harvest volume increases to 35 mmbf per year in the third decade, averages about 41 mmbf in decades four through seven, and increases to 47 mmbf in the eighth decade.

An Alternative - NRF habitat is reached at age 50, reduce NRF to 40 percent and maintains the 50-11-40 rule.

Harvest volume for the first decade would be 43 mmbf per year (not including any thinning volume).

Harvest volume increases to 53 mmbf per year in the fourth decade and averages about 48 mmbf per year from the fifth decade through the tenth decade.

In summary, there is little question that there is a much wider range of alternatives from which to choose. In fact, these alternatives may be viewed as conservative. The Department should develop alternatives that meet wildlife objectives and harvest more volume.

II. Use proposed new stream rules as baseline for riparian protection:

The riparian strategies used in the plan are inconsistent with the proposed new stream rules for Oregon. The new protection measures are an ecological approach that will result in an increase of 46% more stream miles receiving vegetative buffers and increased conifer retention. There is no justification for stricter standards. The agency proposing these new rules should use the new stream rules (when approved) as a basis for managing riparian areas. The new rules provide a "blue print" that create options to increase riparian protection as necessary. Refer to Section 2 for more discussion.

III. Carrying 49% of forest aces in rotations ≥ 100 years for marbled murrelet habitat exceeds biological justification:

There is little biological justification (or scientific data) for the tremendous amount of marbled murrelet habitat provided in alternative strategy 6. The component of the recommended alternative minimizes neighboring federal forest land contributions. Moreover, the U.S. Fish and Wildlife Service has not established, through a rule-making process, any incidental take guidelines. More importantly, the recent critical habitat purposed for marbled murrelets excluded state or private land, therefore, determining that these forested areas are not critical to its survival.

If the reserve system established in each management basin for the northern spotted owl is used, which averages about 409 acres/basin, it is sufficient for (and probably exceeds) the needs of the murrelet. Many of the stand structure attributes (large trees, large limbs and canopy cover) for the owl meet the nesting needs for the murrelet. Moreover, green tree retention, prompt reforestation and multiple thinnings will provide additional habitat attributes across the managed landscape. Section 3 provides information and scientific perspective.

IV. Provide maximum biological/economic potential for trade-off analysis:

There is no discussion of the biological and economic potential (maximum sustainable harvest with little or no regulatory restriction other than meeting the Oregon Forest Practices Act) for the Elliott. Such an analysis would give the State Land Board a clear picture of the true cost to the Common School Fund due to federal and state ESA protection measures. The plan should analyze and display the maximum sustainable harvest and maximum economic return.

In conversations with the Department, it is our understanding that if the existing management plan remained in place (not the stewardship plan), the Elliott could sustain a harvest of about 48 to 50 mmbf per year. The biological potential for the Elliott (under the existing plan) could be as high as 70 mmbf per year. The 70 mmbf per year should be a biological benchmark from which to measure economic impacts as well as potential revenue generated for the Common School Fund.

V. Alternative 7 more closely approximates the natural historic conditions found on the forest:

Alternative 7 uses a combination of 70 year and 200 year rotations which more closely approximates the natural conditions of the forest. Mr. Bob Zybach, Oregon State University, reviewed the use of fire history in the development of the Draft Plan. Section 7 of our comments contains a detailed report by Mr. Zybach that answers three questions: 1) How did the Department use fire history for developing their recommended alternative?; 2) How has the natural fire cycle shaped the Elliott?; and 3) Using an accepted fire history or fire cycle predictive model; What is the potential for shorter rotations to obtain the same wildlife objectives for spotted owls and marbled murrelets as given in the recommended alternative?

Based on Mr. Zybach's review, the following is a brief summary of the report's conclusions.

> ODF apparently did not use the 1770 to 1951 fire history described by Phillips in its development of plan alternatives, including the preferred "Strategy 6." Rather, a 150-year fire cycle model -- generally ascribed to Agee--seems to have been used, in part to help justify a recent change in management focus from timber production to maintenance and creation of older forest types and conditions.

A fire history perspective would have allowed for far greater latitude in the spatial and temporal designing of logging plans, wildlife habitat creation and maintenance strategies, fire control options, and net income production.

The "natural fire cycle" of the Elliott supposes a mathematical predictive model that is biased against human activity (including logging, burning, and road building) and toward "average" decadent stand conditions, numerous older trees, and random lightning strikes. The result of using fire cycle models for planning purposes remains controversial. The "shaping" of Elliott State Forest by fire can be better characterized *historically, as the result of a long-term series of botanical responses to constant human disturbances caused by daily and seasonal fires of varying degree and intensity.* This has resulted in an extensive stand of young, even-aged Douglas-fir trees that has persisted for over 120 years; it is quite possible similar vegetation patterns have existed for similar lengths of time in this area during the past few thousand years.

If the "wildlife objectives" in Strategy 6 are interpreted to mean population maintenance or increase over time, *the mobility of owls and murrelets and their proven resiliency to catastrophic fires would indicate that historical rates of clearcutting can probably be maintained indefinitely* (but past fragmentation caused by this practice should probably be mitigated first); If the "wildlife objectives" are to simply create or maintain certain structural stand characteristics ("desired or required" habitat) within the forest, then these human definitions of desired future conditions would include (and require) a Strategy 6-type approach. The difference in these two positions is the difference between mathematical projections based upon perceived "averages" and interpretive projections based upon documented evidence of disturbance and resilient recovery.

This preliminary review of the Elliott's fire history should be the foundation for the retrospective study of the Elliott. Moreover, the fire history perspective and conclusions provided by Mr. Zybach stands in stark contrast to the description of landscape diversity and biodiversity contained in the Draft Plan. The biodiversity concepts in the Draft Plan discount human activity saying such activity moves away from "natural patterns". In fact, human influence will always be a part of the "natural pattern". Such bias that does not account for continuing human influence will force the forest in a direction of "natural patterns" that may never have existed. Mr. Zybach's information should be considered in the evaluation and formulation of a final recommendation.

The following issues would improve the plan:

VI. Use historic harvest levels to display economic impacts:

The base-line harvest level used for economic analysis (impacts to local communities) uses a low harvest period (about 19 mmbf for 1991-1993). This masks the impact of each alternative. If the historical harvest level of 46 mmbf per year were used, all alternatives except Alternative 7 would have negative economic impacts. The economic analysis should contrast alternative strategies impacts against the long-term historic harvest level. Please refer to Section 4 for discussion and suggested changes to the draft plan.

VII. Display Common School Fund timber revenue impacts:

The reduction of harvest volume affects timber revenue returned to the Common School Fund. Timber sale receipts distributed to the Common School Fund from all Common School forest lands amounted to $28.8 million in the 89-91 biennium and $19.9 million in the 91-93 biennium. ODF projected in its 1993 Oregon Forest Report about $24.4 million may be distributed to the Common School Fund for the 93-95 biennium.

It is estimated that Alternative 6 would generate about $17.1 million net income annually based on a harvest of about 27.9 mmbf per year. However, the Draft Plan indicates that for a ten year average ending in 1990, the forest harvested about 45.5 mmbf per year and generated about $8.2 million per year in timber revenue. The difference in revenue appears to be that stumpage prices are rising well beyond the historical average.

Since stumpage prices are likely to remain high, the Department should assess the potential increase to the Common School Fund if more volume is sold. There should be a separate section either in the Asset Management section or the Resource Analysis section that discusses the Common School Fund itself, timber receipts to the Common School Fund and distribution of the Common School Fund interest to Oregon schools. See Section 5 for further discussion.

VIII. Draft Plan should be a stand alone management policy:

Implementation of the Draft Plan is directly linked to a federally approved Habitat Concervation Plan (HCP). This could leave the plan vulnerable to the public appeals process and court challenges. The Draft Plan should be implementable as a stand alone state management policy regardless of the success or failure of the HCP.

IX. Display Draft Plan's interaction with state-wide conservation plan for northern spotted owl:

The state conservation plan for the northern spotted owl has not been completed by the Oregon Department of Fish & Wildlife (ODFW). The relationship between the state conservation plan and the Draft Plan itself is not made clear in the Draft Plan. How will the state conservation plan affect the outcome of the proposed alternative?

Use of Fire History in the Development of the 1993 Elliott State Forest Management Plan Draft

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February 14, 1994

Prepared For
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Introduction

This review of the Elliott State Forest Draft Plan ("the plan") has been completed under written contract for the State Timber Purchasers Division of the Oregon Forest Industries Council (OFIC) at the request of its director, Greg Miller.

In particular, OFIC requested:

1. An analysis of Oregon Department of Forestry's (ODF) "use of *fire history* for developing their recommended alternative," Strategy 6;
2. A description of "how the *natural fire cycle* has shaped" the Elliott State Forest;
3. An assessment, based upon consideration of the plan's given fire cycles and fire history, of any *"potential for shorter rotations* to obtain the *same wildlife objectives* (owls and murrelets)" given in Strategy 6.

The following discussion outline was used to address the three OFIC requests:

A. Current forest structure and 300-year fire history of the Elliott State Forest.
B. Definition of "natural fire cycle."
C. Forest fires, human population rates, and wildlife habitat dynamics.
D. Historical environments, ESA strategies, and coastal bird populations.
E. Catastrophic fire history, forest productivity, and log income potentials.
F. Conclusions.

The text of the discussion outline is contained in the following pages. Based upon an interpretation of this material, a brief conclusion to each of the OFIC questions can be summarized:

———ODF apparently did not use the 1770 to 1951 fire history described by Phillips in its development of plan alternatives, including the preferred "Strategy 6." Rather, a 150-year fire cycle model— generally ascribed to Agee—seems to have been used, in part to help justify a recent change in management focus from timber production to maintenance and creation of older forest types and conditions. *A fire history perspective would have allowed for far greater latitude in the spatial and temporal designing of logging plans, wildlife habitat creation and maintenance strategies, fire control options, and net income production.*

———The "natural fire cycle" of the Elliott supposes a mathematical predictive model that is biased against human activity (including logging, burning, and road building) and toward "average" decadent stand conditions, numerous older trees, and random lightning strikes. The result of using fire cycle models for planning purposes remains controversial. The "shaping" of Elliott State Forest by fire can be better characterized *historically*, as *the result of a long-term series of botanical responses to constant human disturbances caused by daily and seasonal fires of varying degree and intensity.* This has resulted in an extensive stand of young, even-aged Douglas-fir trees that has persisted for over 120 years; it is quite possible similar vegetation patterns have existed for similar lengths of time in this area during the past few thousand years.

———If the "wildlife objectives" in Strategy 6 are interpreted to mean population maintenance or increase over time, *the mobility of owls and murrelets and their proven resiliency to catastrophic fires would indicate that historical rates of clearcutting can probably be maintained indefinitely* (but past fragmentation caused by this practice should probably be mitigated first); If the "wildlife objectives" are to simply create or maintain certain structural stand characteristics ("desired or required" habitat) within the forest, then these human definitions of desired future conditions would include (and require) a Strategy 6-type approach. The difference in these two positions is the difference between mathematical projections based upon perceived "averages" and interpretive projections based upon documented evidence of disturbance and resilient recovery.

A. Current forest structure and 300-year fire history of the Elliott State Forest.

The Elliott State Forest is approximately 93,000 acres in size, of which about 90% burned in the 1868 Millicoma Fire. This fire killed over 300,000 acres of trees in a few weeks, and is considered one of *the "Great Fires" of Oregon Coast Range history—catastrophic fires of great intensity that covered hundreds of thousands of acres of forestland at a time*, often in a matter of only a few hours or days [Zybach, 1988]. By 1900, most of the burn had reforested to stands of 10 to 30-year old Douglas-fir trees. By 1922, many of these stands were "eight to twelve inches in diameter on the stump" [ODF, 1993: I-5]. Today, the Elliott contains about two billion feet of mature timber, the majority of which is contained in the 100-120 year old stands resulting from the 1868 fire. In the past twenty years over one billion feet of timber has been logged from about 36,000 acres of these fire-established trees [ODF, 1993: I-7]; these last numbers represent about 40% of the forest's total area, but less than 33% of the commercial timber volume that has grown since 1900 (or maybe even 1925).

The fire history of the Elliott is well presented in the plan by the acknowledged expert on the topic, Jerry Phillips. *The question is: how that history was used (if at all) in the development of the preferred alternative.* A clear set of assumptions in the plan is that: 1) long-term school income; 2) general forest health; 3) native biodiversity; 4) spotted owl and marbled murrelet populations; and 5) anadromous fish runs; can all be maintained or improved by attempting to mimic *"natural patterns"* [ODF, 1993: III-28]. Because those patterns—as clearly described and mapped by Phillips [ODF, 1993: I-2-5]—*were primarily a function of forest fire history,* we can look there first for the information needed to best identify and describe the processes and populations considered to be "natural" and desirable to the planning area.

1694. 300 years ago the area that is now the Elliott State Forest was growing many of the fuels that were consumed in the 1770, 1840, and 1868 fires mapped by Phillips. Few of these trees were ever logged. This point in time was nearly four or five human generations before the first European influences began affecting local people, plants, and animal populations. *The forests at that time must have most nearly approximated the "naturally functioning ecosystems" envisioned by government wildlife biologists and old-growth ecologists today.*

What information is available to tell us of environmental conditions at that time? Probably the six best (cheap and accessable) sources are the stumps, snags, and trees remaining on the forest from seedlings established before 1694; the General Land Office (GLO) original land survey notes from the mid-1800s; the rings of bored trees and sound stumps and snags; the timber cruises of the State Forester and his staff between 1915 and 1955; living memory (especially focused oral histories); and photographs (both aerial and terrestrial). The diameter, distribution, and species of the forest's oldest known trees and stands (and their documented remains) can then be sytematically mapped using these sources of information. According to the plan [ODF, 1993: I-3], the 300,000 acre fire of 1868 included 10 to 100-year old stands created after the 1840 and 1770 fires, but "some of [the trees in the area of the fire were] estimated to have been about 300 years old." Were all of the snags measured for age created by the 1868 fire, or could they have resulted from the 1840 or 1770 fires? Or from some other event entirely? The variety and extent of those 300 year old trees need to be known before too strong a commitment is made toward managing for their perceived structural characteristics [ODF, 1993: III-31] over too large an area .

It is reasonable to assume that *most (perhaps as much as 90 or 95%) of the Elliott may have been even-aged stands of juvenile and second growth Douglas-fir 125 years of age and younger in 1694.* That would be very similar—with the exception of the "cookie cutter" design of many post-World War II clearcuts—to the structural and biological forest conditions that exist today. Such an assumtption could be based on the following facts:

1) the 1868 fire was able to burn 90% of the current area of the Elliott [ODF, 1993: I-3];

2) the oldest known stands were then apparently about 300 years old (i.e.; created about 1568);

3) the current land base supports 97% of the acreage in juvenile (also, "precommercial" or "reprod"—between one and about 30 years of age) and second growth (younger than 180 to 220 years of age) stands of Douglas-fir; and

4) portions of the 1770 and 1840 fires also occurred within the current planning bounds (it is possible—and even likely—that the primary fuels of the earlier fires also dated to about 1568, or later).

1770. *Phillip's discovery and mapping of the 1770 Coos fire is significant for the evidence it provides of Indian-caused forest fires that precede European and American contact* [Zybach, 1988: Appendix B: 15-21]. The boundaries of this fire are, due to age, only approximate. The fire seems to have been started by the harvesting and maintenance of an Indian prairie complex along the Umpqua and/or Coquille, Coos, and Millicoma Rivers, although Kalapuyan burning in the Umpqua basin seems the likeliest possibility. The significance of this fire is that it could not have been started by white explorers, settlers or loggers; and that it was probably not started "naturally," (by lightning, volcanic eruption, or some other non-human method) either. So far as currently possible, it seems to demonstrate the probability that the aboriginal human populations of the Oregon Coast Range—and particularly the Kalapuyan families that lived along the eastern rivers of the range— were capabable of starting forest fires that occasionally killed hundreds of thousands of acres of trees at a time.

The existence of this fire also indicates that the "natural pattern" of the western slope of the Oregon Coast Range may have been dominated by nearly solid canopies of even-aged stands of mostly Douglas-fir, stretching from the narrow Pacific fog belt of pine, spruce and hemlock on the west, to the vast oak and grass savannahs of the eastern part of the range. This cover would be mottled and bounded with strips and patches of even-aged alder (becoming more common along marshes, seeps, creeks, and landslides to the west), scattered prairie complexes (concentrated along the edges of estuaries, rivers, and large creeks), meadows (flats, ridgelines, and southern slopes), balds (peaks), and berry patches, and by large areas of snags, burned ground, and/or juvenile Douglas-fir trees (often located to the southwest of the prairies and meadows; a likely combination of seasonal fires and seasonal east winds).

1840. In 1840, missionary Gustavus Hines made an eyewitness account of a forest fire taking place to the immediate northeast of the Elliott, near present-day Elkton. His account is remarkable for four reasons: first, it seems to be the first historical record available regarding a forest fire in the Oregon Coast Range; second, it clearly demonstrates the potential for Indian campfires or prairie fires along the eastern boundary of the Coast Range to enter the forests to the west; third, *this event seems to herald the beginning of three decades of catastrophic forest fires in western Oregon, peaking in 1849-50, and again in 1867-68;* and finally, this account seems to confirm Phillip's research, including the general direction of the fire, which seems to have started west of present-day Eugene, and traveled southwesterly into the area of the Elliott. This is also the same basic pattern (northeast to the southwest) that is known for the other Great Fires of the Coast Range [Zybach, 1988: 26-28], precisely as Phillips has mapped the 1770 and 1868 events. Because the 1840 journals of Hines are not well-known today, and because they tie in so well with Phillip's research on the Elliott, I have included a somewhat more detailed account than might otherwise seem necessary:

Hines kept a journal of his entire stay as a Methodist missionary in Oregon, later turning the results into a popular and well-known book. In 1840 he travelled with a fellow missionary, Jason Lee, from their religious community near present-day Salem, to a community of Indian families near present-day Reedsport. They traveled south with pack animals, crossing the Willamette River after several miles and joining the established "California Trail" on a southwesterly course toward present-day Elkton. The California Trail was a pack animal and livestock route between British

Fort Vancouver and the beaver, cattle, and horses of the Mexican Sacramento Valley. It was constructed by the British Hudson's Bay Company (HBC) and the American Smith, Jackson, & Sublette Co. beaver hunting expeditions of 1826, 1828, 1829 and 1830. Portions of the route are still followed today by parts of I-5, Highway 99W, and Territorial Road.

> Friday August 21, 1840 After traveling about twenty miles over a rolling country, presenting almost every variety of scenery, we halted for dinner on a small stream called "Bridge river," [HBC name for Smith River since 1828, at least. The river was possibly the Siuslaw, rather than the Smith] on account of a log bridge having been thrown across it, by some California party. This stream runs in a deep cut, and, but for the bridge, would have been difficult to cross. In the afternoon we passed over the mountain "La Beache." [these are the 1826 Elk Mountains of David Douglas; French Canadian trappers employed by the HBC called elk "la biche," as in Lake LaBish, near present-day Salem. Today we call this mountainous divide between the southern Willamette and northern Umpqua Valleys the Calapooia Mountains] which consists of a vast assemblage of hills thrown together in a wild confusion, and covered with a heavy forest of fir and cedar trees. The latter is the most stately and majestic timber of the kind that I have ever seen. Some of the trees are from ten to fifteen feet in diameter, and towering to an incredible height. On beholding them, one is reminded of the scripture account of the cedars of Lebanon. It required three hours to cross this mountain, and as we descended it to the south, we found the fire making sad havoc with the fine timber with which its sides were adorned. In some places it rages so hard along the trail, that it was quite difficult for us to pass; but, urging our way along, we arrived at sun down at Elk river, and camped on a beautiful plain on its south bank [near present-day Drain, Oregon; according to local resident Gerald Bacon in 1987, this was possibly a grazing area known as "tin pot" to early stock drivers].

After a week of preaching and singing to the Indian families along the lower Umpqua (near present-day Reedsport), Hines and Lee made their return:

> Monday September 1, 1840. . . . In the afternoon, we again passed over the Elk mountain [see "La Beache" mountain note above], and found that the fire was still raging with increasing violence. A vast quantity of the large fir and cedar timber, had been burned down, and in some places the trail was so blockaded with fallen trees, that it was almost impossible to proceed; while now and then we passed a giant cedar, or a mammoth fir, through whose trunk the fire had made a passage, and was still flaming like an oven. Every few moments these majestic spars would come "cracking, crashing, and thundering" to the ground; but while the fire was thus robbing the mountain of its glory, we pushed on over its desolated ridges, and at sun-down arrived on a little prairie at its base, where we made our encampment. Several times during the night we were awakened by the crash of the falling timber, on the mountain, which sometimes produced a noise similar to that of distant thunder.

1868. Phillips has traced the original source of ignition of this event to a settler's clearing fire in the Greenacres area near Scottsburg. His assertion that the fire seems to have mostly occurred in 250 to 300 year old stands of Douglas-fir is based upon his personal identification and measurement of several representative snags and trees within the fire's boundary [personal communication: April 1, 1988]. *Fires were widespread throughout the Douglas-fir Region in 1868*, with an even larger fire complex, the 350,000 to 600,000 acre Yaquina Burn occuring a few miles to the north of the Coos Fire during the same fire season. There were several sources of ignition to the Yaquina Fire, all of them also believed to be human [Zybach, 1988: 100-121].

> . . . records of precipitation at the mouth of the Columbia show 1868 to have had the driest June, July, August, and September in a 58-year period of record for the station. Similarly these months at Vancouver, Washington, were second only to 1866 in having the least rainfall during a 72-year period. [Morris, 1934: 332]

1883. In addition to 1840, another fire year that is poorly documented is 1883. In his first Annual Report as Oregon State Forester, Lynn Cronemiller, describing a portion of the newly-named Elliott State Forest [1930: 20], wrote that: *"The fire of 1868 was undoubtedly extremely severe, for there are very few snags standing in the area,* indicating that practically all the trees were consumed." If it seems unlikely that large, green trees could have entirely vaporized in a single fire, no matter how hot, there is some support for Cronemiller's conjecture. In 1845, an early explorer and journalist named Joel Palmer [1983: 93], for instance, noted that:

> Along the coast from Cape Lookout to the 42d Parallel there is much land that can be cultivated; and even the mountains, when cleared of the heavy bodies of timber with which they are clothed, will be good farming land. There is so much pitch in the timber that it burns very freely; sometimes a green standing tree set on fire will all be consumed; so that it is altogether a mistaken idea that the timber lands of the country can never be cultivated.

At least three other possibilities would seem more likely to explain Cronemiller's observation:

1) that the area had been subjected to repeated cultural fires through time, and therefore did not have a stand of large trees at the time of the 1868 fire (probably the most likely);

2) that the area had burned earlier (possibly during the 1840 fire), and therefore dead, pitchy snags provided a highly—and almost completely—combustable fuel for the 1868 flames;

3) that the area had burned at least one additional time (with an effect similar to the second possibility) between 1868 and Cronemiller's report.

In support of the latter speculation, there are many contemporary references to fires along the Oregon Coast in the 1880's. During the 1883 U.S. Coast and Geodetic Survey that began on August 11 at the mouth of the Umpqua River (about 6 miles west of the Elliott), for instance, it was noted that: *"At the beginning of the season dense smoke from the many forest fires raging along the coast materially impeded the progress of the work . . ."* [1883: 58].

1896. In the 1890s the record of fire in the Elliott becomes much clearer, mostly due to the making and saving of photographs from that time. The photograph on the following page, for instance, shows an 1896 view of the Elkhorn Ranch hunting lodge, an important part of the cultural history of the Elliott. The lodge was owned by the Gould family, who gave this picture to Jerry Phillips sometime before the late 1980s. *The partial results of the 1868 fire are evident in this picture, as is evidence of the presettlelemnt forest and of the current forest.* The Goulds ran sheep, and this may have had the effect of preventing ladder fuels from developing around the base of these snags, and therefore helping to prevent a re-burning of the land, as occured in the 1868 Yaquina Fire, the 1902 Yacolt Fire, and the 1933, 1939, 1945, and 1951 Tillamook Fires.

Another important question: *Was the primary function of these snags in past times as wildlife habitat, or as ephemeral fuels?*

1910. Widespread and deadly catastrophic forest fires in 1902 and 1910 combined with a widespread national fear of an eminent "timber famine" to directly result in a number of local, statewide, and national efforts to "prevent forest fires." This effort initially resulted in the creation of several county fire districts and a focus for the newly-developed state and federal forester's budgets, culminating—at least symbolically—with the creation of Smokey the Bear in the late 1940s. These local and national efforts seem to have been effective (particularly when combined with earlier fire boundaries, clearcuting, broadcast burning, brush control, and road building efforts) in reducing the number and extent of forest fires in the Coast Range. *It could be argued that the advanced age of many of today's trees in the Elliott can trace their existence to grazing practices and fire suppression policies enacted between the late 1800s and the early 1950s.*

1896 view of the Elkhorn Ranch. The partial results of the 1868 fire are evident in this picture, as is evidence of the presettlelemnt forest and of the current forest: ***Was the primary function of these snags in past times as wildlife habitat, or as ephemeral fuels?***

B. Definition of "natural fire cycle."

A basic conceptual difference separates two schools of forest history: those who think that only "natural" fires started by nonhuman methods (usually lightning—but also volcanic eruptions, spontaeous combustion, friction, etc.) help define our forests, and those who think that it is "only natural" that people set fires. Throughout the Douglas-fir Region, including Elliott State Forest, historical documentation strongly confirms the latter position and discounts the former. This evidence—in the forms of living memory, tree rings, photographs, maps, etc.— supports the idea that *we live in a forested environment that has been far more affected by human fires over the past several centuries (and probably millennia) than fires from all other causes combined.*

The plan clearly acknowledges that "fire is a basic element that shapes the forest ecosystem." Agee (1991) is quoted as saying that "there is no evidence that [Indians] purposely burned upland forests such as the Elliott," and it is thus concluded that *"wildfires started by lightning* have affected forests in the Elliott area for thousands of years" (ODF, 1993: III-50, emphasis added). Although this conclusion might have some merit, it is unlikely that lightning fires have had anywhere near the influence of human fires, or that "wildfires" even existed at all before European American settlement ("wildfire" in commercial forest areas is a European concept based upon fire suppression practices and, as such, could only exist since the arrival and imposition of European values—less than 200 years ago). Finally, there is no historical record of even a single significant forest fire in the Coast Range that was started by lightning [Zybach, 1988: 31-32]. All of the coast's historical "Great Fires" of the past few centuries have had documented—or highly suspected—human sources of ignition.

It is apparently assumed that because Agee thinks that "no evidence" exists to document local people *purposely burning upland forests*, therefore, lightning did. This reasoning is then extended further to arrive at the cyclic equation that "replacement fires burned through the Elliott area on the average of once every 150 years" (ODF, 1993:III-50; the actual quote says "*fire history studies* suggest that replacement fires burned . . . every 150 years," but Phillip's fire history research details fires through much of the area in 1770, 1840, and 1868—about *once every 50 years* in prehistoric and early historic times). In addition, there are lots of records of purposeful upland forest burning by indigenous people in southwest Oregon [Zybach, 1988: 33 -42]. Besides, whether a timber trespass, fire, or personal injury is "on purpose" or "by accident" is irrelevent—the result is the same and the cause is still "human."

In both prehistoric and historic times, families have existed and moved in systematic fashion across the western Oregon landscape. Thousands of cooking and heating fires have been used daily for thousands of years in the vicinity of Elliott State Forest. On a seasonal basis, people have burned brackenfern, cured tarweed, and cleared forest debris over thousands of acres annually during spring and fall burning seasons. Seasonal east winds, extended periods of drought, a rolling topography, and some of the fastest and largest growing fuels on the planet have combined with these widespread and constant sources of ignition to produce our current forests of fire-dependent and fire-resistant plants. These patterns of plants and cultural fires over time have formed the primary habitat for native wildlife in this region since the first arrival of human hunters and settlers, at least 11,000 years ago.

Because "fire cycle" models are based upon an assumption of random points of ignition and randomly spaced catastrophic events (while people use fire in regular, predictable, and systematic patterns), such models cannot be used to either predict a known past or plan a desired future—at least for most of the forests of the Douglas-fir Region. The historic intervention of people into this area meant that fire was introduced *periodically* (on both daily and seasonal schedules) into the environment for the first time. The difference for local forests was that, rather than evolving through possible *cycles* of predictable conditions (including catastrophic stand replacement fires and various "seral stages"), the tendency has been toward a resilient repopulation of areas periodically burned by fire. As conditions change (a constant series of interrelated processes), the size, shape, appearance, and populations of the forest changes. And, as the forest changes, the timing, size, shape, appearance, and intensity of the fires that periodically enter the forest bounds also change.

A similar, but somewhat different, viewpoint is shared by Pyne:

> The magnitude, character, and organization of these historical changes lead to the concept of a *fuel cyle*. And from this concept comes another, the *fire cycle*. As their names imply, for these concepts historical changes are considered to be regular and at least roughly periodic. In fact, they are neither. In general, only where humans intervene with fire and fuel management practices is there an approximate cycle or an apparent periodicity... The fuei cycle and fire cycle concepts are convenient ways to characterize the fact that fuels and fires have histories, but erroneous designations of how those histories evolve and interrelate. (Pyne 1984:103-106)

The significance of the differences between mathematical "fire cycles" and documented "forest histories" to the Elliott plan are critical. If endangered species populations have had to adapt to periodic catastrophic (100,000 acre and larger) forest fires in past centuries, will their long-term survival strategies require some form of return to those past conditions or processes? If so, clearcut logging, slashing, precommercial thinning, and broadcast burning should be considered as important tools in any effort to physically mimic known presettlement forest environments. If not, can "new forestry" practices (that define homogenized "presettlement landscapes" in statistical terms of 50-11-40 equations, snag recruitment strategies, coarse woody debris distribution patterns, and multilayered canopies on an ecosystem-scale basis) successfully mimic past conditions? Would such an effort necessarily result in larger populations of select bird and fish species (including ESA listings, game fish and animals, useful research species, and birds and insects favored for their grace, color, or beauty)? Or would the widespread adoption of these experimental practices create an increasingly volatile and deadly series of fire bombs, as some scientists and analysts suggest (Peterson, 1993: 2)?

The answers to these questions vary widely, depending upon how the historical record is interpreted, or whether statistical value-driven mathematical models are to be trusted. The lesson of history seems to be that we can clearcut, burn, and reforest with near impunity for long periods of time (consider the pasturing and plowing of Greece, Spain, China, or Switzerland). Computer-driven predictive models, on the other hand—based upon assumptions of fire cycles, seral stages, and climax vegetation—seem to say that if we continue clearcutting older trees we will accelerate the extinction process rate (with possible disastrous human consequences) for a number of "late -seral stage" wildlife populations.

C. Forest fires, human population rates, and wildlife habitat dynamics.

The history of catastrophic Oregon Coast Range forest fires is one of incredible, almost over-night changes to vast areas of the physical and biological environment. The Tillamook Fire of 1933, for instance, burned over 220,000 acres of forest in less than one day, sending a 43-mile wide mushroom cloud looming nine miles in the air over the Willamette valley [Zybach, 1982]. As with most other local forest fires of great size [including the 1840, 1868, and 1883 fires), the Tillamook fire occurred during the late summer/early fall east wind "fire season," long after the spring hatch of native birds had learned to fly and fend for themselves. How many birds were trapped in these fires? Or, did birds (and other predators, including humans) flock to the great burns that traced the aftermath of these events, picking off injured and starving rodents, insects, and other exposed prey by the millions? Did the survivors learn to adapt to second growth conditions, as current populations in the Elliott and Tillamook State Forests, and the Siuslaw National Forest,have learned to do? Or did they migrate to other areas and compete for mates and food and shelter with the populations already established in those places? The answers to these questions are very important if we expect to successfully manage for non-game coastal bird species in the years to come.

Today's populations of native coastal birds have all descended from thousands of generations of animals that had to periodically adapt to vastly changed conditions time and time again. Their environment was never a sea of "steady-state" "climax stage", old-growth trees [ODF, 1993: III-31], and never can be. Perhaps it was the process of adapting to periodic fire or wind-caused deforestations over the landscape that helped permit owls and murrelets to survive to the present. Should we then again adopt these processes into the environment? Perhaps even exaggerate their occurrence, in hopes of increasing depleted populations? Or can these effects be simply mimicked, with trees being cut and processed into human products, instead of simply burned and turned into hazardous events and mass air pollution?

It seems to be a matter of the most common sense that *the management of wildlife habitat and native species through time must be based upon established patterns of ecosystem dynamics if the management plan is to be successful.* This problem has been greatly exacerbated over the past several decades due to demands and changes brought about by great increases in local and global human populations. The demands of people upon all of the earth's resources must be seen as the fundamental problem challenging the future of the planet's wildlife populations at this time. The related roles of catastrophic fire, fire suppression activities, and clearcutting must be measured against the expanding *need* for forest products to meet the expanding number of human families being created daily. These human needs (fuel, water, food, shelter, recreation, etc.) are not only derived from forests, but by damming rivers for electricity, planting lawns and other exotic vegetation in our urban areas, growing food crops across great expanses of former prairie lands, and building great freeways of rapidly moving vehicles all across the former migration routes of buffalo, elk, grizzly bears, and antelope. Fire suppression and clearcutting actions have helped to support the increasing human constructions of the past century, but it is debateable how great their impact upon native wildlife habitat has been, compared to other impacts associated with human population growth. These factors need to be especially considered when dealing with flying, swimming, and migrating animals.

D. Historical environments, ESA strategies and coastal bird populations.

A primary concern of logging activities in the Elliott is the harm that might be done to spotted owl and marbled murrelet populations. It is worried that *"habitat removal may cause disturbance extensive enough to disrupt normal bahavior patterns," particularly as those actions might be interpreted through NEPA by the U.S. Fish and Wildlife Service* (USFW)[ODF, 1993: I -22]. The question then, is: What are the normal behavior patterns of these birds, given the Elliott forest's history of young second growth stands of Douglas-fir and over 30,000 acres of clearcutting in the past several decades? A second question is: how does the USFW "interpret" such "actions?" Would the conversion of these stands to an older condition that hasn't occurred for at least 120 years (several dozen bird generations) create an even greater "disruption of normal behavior patterns" than most other management options (including existing management trends)?

The 50-11-40 rule, snag recruitment strategies, and current riparian zone management guidelines all point toward the creation of an idealized, homogenized "old-growth characteristic" condition that has never occurred in the history of the Elliott. Even if the artificial creation of these conditions is physically possible (the 1770 and 1868 fires and the 1962 Columbus Day storm argue heavily against the possibility), *what evidence do we have that this effort will result in greater biodiversity or improve targeted bird populations?* And does any such "evidence" realistically reflect the proven mobility and adaptability of these animals?.

Assuming that the current information regarding the decline in spotted owl and marbled murrelet populations during the 1900s is accurate, how is it possible to tie this presumed decline to a decline in "old-growth?" particularly such "old-growth" conditions contained in the mature second growth stands of the Elliott? *In 1900 much of the current range of these animals consisted of hundreds of thousands of acres of burned snags and 10 to 50-year old even aged stands of Douglas-fir.* Animal grazing, agricultural fires, and federal fire suppression policies have resulted in many of the 1900-era stands continuing to exist to the present time. According to current popular wisdom, shouldn't the numbers of owls and murrelets and anadromous fish in these stands be measurably greater at this time?

In order to make effective long-term strategies for the maintenance of swimming and flying animal populations, it would seem that a regional consensus regarding the types and extent of such practices—and not just forestry practices— is needed. Even the most basic kinds of information is lacking: What is the record of these animals responses to catastrophic events in the past? Are these periodic "tests of rigor or viability" that these species need in order to retain their competitive advantage over other species? What role have introduced species played in this process? *What are the cumulative effects of human population growth, including industrial air pollution, urban lawn and park watering, highway construction, fencing, plowing, automobile use, and electrical power production on these animals?* How will riparian zone and tree age managment activities affect the over-all environment that these species exist in? The questions can't be answered by any one field of biology or any one forest plan.

Until we begin to better understand the complexity of what we're trying to do with our ESA strategies (apparently the goal is to stop the extinction process at virtually all costs), it would be safest—at least from an historical perspective—to not make sudden deviations from proven policies and activities: *These should be social decisions, not forestry decisions.* The costs of these decisions will be borne by millions of people not yet living: how will they view our (*society's,* not forestry's) decisions regarding these animals? Costly and quixotic? Or too little, too late?

E. Catastrophic fire history, forest productivity, and log income potentials.

It is important to remember that *the Elliott's contribution to coastal native wildlife habitat for the past 120 years has been a generally uniform, 80,000 acre, nearly even-aged, nearly pure, stand of young Douglas-fir trees.* This is a characteristic pattern for much of the western Coast Range, and one to which our animal populations have adapted over the past several thousand years.

The history of forest fires and reforestation in the Elliott portray an extremely productive and resilient environment for the growing of trees. The 1868 fire tells us, for instance, that *it should be possible to clearcut about 90% of the forest (over 80,000 acres) at one time—riparian zones and all—without an appreciable loss of productivity.* This claim is supported by the elimination of riparian vegetation thought to have occurred with the 1868 fire [ODF 1993: III-11], current timber production site class ratings [ODF, 1993: III-67], and the existence of current fish, owl, and murrelet populations. Such a clearcut, while unlikely to occur in a period of time less than several decades, might arguably result in measureable increases in native wildlife biodiversity, including birds, flowers, butterflies, and large mammals.

Because the primary goal of the Elliott Forest is to raise money for Oregon schools, it seems unnecessary that logging schedules be reduced so dramatically in a second growth forest at this time; a time when the state's public schools are reportedly suffering from Measure 5 cutbacks and our timber prices are at astronomically high levels (<u>over 500 times higher</u> than the first state timber sales of only forty years ago). At the least, it seems as if *"natural" conditions could be better obtained by integrating past clearcutting patterns into a better designed, more natural wind and fire-resistant pattern.* This type of planning could easily maintain the logging rates of the 1980s, take advantage of the sales prices of the 1990s, and rejuvenate the entire forest with a mosaic of wildlife habitat patterns that mimic the late 1500s and/or early 1700s.

F. Conclusions.

The outlined discussions on the previous pages were intended to provide a background to the more specific questions asked by OFIC. These questions are paraphrased below, followed by answers I believe can be supported by a current understanding of the Elliott's forest history.

1. How did the Oregon Department of Forestry use fire history for developing their recommended alternative?

ODF apparently did not use the 1770 to 1951 fire history described by Phillips in its development of plan alternatives, including Strategy 6. Rather, a 150-year *fire cycle model*—generally ascribed to Agee—seems to have been used to help justify a recent change in management focus from timber production to maintenance and creation of older forest conditions. If the available historical information had been used as the basis for regarding the Elliott's past and present, a much broader range of alternatives should have been developed for its possible and desired futures. *A fire history perspective would have allowed for far greater latitude in the spatial and temporal designing of logging plans, wildlife habitat creation and maintenance strategies, and net income production.* This conclusion is based upon a study of the general patterns and structural characteristics of forest wildlife habitat displayed over much of the western slope of the Oregon Coast Range during the past 300 years, by the demonstrated resiliency and productive capacity of the region's forest soils, and by the number and extent of its current wildlife populations.

2. How has the natural fire cycle shaped the Elliott State Forest?

The "natural fire cycle" of the Elliott supposes a mathematical predictive model that is biased against human activity (including logging, burning, and road building) and toward "average" decadent stand conditions, numerous older trees, and random lightning strikes. The principal problem with fire cycle models for planning uses is that they are based upon the faulty historical assumption that prehistoric families lived in an environment of big trees, uniformly-spaced snags, coarse woody debris, heavily shaded rivers and creeks, and randomly occuring forest fires. With fire cycle models, ecosystems function, snags are distributed, and random forest fires occur in an idealized, static, human-free environment in which homogenized mathematical patterns *(stages, averages, and cycles)* are used to represent past conditions, rather than the dynamic reality of documented fact *(history)*. The "shaping" of Elliott State Forest by fire can be better characterized *historically*, as *the result of a long-term series of botanical responses to constant human disturbances caused by daily and seasonal fires of varying degree and intensity.* The result has been an extensive stand of young, even-aged Douglas-fir trees that has persisted for over 120 years. Based upon a current understanding of the past three centuries of fire in the Elliott, it seems highly likely that a number of similar vegetation patterns have also existed for similar lengths of time in this same area during the past two to three thousand years.

3. Using an accepted fire history or fire cycle predictive model: What is the potential for shorter rotations to obtain the same wildlife objectives for spotted owls and marbled murrelets as given in the recommended alternative

If the "wildlife objectives" in Strategy 6 are interpreted to mean population maintenance or increase over time, *the mobility of owls and murrelets and their proven resiliency to catastrophic fires would indicate that historical rates of clearcutting can probably be maintained indefinitely* (but past fragmentation caused by this practice should probably be mitigated first); If the "wildlife objectives" are to simply create or maintain certain structural stand characteristics ("desired or required" habitat) within the forest, then these human definitions of desired future conditions would include (and require) a Strategy 6-type approach. Again, the difference in these two positions is the difference between *mathematical projections* based upon perceived *"averages"* and *interpretive projections* based upon documented *evidence* of disturbance and resilient recovery.

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