CITY OF ASHLAND

August 4, 2005

Linda Duffy, District Ranger
Ashland Ranger District
645 Washington Street
Ashland, OR 97520

Re: Ashland Forest Resiliency Public Comment

Thank you for the opportunity to create a shared vision for the Ashland watershed. This is only the beginning of what we hope to be a long and a productive partnership. The City and community of Ashland look forward to continuing to advance the health of the watershed, through a continued partnership with the Forest Service during the implementation and monitoring of the plan.

The City and community of Ashland are providing this letter as an official public comment on the Ashland Forest Resiliency Draft Environmental Impact Statement. We appreciate the effort your staff has invested in creating the DEIS with input from those involved with the community alternative. The alternatives have benefited greatly from this collaborative relationship. Our comments focus on how the Ashland Forest Resiliency Community Alternative was analyzed against the purpose and need of the project.

In addition to the technical comments submitted herein, we would like to address the broader issue of our ongoing working relationship, from development of the preferred alternative through project implementation and monitoring.

We welcome the opportunity to engage with the Forest Service in collaborative stewardship of our municipal watershed and believe that it is important to articulate several elements that are essential to an effective collaborative effort.

The *capacity to partner* during a ten-year project is an element that the agency, the City and the community must consider separately and cooperatively. Trust is essential in collaborative relationships; trust is nurtured through continuity in personnel who understand the history of agreements, who field concerns, and who keep the project on schedule. It is important to maintain continuity in staffing that has an intimate knowledge of the watershed and community. Therefore our collaboration should include structures and agreements that withstand changes in staffing, administration, and funding cycles.

We would like to discuss with you what options are available to address this inevitable change and to maintain at least one person, preferably with a strong and diverse scientific and technical background, who has an intimate awareness of the watershed and its issues, - an Ashland watershed specialist.

The *roles of partners* in collaborative stewardship need to be clearly defined and documented, since there will be changes in individual players over time. This particular proposal is predicated on the identification and validation of on-the-ground conditions at the time of implementation and "concurrent monitoring;" it is occurring with a high degree and quality of local participation. Those two features indicate a high need for commitments to effective relationships. Given the limited ability of the DEIS to predict outcomes on the ground, the City must ensure a clear and strong role "at the table" throughout the implementation of this work. It is vital that our work and agreements, so arduously developed, both within the community and with the USFS, be honored and valued beyond the adoption of the final Record of Decision.

Building on the pioneering 1929 Memorandum of Understanding between the City of Ashland and the US Forest Service, we propose an amendment to the MOU that would spell out the details of this continued collaborative relationship. The purpose of such an amendment is to codify a shared commitment to a process of adaptive management. The amendment would include specific provisions that provide for:

- The sharing of 1) on-the-ground field data on conditions that trigger criteria on a project-by-project basis, and 2) the shared analysis and prescriptions relative to that data; this would be designed with recognition of the time-sensitive nature of the work and of the need for public notice;
- Project-based field trips to early projects and/or unique condition-class projects, to assist community and City representatives in gaining an understanding of the analysis and prescriptions that create outcomes not being detailed in the current DEIS;
- Ongoing communication through meetings and workshops between the USFS and the City/community representatives to discuss critical topics, including Desired Future Conditions, LSR and Spotted Owl Habitat, and Monitoring implementation and funding.
- A description of how the City, community interests and USFS will operate as a collaborative partners;

We recognize our need to establish a structure for meaningful participation during the project life span; we are currently discussing what shape that will take.

The *necessity of monitoring* on this project cannot be overstated. The Healthy Forest Restoration Act, under which this project is structured, places significant weight on community involvement. The City of Ashland dedicated considerable resources to support the development of the Community Wildfire Protection Plan, the Community Alternative, and the clarification of that alternative; local specialists and lay citizens donated countless hours. We conducted public meetings and outreach that assisted the USFS by conveying to local citizens the agency's commitment to manage the watershed. We are conducting outreach to the scientific community to increase the attention our special watershed gets from researchers. Our investment saved the Forest Service a sizeable amount of time and money that it would have spent on public outreach and involvement.

Ashland residents hold strong and diverse perspectives on our relationship with our municipal watershed. Our ability to forge agreements on the management of that watershed relies on our shared commitment to monitor the effects of our assumptions upon the landscape. Adaptive management requires effective monitoring.

We appreciate the leadership you have demonstrated on this project. We look forward to advancing this novel collaboration that benefits the unique and unmatched character of Ashland's watershed.

Respectfully,

Richard Brock
Chair, Ashland Forest Lands Commission
Signing on behalf of:

Frank Betlejewski
Jo Anne Eggers
Anthony Kerwin
Joseph Vaile
Diane White
Members of the Ashland Forest Lands Commission

Keith Woodley, Fire Chief
Ashland Fire & Rescue

Marty Main
Consulting Forester
Small Woodlands Services

Darren Borgias
Southwest Oregon Stewardship Ecologist
The Nature Conservancy

Cindy Deacon Williams
Conservation Director
Headwaters

George J. Badura
Soil Management Services

Chris Chambers
Community Member

Endorsed by the Ashland City Council on August 2, 2005.

With special thanks to Joan Resnick, The Real Life Training Group, for facilitating our numerous meetings and to the many community members who attended meetings and submitted comments.

TABLE OF CONTENTS

Appendix

Wildlife

While this discussion focuses on Northern Spotted Owl habitat, it is pertinent to many late-successional species and on conservation of the habitat upon which they depend for shelter, nesting, roosting and other critical resources necessary to maintain viable populations in the watershed.

The Forest Service proposes to maintain 60 percent canopy closure in areas currently providing northern spotted owl habitat (DEIS II-46, 47). Sixty percent canopy closure is often used in the DEIS as a figure delineating a break between functional and non-functional spotted owl habitat. This single number fails to represent important structural differences that can occur in separate stands with the same canopy closure. Good spotted owl habitat generally requires multi-cohort stand conditions, which obviously is not ideal from a wildfire management perspective. Conversely, some even aged stands have very high canopy closures and have good vertical discontinuities, but poor structural characteristics for good spotted owl habitat.

The Community Alternate proposes "some light touch prescriptions to restore late-successional habitat benefits for northern spotted owls" (DEIS II-58) and further emphasizes that treatments within ¼ mile of activity centers are for owl habitat restoration only" (DEIS II-91). This was not made clear in the DEIS. Treatment within ¼ mile of spotted owl activity center should be consistent with minimizing effects on owls and other late-successional associated species while reducing the risk of a stand replacing wildfire that would remove or severely degrade this habitat in the activity center.

As the purpose and need of the project is to minimize risk of large scale severe wildfire negatively affecting the community and its watershed and to create forest resiliency and there is no overriding mandate or management direction to produce commercial timber within the Ashland Watershed, a more conservative approach to treatment in suitable spotted owl habitat is warranted.

Sixty percent canopy closure is considered the minimum required to maintain suitability of Nesting, Roosting and Foraging (NRF) spotted owl habitat; however, some biologist feel that this reduces suitability of habitat to a point where it is likely to have a detrimental effect to conservation of the species and/or reduced reproductive success of individual owls until the habitat recovers to provide a higher canopy and more structural variability (post-harvest stands often have a more homogeneous structure).

Treatments more in line with the Community Alternative (reduction of ground fuels, retention of shrub diversity and maintaining a higher canopy closure where site conditions would support it in the long term) is a more reasoned approach to management of habitat for an endangered species as well as for the myriad of other late-successional habitat associated species which depend upon a heterogeneous structure for critical resources.

The biological evaluation (DEIS App F p. 5) points out that about 40% of the home range for Northern Spotted Owls needs to provide suitable nesting, roosting and foraging habitat (prime complex, closed canopy, late-seral forest) for home range viability. Home range analysis was approximated in the DEIS showing that suitable habitat currently covers between 52% and 83% of the ground within 1.3 miles of known activity centers. Across the entire project area late successional closed canopy habitat would decline under the community alternative to 73% of the area treated amounting to 72% of the total area in the northern portion of the Late Successional Reserve (LSR), and 54% of the entire LSR (much of the southern portion is recovering from past logging). This exceeds the minimum threshold at each scale yet raises the concern about reduction of such habitat that may be critically important on larger scales.

Franklin et al (2000) point to the value of the distinct mosaic of stand structures to the fecundity of Northern Spotted Owls in the Klamath Mountains. Because the Community Alternative does not call for area wide thinning but emphasizes restoring more open structure and dominance by early seral fire resistant species only on the less productive south, west and uppermost north and east slopes while retaining suitable habitat on lower north and east slopes, bottoms and riparian areas, steep slopes, unstable areas, and higher elevation Plant Association Groups (PAG), it restores beneficial heterogeneity that could enhance fecundity of the birds present. The interplay between these factors do not appear to be considered in the DEIS.

While the Community Alternative proposes downgrading some NRF habitat, it is in south and west aspects and in vegetation communities that are less suited to retaining this habitat type in the long term. Suitable habitat would be retained in areas with ecological characteristics best suited to maintaining that habitat. Suitable NRF habitat would exist on the landscape in a mosaic pattern in riparian areas, north and east slopes and in micro sites on other aspects and would likely be more consistent with the landscape patterns observed in the Klamath Mountains and with long term sustainability. The DEIS analysis of late successional habitat does not address the differential role of landscape setting and the interplay with fire in the long-term viability.

The analysis presented in the DEIS has not quantified the long term probability for maintaining the habitat and the contribution that the treatments or no action would have as a measure of viability. This should be added using the approach presented in our comments on successional states in this communication. This new information will need to be further evaluated by the City and community and used to adjust the Community Alternative or final proposed action to optimize the maintenance of late-successional habitat while meeting fire resiliency and ecological integrity goals.

The Community Alternative put in considerable effort to maintain important ecological processes and structures across the landscape in consideration for wildlife, and social values, which embrace the importance of wildlife. Important features such as large trees, snags, coarse wood and overall desired structural condition of each PAG was considered with the intent to retain these structures across the landscape. The onus is on a solid justification for removal of any of these structural components in any PAG. Thus, habitat is maintained for all wildlife species in conjunction with associated PAGs and heterogeneity is maintained across the landscape to address the needs of wildlife species and the long term viability of all species.

In summary, the Community Alternative approach, which considers vegetation composition to determine treatments, provides greater protection and conservation of habitat with consideration of long term maintenance; treatments based on PAGs would require less maintenance, provide for maintaining species (plant, animal, fungi) more suited to local conditions (soil type, aspect, etc.) and provide for long term forest resiliency while minimizing effects to species and the habitats on which they depend. As stated earlier, it will be important for the City and community to further evaluate the impacts to Northern Spotted Owl suitable habitat and to consider adjustments to the Community Alternative to arrive at a balance of restoration and protection that serves the wildlife habitat needs, including the larger regional needs of the Northern Spotted Owl and the community for the long term.

Yarding Systems, Roads and Helicopter Landing Pads

The DEIS at III-76 refers to the past usage of helicopters and ground-based systems adjacent to the Ashland Watershed to remove biomass. The availability and location of helicopter landings has a huge impact on economic feasibility. The use of these landings also provides the ability to successfully remove the merchantable products of this restoration project in the most ecologically sensitive way. However these landings can also have negative ecological consequences. The City of Ashland would like to ensure that these activities do not cause unnecessary harm to important watershed values. With decomposed granitic soils and special habitat values, this area is unique.

The USFS has proposed a maximum of 31 landings. If these landings are similar to those suggested for ground-based logging (on ridgelines and low gradient positions relatively far from the hydrologic network) then erosion effects and sediment delivery are reduced. If appropriate mitigations are developed, then effects are again reduced. However, these general assumptions would have to be verified on-the-ground at each proposed landing location.

To better prevent cumulative soil disturbance in the FEIS project area, we recommend site-specific analyses and expansion of existing landings and/or new development, especially in regards to the development of the two new road segments. Seasonal restrictions on haul road use and subsequent maintenance are also important long-term watershed level issues. It appears that the sediments contribution from proposed landings neglected to account for contributions from existing landings that need to be re-cleared. The DEIS lacks information about site-specific soil compositions and management history in each treatment unit that will be relevant to yarding and roads and important for decision-making. Specific soil types and topographic positioning require different management and mitigation practices relevant to yarding and roads.

Tractor logging, cable yarding, helicopter landing pad construction and similar activities can expose soil, cause compaction and loss of soil at the site. Soil disturbance caused by logging activities triggers erosion and compaction and can adversely impact both soil and water resources. The existing level of soil disturbance at the site level has not been measured and discussed in the DEIS so the amount of soil disturbance through the implementation of the project is unknown. So it is impossible to know how the soil standards and guidelines of the Rogue River Resource Management Plan will be met.

There is unlikely to be a detectable difference between the Community Alternative and Proposed Action regarding the level of sedimentation that would reach streams, even though the analysis of the Community Alternative suggests slightly higher rates of erosion and sedimentation (DEIS at III-140).

The Community Alternative strives to encourage small-scale operators that are able to obtain firewood, poles and other small diameter material, the byproducts of genuine fuels reduction. The Forest Service should choose an alternative that can be designed and implemented to encourage small-scale operations that are ecologically sensitive.

Helicopter usage has direct impacts during their use and from helicopter landing pad construction. Helicopter use can have also have impacts on recreational experiences. Likely, the most important operational consideration is the impact of helicopter use on wildlife. Northern Spotted Owls, goshawks and other wildlife can avoid helicopters during extended use. The Forest Service should attempt to prevent these impacts. Similarly, the DEIS does not address the effects on wildlife, recreation, aquatic habitats, cultural resources, and sensitive plants from repeated landings.

Helicopter landing pads can also have visual and aesthetic impacts and therefore urge further assessment of helicopter pads on these values. Over the short-term and long-term, helicopter landings would be visible from a number of locations within the Analysis Area. These landings would have both adverse and beneficial effects for the casual viewer of the surrounding landscape. Some community members feel that these small cleared areas (approximately 175 feet by 175 feet) would detract from the unaltered appearance of many locations within the analysis area. For others, the landing sites would provide valued scenic points from which to view the surrounding landscape, both within and outside of the Analysis Area.

One short spur roads and helicopter landing may be constructed within the West Fork area (candidate landing site #13). Other management actions such as density management, pruning, and prescribed fire are proposed throughout the West Fork Area (DEIS at III-153).

McDonald Peak Inventoried Roadless Area (IRA)

The Forest Service proposal to take large trees from the Roadless Area is not preferred by the City and the community. When mapping areas for treatment, the Ashland Forest Resiliency Community Alternative Team (AFRCAT) discovered some limited acreage within the McDonald Peak Inventoried Roadless Area that were possibly in need of fuel treatments. These acres were very low on the priority scale. The team also recognized that treatments in the McDonald Peak Roadless Area, in particular, would be socially controversial. Therefore, the proposed activity on these lands is prescribed fire and limited "light touch" hand work on small diameter (under 7 inch dbh) understory fuels and vegetation. The City of Ashland endorses this limited work in the McDonald Peak IRA while recognizing it is a low priority in this project.

Economic and Financial Considerations

The economic analysis provided is more accurately described as a "financial analysis". The City and community need a full economic analysis that would include the following: all costs associated with mitigation of negative impacts; the costs and benefits of the use of prescribed fire, administrative needs, contracting, monitoring, etc…over the life of the project and long-term maintenance of the impacted land, and evaluation of the economic costs to ecological services.

Given budget shortfalls for the Ashland Watershed Protection Project (AWPP), the City and community are concerned that appropriate budgets and knowledgeable staff will be unavailable and unresponsive during the life of this project. The City is willing to lobby congressional delegates (and already has) for continuing support for all work in the Ashland watershed. The City want assurances that every possible dollar taken as revenue from this project will be reinvested back into this landscape. This may include the use of "Stewardship Contracting" and the Wyden Amendment to fund community participation in activities that will benefit federal land. We expect that the Forest Service will continue to ask for maximum funding for all aspects of this project, including on-the-ground baseline data collection and monitoring.

Significant Issues

1) Smaller helicopters that do more thinning types of work typically run at around $3000-3500 per hour, as opposed to the $5000 reported.

2) At these high per hourly rates, efficiencies in planning and implementation using helicopters becomes extremely important to be economically feasible.

3) Stewardship contracting has a lot of great possibilities, but is not necessarily a panacea. The project will ultimately be no better than the quality of the contractor, the quality of the administration of that contractor, and the level of funding. Those are big caveats with significant ecological outcomes.

4) The continued focus on improving the market for small diameter and biomass material is an opportunity to capture added value and defray costs for fuels treatment. The Community Alternative allows for ground based logging on slopes less than 20% with certain mitigation measures. This provides for the opportunity to remove and market small diameter material in a more cost effective manner.

Does the volume estimate on page II-94 take into account what can be removed economically in small tree size classes? Page III-77 describes how the rough estimate of project revenue is calculated for only trees 11 inches dbh and greater essentially eliminating any benefit obtained through small diameter and/or biomass utilization. The FEIS should take into account a lower diameter valuation limit on the 230 acres of ground based logging allowed under the Community Alternative. Figures for these values can be obtained through Blair Moody at the BLM for pilot projects in Southern Oregon. Lomakatsi Restoration Project and the Jefferson Sustainable

Development Initiative may also provide figures for an in-depth economic analysis of small diameter through Stewardship Contracting.

In addition, accurate estimates of small diameter value cannot be obtained from satellite imagery due to the small size classes and their location beneath dominant canopy trees. A ground based survey is needed to make any meaningful analysis.

5) Expenditures to insure inventories prior to implementation of treatments as suggested in the Community Alternative, but not in the Proposed Action, is a wise and prudent expenditure in this project.

6) A financial analysis alone provides limited usefulness. A good economic analysis will value those ecosystem services we are trying to promote. In essence, AFR can be thought of as an investment in ecosystem infrastructure to insure continued delivery of those resources and services we value, most notably water and late-successional values.

7) Take a holistic look of costs and benefits over time. There have been studies which compare the cost of fire-fighting and post-fire restoration with the fuels treatment costs. In addition, what would a large-scale fire mean economically for the City of Ashland in terms of water delivery, tourism, recreation, and loss of property value? Items to include in the economic analysis along these lines could be: the value of homes in the Ashland WUI, City revenue based on water sold to the community per year, use of Contingent Valuation Method to determine economic value held by community for existence of late-successional habitat, recreation opportunities, and spiritual renewal. (See http://www.ecosystemvaluation.org/contingent_valuation.htm.)

By developing real dollar values for these services we begin to see the real situation when balancing costs versus benefits.

8) The analysis does not mention that there may be a benefit to cataloguing and treating known populations of exotic species. Ground disturbance is assumed to make matters worse, which is largely true, but can we analyze an improvement in the existing conditions as is planned in the Community Alternative? This would rely on ground based data collection to analyze the potential for improvement of current conditions.

Successional and Structural States

Representation of all successional/structural states for plant association groups should be added as a significant issue.

The range of successional and structural states in forested settings provides important inputs and constraints on elements of biodiversity and the processes that operate on them at multiple scales. Maintaining ecological integrity of the forests depends in part on maintaining representation of successional and structural states within the natural range of variability. The DEIS is correct in elevating late-successional habitat and Northern Spotted Owl habitat as significant issues, but should go further in quantifying and evaluating representation of other successional and canopy structural states at a landscape scale and the effects of the current representation on long term ecological integrity.

Decline in the historic extent of late-successional habitat across the Pacific Northwest due to timber harvest in the past century has been well documented. There is a large body of science demonstrating the value of interior late-successional old growth for the owl and other species. The network of Late Successional Reserves, including one centered on Mount Ashland, were established on federal lands to secure and increase the representation of late successional habitat. The spatial patterning, scale, and juxtaposition of habitats is important.

Less well understood are changes in forest habitat due to a century of fire exclusion. In forests with frequent fire return intervals, fire exclusion has led to uncharacteristic accumulation of forest fuels, shifts in species composition, increased density of small diameter trees, and increase in canopy closure widely documented in the scientific literature; however, there remains uncertainty on the extent of the phenomenon in the Ashland watershed because detailed local studies have not gone far enough. While the fire events of the last century are reasonably well documented, the history preceding that has not been well elucidated. Abundant fire scared trees, and the species and size class composition of the forests speak to the importance of fire. A longer fire history would help with establishing the historic range of variability and provide a reference or baseline to compare to the current condition

The Klamath Mountains provide complex forests of different species composition, ages, and structures controlled by the complex interplay of succession, topography and fire. Sensenig (2002) documented the role of frequent fire in contributing to the complex structure of late successional forests across southwestern Oregon. In the Klamath Mountains, Franklin et al (1998) points to the value of the mosaic of distinct stand structures, and especially edge habitat, to the Northern Spotted Owl population. The natural contribution of fire to the mix depends in large part on the periodicity of fire returning to a forest, the intensity of the fire and the severity of effects—referred to as the *fire regime*. The historic fire regime for dry and mesic mixed conifer forest types found in the Ashland watershed is referred to as mixed-frequency mixed-severity, and was likely quite variable.

The scientific literature about similar mixed conifer forests in the Klamath Mountains provides median fire return intervals ranging from 7 to 17 years, with important outliers extending the range to 65 years (Frost and Sweeney, 2000). The variation and range around the median is important for the generating much of the heterogeneity apparent.

Effective restoration would reestablish forests within the natural range of variability using historic conditions and reference stands as general guides (Brown et al. 2004). Reference site conditions can be determined by completing stand reconstructions, aging trees, studying the history of trees recruited into stands and the shifts in recruitment that occurred relative to the fire history. Completing these stand reconstructions and fire history would greatly improve the context for considering future management. Detailed, quantified stand investigations would provide guidance on historic basal area, spacing, clumping, etc. that could be used to set help set performance standards for restoration.

During the last century, with the exception of the 1959 fire that burned to the canyon mouth, fire has been largely excluded from the project area. Many fires have been suppressed in the project area. Approximately 133 natural ignitions were suppressed since 1960 (UBWA, 2003), and many more naturally ignited fires were suppressed in the project area since the last large fire in 1910. Fire exclusion has lead to canopy closure and increased stem density that many scientists interpret as uncharacteristic homogenization of forest—outside the natural range of variability. In a study on fire and stand development in mixed conifer forest in another part of the Klamath Mountains, Taylor and Skinner (1998) found that "Recently there has been an increase in forest density and a forest compositional shift to shade-tolerant species." Leiberg's observations of forest conditions in and around the watershed at the turn of the previous century, while not an adequate baseline for a reference condition, suggests that shifts in stand composition have occurred in the Ashland watershed, and that there has historically been a wide array of potential successional paths along which forests developed (Borgias, 2005). Reductions in open canopy habitat comprised of widely spaced large trees in the Ashland watershed has led to declines in certain species (e.g. the sensitive species *Horkelia tridentata*) that require more open forests. In addition, the early seral structural state that historically developed following patches of severe fire is nearly absent.

While past, current and desired proportions of successional states for each plant association group were identified in the Upper Bear Assessment (UBWA page II-30.46 and summary table on V-12), the DEIS appears not to have revisited or analyzed these desired conditions. In **Creating a Natural Landscape** (DEIS page II-16), strategies to move in this direction are discussed in the first two bullets but this direction lacks quantification. The lack of an adequate baseline or reference conditions for the range of structural and successional states and the proportion of the landscape they might occupy constrain our ability to assess current conditions or to optimally prescribe desired condition. The known and probable historic conditions and rates of disturbance and successional pathways that were used in a vegetation development dynamics modeling described in the UBWA were not disclosed there or in the DEIS. Ideally, the community would collaborate with the Forest Service in reviewing the modeling and using it to inform decisions about desired conditions.

The further analysis requested here is needed to identify an appropriate balance to seek in restoring ecological integrity to regain open canopy old forests while also ensuring that the proposal would help meet the critical need for protecting highly viable and functional late-successional habitat in a critical node for species migration and genetic dispersal. A spatially explicit landscape modeling tool (e.g. TELSA) should be used to depict the array of probabilities that the landscape settings offer to support each structural and successional state. Modeled probabilities should compare current condition and no action to the outputs from the range of fuel and thinning treatments (with continued fire maintenance) proposed under the two alternatives. This analysis would provide a valuable reference to optimize retention of late seral closed canopy forest and adequate representation of the other seral/structural states. Again, it would be appropriate for the City and community to participate with the Forest Service in setting the desired conditions.

The DEIS analysis of the acreage that would be considered downgraded, due to canopy closure reduction, from suitable nesting, roosting and foraging habitat to dispersal habitat provides new perspective on the alternatives that is a concern to the City of Ashland and the community. The analysis would benefit from a more clear explanation of the suitable habitat analysis, including maps of the suitable and dispersal habitat relative to the proposed alternatives. The City and community will also want to consider this additional data perspective to inform the design of the Community Alternative (CA) to optimize the balance between meeting the ecological integrity goals for the amount of more open canopy old stands and the provision for improved viability of the late successional closed canopy habitats and the species that depend on them. The City and community desire field trips with the FS and AFRCAT or the Forestlands Commission to evaluate representative samples of habitat and the prescriptions under the two alternatives that would impact suitable Spotted Owl habitat.

The CA was designed to meet the purpose and need while restoring ecological integrity, in some extent, by helping to restore stand heterogeneity that follows in part on the work of Skinner (1998) who described spatial patterning in another Late Successional Reserve. The CA emphasizes restoring more open forest stands dominated by large old trees of fire resistant, shade intolerant species on the less productive south, west, and uppermost slopes while retaining closed canopy late seral forest on northerly and easterly slopes, bottoms and riparian areas, steep slopes, unstable areas, and higher elevation Plant Association Groups. It will be important for the City and community to adjust this approach for the final EIS to reflect new information in the DEIS.

To the extent possible, ecological integrity and fire resiliency can be achieved by setting as desired condition and managing for desired conditions that reflect the pre-suppression era as the baseline or reference condition to the extent that the mix of social needs can also be met. Once this condition is met (based on monitoring and adaptive management), natural ecosystem dynamics should be emphasized through “custodial” or “passive” management in the form of maintaining natural processes (wildland fire use) or simulating them (i.e., prescribed burning) as needed based on the complex factors including PAG.

Soils

The discussion about soils and soil productivity in this DEIS misses some key and extremely important facts**.** The FEIS should better reflect the fact that soil present on a site along with the precipitation and temperature are the key to maintaining a plant association, which leads to most if not all habitat. Plant associations can occur on more than one soil type, and each soil requires unique management necessary for maintaining the soils productivity capacity.

The DEIS soil productivity discussion should be improved. For example, it needs to distinguish between surface and landslide erosion concerns and needs to better define coarse woody material (CWM) as related to percent surface cover.

The DEIS states that CWM will maintain the sites Long-Term Site Productivity (LTSP). CWM is valuable for habitat as well as for holding soil in place from surface runoff and erosion if it occupies a significant percent of the soil surface; however, it is of questionable value for maintaining slope stability. CWM is slow to decompose, therefore it does not supply soil organic matter in a timely manner and does not cover the soil surface to any great extent. The most important organic matter for the soil is supplied by the duff and litter or fine woody material (FWM) that extensively occupies the soil surface. This replacement is critical because the resulting soil humus can hold up to 8 times (800%) its own weight in water for the vegetation and it holds and supplies nutrients for the vegetation. Humus is critical in these sandy soils with low water-holding capacity and low nutrient holding capacity. The Community Alternative (CA) has allowed for protection of soil productivity whereas it appears the Proposed Action has not adequately addressed conservation of this important resource.

We recommend that the Community Alternative typification of CWM as greater than 6 inches diameter and as a percentage of soil surface cover be used to describe CWM. The Proposed Action has various sizes for CWM and addresses them as number of pieces per acre but not as a percentage of surface cover. To be effective for runoff control, cover percentage and orientation on the slope is critical. Under the discussion of Down Wood (page II-75) the DEIS states: "A target range for number of pieces of coarse woody material per acre was developed for each Plant Association Group (PAG) using current plot data presented in the 2003 Upper Bear Assessment. This range assumes that by maintaining the desired range of coarse woody material over all the sites, long-term site productivity would not be reduced." This point is reiterated on page III-25 under Soil and Site productivity / Direct Effects of Alternatives. However, the analysis misses two important points: (1) the importance of the other required soil productivity needs and (2) recognition that CWM is not the major contributor to long-term soil productivity even though it may maintain the LTSP for some habitat needs if the soil is not adversely impacted.

The DEIS relies on the WEPP model, which includes assumptions that may not be valid within the watershed. Surface soil erosion and its controlling factors, i.e. soil, the cover, the slope and the climate, need greater attention. On page III-23 soil erosion hazard is based on slope alone, which is an oversimplification. As mentioned above, soil characteristics, slope characteristics, cover conditions and climate characteristics are significant determinants of erosion hazard. Of these, the soil and the cover are the conditions mainly impacted by management that can lead to soil erosion.

On pages III-24 and 25 the DEIS states: "For all slope gradients, rates of predicted sheet erosion increases after effective ground cover is reduced below 70%." While this is true, it is not complete – sheet erosion increases well before the effective ground cover is down to 70%. This predicted rate is presumably based on the WEPP model and not on-site soil conditions. The rest of the analysis is based on predicted erosion rates based on percent slopes and not the other soil erosion factors mentioned above.

The DEIS states that the site-specific soils mapping for planning purposes is approximately 90+% accurate. The reference to "planning purposes" is taken to mean that much site verification is needed to match management work to present soil conditions. In fact, the soils mapping referred to is not site-specific, and as a result site-specific project soils mapping will need to be conducted as part of implementation planning.

The analysis of effects and the comparison of the extent to which the alternatives meet the purpose and need relative to protection of “values at risk” is lacking for anticipated effects on soil productivity or erosion.

The role of Effective Ground Cover (EGC) for soil productivity maintenance and for soil erosion concerns is only marginally treated in the FS analysis. The ground cover the analysis gives significance to is the CWM and not the critically important FWM. On page III-22 the DEIS refers to the soils inorganic component versus its organic component, yet misses important characteristics of the two and the overall importance of the organic component as discussed above. The analysis also lacks some critical soils characteristics that are important in designing management prescriptions.

The Community Alternative has addressed the above concerns. The FWM is both effective for erosion control and supplying the needed soil humus for LTSP. A site-specific prescription is needed to optimize the balance between the <3” FWM component of effective ground cover for preventing soil erosion while reducing fuel. The key issue is how and where the FWM is retained.

Existing soil erosion monitoring information referenced in the discussion consists of visual observations. As visual observation is a relatively weak tool for determining erosion, line transects are needed to measure soil erosion -- especially the sheet erosion that commonly occurs in the watershed.

A reference in chapter III states that Table II-5 shows the relationship between the percent bare soil exposed and the potential for sheet erosion. The described contents appear in Figure III-4. Table III-4 is based on questionable application of the WEPP model and not site-specific post-management conditions.

We recommend incorporation of the Community Alternative approach of providing soil prescriptions based on soil types so as to ensure a greater likelihood of protection soil productivity. The DEIS on page II-65 directs the reader to Chapter III for specific soil types. However, there are only general discussions on soils in chapter III under Soils and Site Productivity. The comments lack differentiation of the range of sites.

Relying on compliance with soil standards and guidelines (S&Gs) is a good starting point but has some limitations that should be addressed. For example: for a soil to be detrimentally displaced, it has to be at least 5 feet wide and compose 100 square feet. Under the S&Gs if an area is 4 feet wide or 90 square feet it is not considered toward the combined effect of an adverse impact. On critical soils with steep slopes and in a municipal watershed, these smaller displacements can produce extremely adverse effects especially when considered cumulatively. The CA soil prescriptions addresses this limitation.

Another concern for using the S&G’s without question is that the Forest’s Land Management Plan sets a maximum of 7 percent soil exposure on severely erodable soils in Restricted riparian areas and a maximum of 15 percent exposure in both Restricted and Managed Watersheds. The CA addresses these while the Proposed Action does not.

Big Trees

Clarify Methodology for Estimating the Number of Big Trees to be Cut
The importance of large trees to the ecological systems in the watershed, to the maintenance of late successional habitat and to the sensitivities of the community cannot be overstated. The specific diameter or age at which trees are considered "large," and therefore perform relatively important ecological functions, is a function of many factors operating at the site level. In general, indices of forest structure that are related to high levels of biodiversity include tree size, tree age, foliage height diversity, canopy gaps, coarse woody debris, and standing dead trees (especially large ones) - all of which vary by species.

Given this sensitivity, estimating the impacts to large trees in the project area from remotely sensed data is not adequately reliable. Several researchers (Staus et al., 2002; and Jiang et al., in press) found higher error rates in classifying old forests in comparison to younger forests across the Pacific Northwest on the basis of remote sensing data. While imagery is useful for design of actions and planning (II-17), it should not be used for estimating large tree densities, without verification of the accuracy of the data in the watershed. The data quality should be quantified specifically for trees larger than 17" in the Ashland Watershed stratified by the range of settings and stand types that are proposed for treatment in the two action alternatives. The numbers of trees marked for cut by diameter class in the recent AWPP work may provide a useful guide for at least part of the watershed. The City has already agreed to work with existing data, but verifying the accuracy in this context is especially important to the community.

Regardless, the numbers of large trees/acre that the DEIS indicated would be cut pursuant to the Community Alternative (Table III-22, page III-73) seemed significantly higher than the team involved in its development believes their prescriptions would dictate. Our objective is to retain the largest trees on any given site, regardless of size, and only remove large trees if justified and confirmed through a rigorous tree-by-tree verification protocol. If we apply the prescription rationale for the CA to the stand tables listed in Appendix H of the FEIS for the Ashland Watershed Protection Project, our basal area guidance would dictate that no trees greater than 18 inches dbh would even be considered for cutting in 12 of the 19 units. In the seven remaining units, trees greater than 18 inches dbh would be individually examined to determine if there is an ecological justification for treatment, while still retaining at least 18 to 36 trees per acre greater than 18 inches dbh. We expect that most of the large trees for which there may be a site-specific justification would be in the 18-24 inch dbh category.

Evaluation Needs Broader Scope and Additional Specificity
Given the fact that the Purpose and Need specifically references the primary goals of the Ashland Watershed to include protecting and enhancing late-successional and old-growth forest ecosystems (as well as providing water for domestic supply), we recommend that the evaluation be expanded to fully assess and compare impacts to old-growth forests – one element of which are big trees (see for example, the various discussions of monitoring and comparison indicators in Chapter II, and the discussion regarding attainment of purpose and need in Chapter III).

In addition to a desire to manage for the primary goals of the watershed and protect these "values at risk," there are at least three reasons why the public and scientists are concerned about protecting large trees and therefore at least three reasons why the evaluation of environmental consequences should be expanded: (1) large trees have been disproportionately targeted for logging and therefore are a limited resource in most forest areas, including the Ashland Watershed; (2) large trees tend to be resistant to low to moderately severe fire and therefore are differentially important in maintenance of forest resilience (another stated project purpose); and (3) large trees are preferred by many species of wildlife, including cavity nesting birds, denning mammals, and species of concern such as goshawks, fisher, and the spotted owl. In addition, large tree removals (along with bulk crown density reductions) could be directly responsible for the downgrading of suitable spotted owl habitat to dispersal habitat resulting in reduced project values (late-successional habitat) and a “may affect and may adversely effect” determination (and likely to adversely effect) for the Northern Spotted Owl.

Furthermore, the discussion of the environmental consequences of the two alternatives (page III-19) should address survival of large hardwood trees, particularly madrone, and should reflect the fact that not all large trees are equally resilient to fire. In addition, the DEIS evaluation of effects should discuss the implications of the rigorous review process mandated by the CA (with respect to both 17-24”, and > 24” big trees) as well as address the alternative’s provisions that prioritize keeping cut large trees on site as large woody debris or snags.

Verification Process Provides Needed Sensitivity for Big Trees

Given the public interest in protecting old-growth characteristics, we applaud the agency’s intent to treat commodity production as a by-product of management (II-16) in this project. Furthermore, we encourage the agency to incorporate a conservative approach to removal of large trees as part of the trust-building the agency is seeking.

The Ashland community has taken to heart the widespread scientific support for retention of large fire resistant and legacy trees (see Franklin and Agee 2003). We are aware of and sensitive to the fact that many birds, particularly cavity nesters, and mammals find denning and nesting habitat in the larger trees (dead and alive) and downed wood within the forest (Bull 1975; DellaSala et al. 1998; Maser et al. 1979; Neitro et al. 1985; Rose et al. 2000 for review) and the fact that large woody debris is critical to the ecological function of aquatic systems (FEMAT 1993; Maser and Sedell 1994; Naiman et al. 1992).

Since the agency is reluctant to use a diameter-based harvest prohibition to garner public trust – despite the fact that this approach has been used effectively to build trust in other projects (e.g., the Boaz project in the Applegate; six projects in the Illinois Valley; and various projects in the southwest, Allen et al. 2002), we strongly encourage you to adopt the verification process described in the Community Alternative. In the 2004 City sale, a verification process was used that numbered, mapped, and described reasons for every tree bigger than 17” dbh that was marked for removal so that each and every tree could be visited in the field if need be. This arrangement seemed pretty successful – both in terms of our ability to implement the project and with respect to increasing our ability to demonstrate to the public the validity of our big tree decisions. Furthermore, we recommend that you adopt the provisions in the Community Alternative that mandate large trees felled for “forest health” reasons be left on site to achieve coarse woody debris or snag requirements for large materials.

This project provides a wonderful opportunity for the Forest Service to create a different model and approach, both from an ecological and a collaborative perspective. It is important that we avoid inappropriate tree removal in the name of "fuel reduction," while allowing caring, concerned professionals the flexibility to do what is needed on a site-by-site basis. We believe a useful and pertinent verification process that oversees decisions involving big tree cutting, coupled with specific criteria for large tree retentions, and pursued with codified and meaningful City and public involvement during the implementation process (see opening remarks) is the best approach for ensuring ecologically-sound management, while also helping to make decisions transparent to the public.

Finally, we note that it is not uncommon for large trees to occur in clumps in fire-adapted forests (DellaSala et al. 1998). An understanding of this phenomenon should guide on-the-ground application of Big Tree decisions and be documented in the verification process.

Implementation Must Ensure Large Trees are Prepared for Prescribed Fire
While we support and strongly encourage the use of prescribed fire in appropriate PAGs whenever conditions are appropriate, we note that duff layers around large trees may have accumulated during the long period of fire exclusion. Reintroducing fire could result in large tree mortality due to root damage caused by cooking built up duff layers. In the southwest, this activity has been observed as the primary cause of mortality in large ponderosa pine during prescribed burning (pers. commun., Dr. Wally Covington, Northern Arizona University) and researchers have mechanically (through raking) removed some of the duff layer at the base of large trees to reduce impacts prior to prescribed fire. We suggest you determine the effects of fire exclusion on duff layers at the base of large trees, effects of prescribed fire on risk of large tree mortality, and consider reducing duff build up prior to reintroduction of fire as needed.

Aquatic/Riparian Areas

Concerns over the effects of land management in the watershed on soil erosion and water quality are long-standing. Thirty-five years ago these concerns led to a moratorium on logging within the watershed and last year they were a major issue raised during community discussions on the Mt. Ashland Ski Area expansion. More recently the potential implications for increased erosion resulting from an intense fire have become the subject of attention. Given our community's long-standing and continuing interest in the integrity of the aquatic ecosystem, we were gratified to see that the Purpose and Need for this project identifies protecting "values at risk" (including the aquatic portion of the ecosystem) as a project purpose and notes that one of the primary goals of the watershed is providing water for domestic supply. To reflect this, the DEIS discussion regarding attainment of the Purpose and Need (Table II-9) and impacts on significant and other issues (Tables II-10 and II-11) should be expanded to include full consideration of the environmental impacts of the alternatives on the integrity of the watershed's aquatic ecosystem.

Risk of Fire v. Risk of Treatment Reach a Different Balance in Riparian Areas
Significant evidence exists to conclude that although fires can have substantial effects on streams and riparian systems and may threaten the persistence of some populations of fish, particularly those that are small and isolated, major new efforts to actively manage fires and fuels in forests may be a threat rather than a benefit to conservation of native fishes and their habitats. This is

particularly true when treatments are focused on addressing forest management symptoms (e.g., fuel load, etc.) rather than on restoration of natural processes (Rieman et al. 2003). Furthermore, scientific research has demonstrated that fire through unlogged watersheds can result in significantly less erosion and sediment movement than fire through a logged watershed (with the extent of this difference dependent upon the specific logging practices used). As a result, analyses in the DEIS should reflect an awareness of the risks that actions undertaken to reduce the risk of fire can present to the health and ecological resiliency of aquatic ecosystems.

Opportunities for Restoration Actions Should Be Incorporated

A number of opportunities for restoration (including watershed restoration projects, road restoration and improvements, and fisheries enhancement projects, among others) were eliminated as non-connected actions (page II-10). However, many of these restoration projects provide an opportunity to improve the ecological integrity of the watershed, thereby responding to the DEIS's purpose of increasing the overall resiliency of the project area.

Dunham et al. (2003) suggested that pre-fire restoration efforts to promote persistence of fishes in fire-prone landscapes by alleviating damage caused by past human influences are likely to be the most effective approach for obtaining conditions that are more resilient to wildland fires. Other researchers also have concluded that active management to restore diverse ecosystems that are more resilient to fire should not focus solely on efforts to modify future fire behavior, but should instead aim to maintain and restore forests and aquatic ecosystem so that they can respond to and benefit from inevitable disturbances such as fire. Logical priorities for restoring fire resiliency in the aquatic and riparian environment would be to address habitat loss, degradation and fragmentation (including restoration of fish passage), channelization, chronic sediment inputs and accelerated erosion (including management of roads), changes in hydrologic regime, and nonnative species invasions (Bisson et al. 2003; Dunham et al. 2003).

AFRCA Riparian/Aquatic Provisions as Characterized in the DEIS Need Clarification

The DEIS needs to make clear that the Community Alternative requires that site-specific delineation of riparian areas be completed prior to project implementation so that the "default" delineations specified for riparian reserves in the Northwest Forest Plan can be superceded with on-the-ground identification of riparian areas tailored to real conditions in the Watershed. The riparian delineation should follow the regional Watershed Analysis guide protocols.

Once an on-the-ground, site-specific delineation of riparian areas is complete, the Community Alternative specifies that the prescriptions for treatments (i.e., restoration) in riparian areas would be applied only where past timber harvest made restoration of riparian function necessary. That is, treatment within riparian areas generally would occur only as an action undertaken to restore riparian forest structure (e.g., to increase the amount of large wood) on those portions of the landscape impacted from past timber harvest projects.

Notwithstanding this general rule, it is important to note that the Community Alternative identified some small areas that may be within currently delineated default Riparian Reserves that provide strategically important "connections" to other treatment units. These specified areas may receive a "gradational treatment" approach from the upland treatment area to the 50" no-treatment buffers imposed around site-specifically delineated riparian areas, with the understanding that the riparian area boundaries would be delineated as described above (refer to clarification language submitted on February 4, 2005). The DEIS does not adequately reflect the CA on this point.

The effects of the community alternative on Riparian Reserves (page III-83) should be re-evaluated to reflect this more complete understanding of the alternative's provisions.

Assumptions about Fire Wicking Behavior in Riparian Areas is Unsupported

The DEIS justifies bulk crown reductions and some large tree removals in riparian areas based on a presumed "wicking effect (II-44)," yet provides no data or scientific literature to support a conclusion that this effect is likely in the project area. Effects of wicking, including the actual existence of this effect, remain unclear at this time. While riparian areas within canyons may funnel fires caused by high winds in some cases, this phenomenon is not expected project-wide. Regardless, fire wicking should not be used to justify crown closure and large tree reductions in riparian areas throughout the project area, particularly given the concerns expressed above regarding the risks of fuel reduction treatments within riparian areas.

It is worth noting that observations of the Biscuit fire indicate that there was no riparian "wicking effect" and that instead canyon ravines and the lower third of riparian areas burned under lower intensities than uplands (DellaSala and Strittholt in review), except in those portions of the landscape where extreme conditions of temperature and wind resulted in burn patterns unconnected to vegetation (i.e., all areas exhibited a stand replacing fire).

Several Clarifications of Assumptions and Models are Needed

Retention of high levels of down wood is a key design element of the Community Alternative (both to benefit soils and aquatic ecosystems). There appears to be some confusion regarding the relationship between the Down Woody Material targets in the DEIS and the current range of DWM indicated in the 2003 Upper Bear Assessment. Although the proposal calls for retention within the upper one third of the range for down logs for that PAG, the targets listed in Table II-1 do not correspond to numbers within the upper one third reported in the 2003 Upper Bear Assessment (2-25). This needs to be re-visited and clarified since it is a critical element of the project.

The DEIS does not address surface soil erosion and its controlling factors well. Contrary to conclusions on pages III-24 and 25, rates of predicted sheet erosion increase well before the effective ground cover is down to 70%. In addition, we ask that modeling information on sedimentation expected from cumulative effects in the watershed, including Mt. Ashland expansion, specifically be provided. Finally, the DEIS should specify which models will be used to evaluate impacts to hydrologic or other non-fire watershed processes relevant to assessing the extent to which the domestic water supply and old-growth forest condition purposes will be met.

Community Alternative Addresses Management Direction and Ecological Limitations

The Community Alternative has several specific strengths that will help protect the integrity of the aquatic ecosystem that are worth noting. 1) The CA addresses inherent limitations in application of soil standards and guidelines in a municipal watershed and in Restricted Riparian Areas (i.e., soil displacements less than 5 ft wide and 100 square feet are by the Standards & Guidelines definition not considered when determining combined adverse impact). The soil prescriptions specified in the CA (Appendix 1) provide site-specific mitigation measures to protect soil productivity and minimize soil erosion potential. 2) The CA responds sensitively to landslide hazard zones by minimizing treatment on landslide hazard zones 1 & 2 (III-8). 3) The CA responds with greater interest in maintaining and restoring riparian forest ecological integrity. At a minimum, we suggest that in order to protect aquatic and riparian resources, the Proposed Action provide greater large tree and canopy retentions in riparian areas and landslide areas.

Analysis Indicators

The public and the decision maker need a full discussion of the environmental consequences of the actions under consideration so as to allow for an informed choice. We believe that the public and the agency decision maker would be well served by a methodical re-evaluation of the indicators used in the DEIS to measure the anticipated ecological outcomes of the alternatives.

Analysis and Monitoring Need to Measure Ecological Effects
Many of the indicators used in the DEIS would have greater utility in project implementation monitoring (that is, contract Quality Assurance/Quality Control) than they do in either evaluating environmental consequences of the alternative actions or monitoring project effectiveness; that is, the indicators measure how much treatment is to be undertaken (e.g., acres treated) but do not evaluate the ecological effect of the proposed treatment (e.g., anticipated shift in the stand composition in terms of % shade tolerant/% shade intolerant species). The DEIS should more directly discuss the ecological implications of the acres, miles and stands, et cetera, treated. The quantity of treatment does not in and of itself explicate the environmental consequences of the action.

We recommend that measures be added so as to compare consequences during the NEPA analysis and monitor ecological effects of project implementation. Appendix 2 provides some thoughts on the ecological questions, indicators and measurement we believe might be appropriate for measuring ecological effects of this project.

Analysis Should Evaluate Effects Relative to all Objectives.
To evaluate and compare the extent to which the two action alternatives meet the Purpose and Need, indicators must be developed for all the inherent objectives, including “protecting values at risk.” It currently is impossible to compare the relative merits of the alternatives relative to this project purpose, because the analysis incompletely assesses the degree to which the objectives associated with protecting values at risk (e.g., domestic water supply and late-successional forest conditions) are likely to be met. As the DEIS is revised in coming months we recommend that Table II-9 and associated discussions evaluating and comparing the alternatives in terms of attainment of purpose and need be revised.

At a minimum, indicators should be included to evaluate the differences among the alternatives in achieving the primary goals for the Ashland Watershed (i.e., “providing water for domestic supply” and “protecting and enhancing conditions of late-successional and old-growth forest ecosystems”) as identified in the Purpose and Need (page I-5). At a minimum, we suggest that the following also must be evaluated to compare the alternatives’ impact on “values at risk”:

- The degree to which Wildland Urban Interface (WUI) private property, including lands within the City of Ashland borders, is protected. One of the main goals of the HFRA is reduction of fire risk to communities through fuels treatment in the WUI (the part of the watershed where the bulk of human activity takes place and where there is a high ignition potential). Therefore, effectiveness of the WUI treatment in protecting structures, private property, and the City's water treatment plant – that is, community fire protection – should be a significant element in the evaluation of alternatives.

- The degree to which habitat diversity and heterogeneity is maintained/restored. The end product of the restoration work in the watershed will dictate the size, intensity, and pattern of the next wildfire or even prescribed fire, which in turn creates new forest structure and habitat for plants and animals. It appears that the fuel discontinuity network of the CA limits fire effect and intensity in a way that enhances future biodiversity by juxtaposing smaller units of differing treatments based on site specific ecological parameters.

- The degree to which probability of ignition and fire suppression effectiveness are affected.

- The extent to which the alternatives meet each of the Northwest Forest Plan Riparian Management Objectives (RMOs) and Late-Successional Reserve Objectives (LSROs). Given the landscape/watershed scale of this DEIS, it is imperative that indicators be added to facilitate a comparison of the effects of the alternatives on attainment of the RMOs and LSROs specified in the Northwest Forest Plan.

Indicators used to evaluate the alternatives relative to significant and other issues should be coordinated with the monitoring questions listed in Section II.C.7 as well as with indicators used to assess attainment of Purpose and Need.

Indicators are used to compare the environmental consequences of alternatives relative to significant issues, relative to other issues, relative to attainment of Purpose and Need, and to answer monitoring questions. These measures of environmental consequences should be coordinated, particularly when the same issues are the focus of the alternative comparison and the monitoring question. In general, the kinds of indicators useful in post-project effectiveness monitoring also are the kinds of indicators useful in comparing anticipated environmental consequences during NEPA analysis.

For example, in order to make an informed decision, the public and the decision maker will need to know how the alternatives impact water quality and hydrologic function (Significant Issues 3, 4, 5 and Other Issue 1, 2, 13; Table II-10 on page II-93 and Table II-11 on page II-94 to II-95). In order to determine project effectiveness, monitoring will need to determine if water quality and hydrologic function are being maintained (Monitoring Question WQ & HF 1, Section II.C.7 on Page II-87). The same indicators can and should be used in both instances.

That is, answering the monitoring questions and comparing anticipated environmental consequences requires indicators to evaluate impacts on sediment recruitment and movement, recruitment of large woody debris, and changes in flow regime (including minimum, maximum, and peak flow), as well as indicators for answering the specified monitoring sub-questions (temperature, pebble counts, % riparian area protected during disturbance, macroinvertebrates, fish habitat and populations).

By coordinating the NEPA and monitoring indicators the public and the decision maker also will be more able to implement adaptive management principles during project implementation.

Fire and Fuels

Community Support for Fire and Fuels Work

In 2004 the City Forest Lands Restoration Project Phase II completed 183 acres of treatment on City lands low in the watershed in the interface zone. This project was unanimously approved by the Ashland Forest Lands Commission (an appointed body) and the Ashland City Council (an elected body). This demonstrates strong and growing support for management in the interface. The approval of the CA by the Forest Lands Commission and the City Council demonstrates a growing willingness to plan, implement, and evaluate active fire and fuel management tied to ecological restoration in appropriate settings in the watershed.

Prescribed Fire

The level of prescribed burning needed, as envisioned in both alternatives, clearly exceeds the current capacity of the USFS to implement. There are a wide range of impediments to completing prescribed fire. Therefore prescribed fire plans need to be completed in advance and those resources need to be allocated to facilitate burn operations whenever an appropriate ecological and operational burn window exists. In the CA, treating the WUI is priority one.

Fuel Models

The USFS indicated that they would use FLAMMAP and FARSITE but that analysis was not shared in the DEIS.

The simplified fuel model classification used in the DEIS is not adequate given the range of new fuel models currently available or that could be developed specifically for the site. At a minimum the EIS should adopt the expanded set of standard models provided by Scott and Burgan (2005), which would increase the number of models available in the watershed's forests from three timber models to nine.

Silviculture

Forest Resiliency

Agee and Skinner (2005) define a resilient forest, with respect to fire effects on forest stands, as one capable of maintaining substantial live basal area after being burned by a wildfire.

The impacts of ''no action'' in dry forest ecosystems must incorporate the probability of stand-replacing, intense fire where stand density has increased and dead fuel accumulated in excess of historical levels. The probabilities of wildfire in space and time are not well defined: wildfire *may not occur here this year or there next year, but at some scale the spatial loss per time period can be defined. It may be quite difficult to point to a particular stand and define its probability of burning in some given future period, but the probability that substantial areas of dry forest will continue to be burned by severe wildfire is known, and it is high.*

The challenges are real, and become more important each year. Dry forests continue to burn at unprecedented rates, emplacing undesirable landscape patterns for a century or more, and reducing opportunities for restoration. Restoration activities are critical. We know what to do, and know, at least at a stand scale, how to do it right. Our greatest challenge is to expand that scale with socially acceptable treatments to sustain these dry forest landscapes into succeeding centuries.

Other elements that define a resilient forest in general must also be considered (see further discussion regarding ecological integrity) when evaluating the degree to which the alternatives meet the stated project purpose of "obtaining conditions that are more resilient to wildland fire."

Hardwoods

The DEIS does not adequately address the ecological value of hardwoods in the Ashland Watershed. In Chapter 2 there is some discussion of the importance of hardwoods as an ecosystem component, but the discussion does not fully describe their contribution for forest structure (canopy layering), mast and berry production and as habitat (for example, oaks will rot from the inside out and provide habitat for cavity nesting species while the tree is still alive). The fact that hardwoods have a good chance of surviving fire events, retaining their root systems and holding the soil in place post fire is not well described. Another benefit of retaining hardwoods not mentioned in the DEIS is their cation recycling benefit for the forest community and soil productivity. Hardwood leaves decompose more rapidly and help develop soil humus more readily.

Insect Related Mortality

The Community Alternative does a better job of recognizing the uncertainties associated with insect and pathogen populations as well as addressing the positive and negative aspects of these populations. The Forest Service has collected insect mortality data for the Region for more than 25 years (http://www.fs.fed.us/r6/nr/fid/as/as-data.shtml shows information for 1980 to 2005). Additional analysis of this data specific to the Ashland Watershed would aid in determining quantitatively the current status of insect infestation and the trend(s).

Legacy Trees

The term "legacy" tree should be expanded to include hardwoods and white fir as described by cohort sizes.

Project Implementation

A range of acceptable basal areas should be a part of adaptive management for this project. Significant deviations from general prescriptions could be delineated during the implementation process with appropriate justifications for these deviations.

Using target relative density as a way to measure when management objectives are reached is a sound idea. In order to do this similar stand types must be stratified, plot data collected, and run through a computer program such as ORGANON so that relative densities by species and size class can be determined for each stand. Each stand must then be revisited and ground truthed to lay it out for whatever treatment is prescribed. For commercial thinning projects, after stand stratification, the same goal can be achieved by switching to a basal area leave tree mark using the basal area targets described in the DEIS [Chapter 2, page II-69: an overall reduction in stand basal area not to exceed 50 percent of existing basal areas or a specified basal area range (60 to 80 square feet in the White Oak PAG, 80 to 100 square feet per acre in Ponderosa Pine PAG, 100 to 120 feet in the Douglas-fir PAG and 120 to 150 square feet per acre in White Fir PAGs), whichever is greater.]. This focuses on the retention trees and the amount of basal area left can be measured easily with a prism. Collection of plot data in each unit would not be necessary.

It is important to recognize that higher order strategic and logistical realities could easily reduce the number of acres it is feasible to treat under either alternative. For example, in the Community Alternative, there are many isolated pixels that logically would not be converted into management units either because of limited access and/or cost-effectiveness concerns. A minimum acreage size for an acceptable unit for any type of activity (e.g., 2 acres for non-commercial fuel reduction; ten acres for prescribed burning, etc.) would remove these more scattered, small acreages and might be a practical approach. The City and community will want to make this type of refinement prior to the completion of the FEIS.

It is important to note that significant on-the-ground application of the alternative ultimately selected for implementation has been left to a post-FEIS/ROD implementation planning process. We have consistently voiced our belief that site-specific information is needed to appropriately implement whatever direction is approved for implementation.

Riparian Area Connections Treatment

The Community Alternative specifies that some small portions of currently delineated default Riparian Reserves have been identified for treatment because they provide connection between upland areas that are a high priority for treatment (that is, they are within 200 feet of other settings that should be treated). These areas would extend the higher priority treatments by implementing a "gradational treatment" down slope into lands included within existing Riparian Reserves to take advantage of resiliency, existing or created. However, the treatment would not extend into land within 50' of riparian areas as redelineated pursuant to the regional Watershed Analysis guide to reflect real on-the-ground conditions within the Ashland Watershed (see section 8, Aquatic/Riparian Areas). An interdisciplinary design / rationale for site-specific prescriptions must be developed for these treatments and consider maintenance of functional riparian habitat while reducing fuels.

Spatial Scheduling

The DEIS discusses temporal scheduling but not spatial scheduling. As such, the discussion understates a key component of the CA; that is treating the area closest to Ashland first. It is stated earlier in the DEIS (II-58), but not reflected adequately in the analysis of effects or the assessment of the degree to which the alternatives meet the Purpose and Need.

Treatment Staging
Some stands in the project area would need staging with a probable decrease in need with increasing elevation and/or stands of currently reduced stand densities. However, these stands that do need staging badly need it – particularly those threatened stands at very high densities that currently retain important wildfire management values in the form of significant vertical fuel discontinuities (e.g. Units B, N on the City ownership).

Botanical Resources

The analysis was thorough and appreciated. Effects analysis could be informed by the BLM analysis of prescribed burning on *Cyprepedium fasciculatum*.

Ecological Integrity

The best means for achieving the objectives outlined in the Purpose and Need is to undertake actions to restore the ecological integrity of the watershed. An ecological restoration approach helps ensure that the "values at risk" within the watershed are protected and is the best approach for obtaining "conditions that are more resilient to wildland fires" over the long-term. Such an ecological restoration approach was the philosophic underpinning that guided development of the Community Alternative.

In contrast, an approach narrowly focused only on reducing hazardous fuels and crown fire potential may result in detrimental effects to watershed values that could be avoided and/or miss opportunities to improve the watershed's fire resiliency that could be taken if a broader ecological perspective were used. Such a narrow focus increases the potential that values at risk will be harmed as a result of treatment, particularly those values associated with protecting the domestic water supply and protecting late-successional conditions. Such avoidable harm could occur either directly as a result of actions taken or indirectly due to a failure to take steps needed to prepare the watershed to respond to and benefit from the next fire.

Therefore, we strongly encourage you to incorporate proactive steps to restore the ability of the watershed to respond positively to fire. For example, by addressing habitat loss and fragmentation; resolving accelerated erosion, chronic sediment inputs and other changes in the hydrologic regime (e.g. associated with the road network, the ski area development, old skid trails, etc.); and undertaking other actions to restore ecological integrity so as to alleviate the influence of human disturbances in the watershed that are likely to interact with fire in such a way that the consequences of wildland fire are more severe than otherwise would be the case. We also encourage you to conceptualize efforts to increase the fire resiliency of the watershed as a corollary of increasing the overall ecological integrity of the project area.

Furthermore, the analysis of the effects of the alternatives should evaluate and compare not only the anticipated changes in fire behavior expected to result (i.e., the degree to which fuel loads and crown fire potential will be changed), it also should compare the effects the alternatives are likely to have on a range of measures for ecological integrity. Such an analysis is critical to determining the extent to which values at risk are protected and the degree to which terrestrial, riparian and aquatic ecosystems are capable of responding with resilience (i.e., the degree to which conditions that are more resilient to wildland fire are obtained and values at risk are protected). We strongly recommend that the analysis of effects be broadened so as to disclose more fully the environmental consequences of both the action alternatives. Such an analysis is likely to demonstrate that the CA will not only result in reducing fuel loads and crown fire potential, but also will restore a greater degree of ecological integrity than is likely from the Proposed Action. However, unless these environmental consequences are evaluated and specifically detailed in the FEIS (particularly with respect to effects on aquatic and late-successional resources), the public and the Forest Service will not have the analysis needed to determine which alternative best meets the stated Purpose and Need and the decision will not be as well informed.

Inventory and Monitoring

The Record of Decision should specify that inventory and monitoring are inherent, critical components of the project decision and that as a result, adequate funding and staffing for these project elements are as important as similar considerations associated with implementation of any other project element (i.e., the fuel reduction treatments). Without adequate pre-treatment inventory and project monitoring we have very little confidence that the project treatments can be properly implemented.

Pre-Treatment Inventory

Stand level inventory should be used to develop site-specific prescriptions during the implementation phase. Individual site differences may suggest slight prescription changes to more accurately reflect the inherent heterogeneity of site conditions within and among the treatment units/areas arrayed across the watershed."

On-the-ground assessments will be needed to tailor riparian area delineations to the conditions extant within the watershed.

Monitoring Priorities

Monitoring should be prioritized in the Ashland RNA. If the RNA plan needs to be updated to do this, it should be done as soon as possible to facilitate effectiveness monitoring efforts.

Literature Cited

James K. Agee, Carl N. Skinner, 2005. Basic principles of forest fuel reduction treatments. Forest Ecology and Management 211 (2005) 83–96

Allen, C.D., M. Savage, D.A. Falk, K.F. Suckling, T.W. Swetnam, T. Schulke, P.B. Stacey, P. Morgan, M. Hoffman, and J. Klingel. 2002. Ecological restoration of southwestern ponderosa pine ecosystems: a broad perspective Ecological Applications 12(5):1418-1433.

P.A. Bisson, B.E. Rieman, C. Luce, P.F. Hessburg, D.C. Lee, J.L. Kershner, G.H. Reeves, R.E. Gresswell. 2003. Fire and aquatic ecosystems of the western USA: current knowledge and key questions. In: M.K. Young, R.E. Gresswell and C.H. Luce, eds. The effects of wildland fire on aquatic ecosystems in the western USA. Forest Ecology and Management. Vol 178(1-2): 213-229.

Borgias, D. 2005. **John B. Leiberg's 1899 Observations on the Forests and Fire in and around the Ashland Forest Reserve and the Ashland Creek Watershed.** In USFS 2005. Ashland Forest Resiliency DEIS, Appendix.

Brown, R.T., J.K. Agee, and J.F. Franklin. 2004. Forest restoration and fire: principles in the context of place. Conservation Biology 18:903-912.

DellaSala, D.A., R.G. Anthony, T.A. Spies, and K.A. Engel. 1998. Management of balk eagle roosts in fire-adapted mixed-conifer forests. J. Wildlife Management 62(1):322-333.

J.B. Dunham, M.K. Young, R.E. Gresswell, B.E. Rieman. 2003. Effects of fire on fish populations: landscape perspectives on persistence of native fishes and nonnative fish invasions. In: M.K. Young, R.E. Gresswell and C.H. Luce, eds. The effects of wildland fire on aquatic ecosystems in the western USA. Forest Ecology and Management. Vol 178(1-2): 183-196.

Excerpt from the Final EIS on the Roadless Rule: "Forest Health and Fire Ecology," pages 3-72 to 3-78. (http://www.roadless.fs.fed.us/documents/feis/documents/vol1/chap3_health.pdf)

Forest Ecosystem Management Assessment Team. 1993. Forest ecosystem management: an ecological, economic, and social assessment. USDA Forest Service and others. Washington, D.C.

Franklin, A. B., D. R. Anderson, R. J. Gutierrez, and K. P. Burnham. 2000. Climate, habitat quality, and fitness in northern spotted owl populations in northwestern California. Ecological Monographs, 70:539-590.

Franklin, J.F. and J. Agee. 2003. Scientific issues and national forest fire policy: forging a science-based national forest fire policy. Issues in Science and Technology 20(1): 59-66.

Frost, E. and R. Sweeney. 2000. Fire Regimes, Fire History and Forest Conditions in the Klamath-Siskiyou Region: An Overview and Synthesis of Knowledge. Unpublished report available at the World Wildlife Fund.

Jiang, H., J.R. Strittholt, and N.C. Slosser. In press. The spatial distribution patterns of late-seral forests in the Pacific Northwest, USA. Landscape Ecology.

Maser, C. and J.R. Sedell. 1994. From the forest to the sea: the ecology of wood in streams, rivers, estuaries, and oceans. St. Lucie Press. Delray Beach, FL.

Maser, C., R.G. Anderson, K. Cormack Jr (and others). 1979. Dead and down woody material. In: J.W. Thomas, ed., Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington. Agric. Handbook 553. Washington, D.C., USDA.

"Modifying Wildfire Behavior - The Effectiveness of Fuel Treatments:The Status of Our Knowledge," National Community Forestry Center, April 2003. (http://www.theforesttrust.org/images/swcenter/pdf/WorkingPaper2.pdf)

Naiman, R.J., T.J. Beechie, L.E. Benda, D.R. Berg, P.A. Bisson, L.H. MacDonald, M.D. O'Connor, P.L. Olson, and E.A. Steel. 1992. Fundamental elements of ecologically healthy watersheds in the Pacific Northwest coastal ecoregion. In: R.J. Naiman, ed. Watershed management: balancing sustainability and environmental change. Springer-Verlag, New York.

Neitro, W.A., V.W. Binkley, S.P. Cline, R.W. Mannan, B.G. Marcot, D. Taylor and F.F. Wagner. 1985. Snags (wildlife trees). In: E.R. Brown, ed., Management of wildlife and fish habitats in forests of western Oregon and Washington. USDA FS PNW Region

B. Rieman, D. Lee, D. Burns, R. Gresswell, M. Young, R. Stowell, J. Rinne, P. Howell. 2003 Status of native fishes in the western United States and issues for fire and fuels management. : M.K. Young, R.E. Gresswell and C.H. Luce, eds. The effects of wildland fire on aquatic ecosystems in the western USA. Forest Ecology and Management. Vol 178(1-2):197-211.

Rose, C.L., B.G. Marcot, T.K. Mellen, J.L. Ohmann, K.L. Waddell, D.L. Lindley, and B. Schreiber. 2000. Decaying wood in Pacific Northwest forests: concepts and tools for habitat management. In: D.H. Johnson and T.A. O'Neil, eds, Wildlife habitat relationships in Oregon and Washington. Oregon State University Press, Corvallis.

Scott, Joe H.; Burgan, Robert E. 2005. Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Sensenig, T., 2002. Development, Fire History And Current And Past Growth, Of Old-Growth And Young-Growth Forest Stands In The Cascade, Siskiyou And Mid-Coast Mountains Of Southwestern Oregon, PhD. thesis, Oregon State University, Corvallis, OR, 191p.

Staus, N.L., J.R. Strittholt, D.A. DellaSala, and R. Robinson. 2002. Rate and pattern or forest disturbance in the Klamath-Siskiyou ecoregion, USA between 1972 and 1992. Landscape Ecology 17: 455-470.

Taylor, A.H. and C.N. Skinner. 1998. Fire and landscape dynamics in a late successional reserve, Klamath Mountains, California. Forest Ecology and Management 111:285-301.

DRAFT Ashland Forest Resiliency Monitoring Framework
Proposed Ecological Questions, Indicators, and Measurement

May 23, 2005

The table below suggests indicators most useful for measuring if planned treatments are effective at appropriate scales at reducing the potential for, and scale of stand replacement fire events while maintaining other ecological integrity and resource values, including water supply and water quality and late successional species habitat in forests that are influenced by fire over the long term. The effects of roads should be added. The order is a rough cut at the priority given by the Ashland Forest Resiliency Community Alternative Technical Team.

#	COST	Key Question and Sub questions	Indicators	Objective	Criteria for scoring indicators	Measurements and Protocol
		I. Is ecological integrity and resiliency maintained?				
		1. Are potential fire behavior and effect adequately reduced?				
	$/PLOT?	**What is the change in the *potential and scale for stand replacement fire* events**	FLAMMAP analysis, potentially consistent with the EIS effects analysis See below	…over 40% of the project area… See below	See below	FIREMON protocol for inputs • Species, density and size of live (and dead?) trees • Crown bulk density • Height to crown base • Canopy closure (aerial fuels) • Ladder fuels • Sub-canopy cover composition • Forest floor veg. composition • Down woody fuels (Brown) (see Bob Shoemaker, Charlie Martin)
1			**days crown fire initiated**	<10?	e.g.: Good: <10, Fair: <14, Poor>14, TBD	See above
2			**days crown fire sustained**	<3?	?	See above
		2. Are forests of the Upper Bear Watershed more resilient to fire?				
3			**Potential Live tree biomass retained post fire**, or other tree survival rating from Fire Severity outputs from FLAMMAP. Consider Forest Vegetation Simulation FVS or other stand development model. Outputs and graphic of composition and structure (stratified by Pag and treatment setting) for likely post fire outcome	Goal?	Ranking	(FLAMMAP, FVS, also see John Sessions JACO models or similar)

4			**Proportion and spatial distribution of Fire Regime Condition Class rating across (FRCC)**	See UBWA for goals		Use FIREMON data to inform FRCC protocol (Shoemaker/MJ Harvey). ARCATs should review these.
		3. How has the potential for fire management been changed?				
5			**Average flame heights (ft)**	6	<4,<9,>9	Firemon data to inform FLAMMAP
6			**Rate of Spread**	??		Firemon data to inform FLAMMAP
7			**Average first 24-hour fire size of random starts weighted to historic distribution in runs of FARSITE**	200 ac?		Use FIREMON data to inform FARSITE Shoemaker/MJ Harvey on FRCC)
8			**Number of days in a year that Rx fire units can be burned within prescription**	180?	>60, <60, <30	Shoemaker/MJ Harvey
		4. Are changes in overall forest successional state within desired range?				
8		**Are late-seral, old growth stands sustained by composition, structure and dynamics?**	**Current Acres of forest rated Late seral old growth habitat, and acres likely to be sustained after 90th percentile weather fire event** **Forest Vegetation Simulation FVS or other stand development model.** Outputs and graphic of composition and structure (stratified by PAG and treatment setting) for likely post fire outcome	?		**Stand Inventory data to augment FIREMON data above** **Overstory** • **Species Size-class distribution** • **Canopy cover** • **Age class distribution** • **Tree size/height, Radial growth** • **Snag abundance and classification** **Understory** • **Species composition (cover)** • **Coarse woody material** **Stand Data** • Patch size • Patch shape **PHOTOPOINTS (digital, web access)**

						Updated Air photos **Updated Landsat imagery classification post treatment** (Diane White and Dick Waring for reference site composition by PAG,
9		**Are old and large trees retained?**	**Desired Size class distribution by PAG/successional state**	Quantify size class distribution?	Within 99.9% of desired range?	See above
10		**Are large snag abundance and distribution within desired range?**	**FS standards in UBWA as revised by AFRCA**			See above
11		**Is the composition of the understory consistent with desired**	Similarity Index of understory relative to reference composition generated from FS ecoplot data by plant association group			See above Darren on Similarity Index.
12		**Are sensitive plant spp abundance and distribution at desired level?**	**Survey level abundance and distribution of sensitive species**			Species surveyed abundance and distribution in and around treatment area
13		**Are key invasive, non-native species minimized**	**Survey level abundance and distribution of non-native invasive species (need key spp list)**			Key species surveyed abundance and distribution in and around treatment area
		5. Do the treatments help maintain parasitic plants and pathogens at desired levels?				
14			**Dwarf Mistletoe ratings**			See Goheens, Marty
15			**Laminated root rot disease (*Phalinus aurorea)***			See Goheens, Marty
		6. Do treatments maintain the fauna in desired condition?				

16		**Are sensitive animal species maintained at desired level?**	**Survey level abundance and distribution of sensitive species** • **Northern Spotted Owl** • **Goshawk** • **Great Grey Owl** • **Fisher** • **Bats?**			Consult with Dave Clayton, Tony Kerwin
17 18 19		**How are key species' habitat structures affected?**	Abundance of Habitat Structure **Down logs** **Snags** **Cavities**			See FIREMON and STAND INVENTORY above Cavity counts in FIREMON/stand inventory plots
20		Various forest birds affected adversely?	Bird diversity/richness (foliage gleaners v. bole creepers) **Woodpeckers?**			John Alexander KBO, Tony Kerwin on key species and species groups to monitor
21		**Is the abundance of insect outbreaks affected?**	**Abundance of Arboreal phytophagus insect outbreak patches from annual flyover**			See Goheens
		7. Do the treatments maintain desired soil productivity?				
22 23 24 25 26 27		**What are the changes in the soil's ability to provide water and nutrients?**	FS Standards or revised goals for: • **Effective ground cover** • **Surface soil disturbance** • **Erosion** • **Soil compaction (density)** • **Burned conditions** • **Slope movement**	FS standards FS standards FS standards FS standards FS standards FS standards		Review/ adjust FS standard and guideline monitoring protocol for spatial scale. Densitometer or pentrometer for soil density/compaction if ground based equipment used. (Dave Steinfeld, George Badura, Richard Hart)
		8. Are the treatments supportive of the desired hydrology and water quality for Ashland Creek?				
		Do treatments support of the current production of	Ashland Creek outlet and major forks above the Hossler Dam			Confer with John Brazier, Kate, Cindy, Richard,

	water	• **Hydrograph (timing, amount of water)** • **Sediment**			
	Do treatments support desired water quality?	Ashland Creek outlet and major forks above the Hossler Dam • **Macroinvertebrates** • **Sediment** • **Pebble cementation** • **Pebble counts**			
	Do treatments support desired stream habitat and function?	Ashland Creek outlet and major forks above the Hossler Dam • ROSGEN rating for cross sections. See thalweg measure from TNC			Rosgen on midslope streams looking at effects of global climate change. Channel condition at least below ski area middle fork above the loop road.
II. Is the social capital to support ecologically compatible management increased?					
	9. Do the treatments maintain public support, access and participation at desired levels?				
	Public Support Supportive public participation in restoration and monitoring Public access to monitoring results on web site. Public use and recreation	Groups, individuals, student volunteers at meetings, field monitoring, discussions, field trips. Survey sentiment/perceptions in community of treatments, and treatment effects. Supportive comments, letters to editor Impacts of recreation, benefits to recreation			Vicky Sturdevant (SOU)
	Are key plant spp important to indigenous people maintained at desired abundance and distribution at level?	Survey level abundance and distribution of species important to indigenous people			Key species surveyed abundance and distribution

		8. Do the treatments provide the desired balance between costs and revenue?				
		Treatment cost and revenue long term				??
		Treatment cost and revenue short term				
		Small Diameter Utilization				

		OTHER LOW PRIORITY BELOW				
		(Research: Can LIDAR with LANDSAT track change in fuels at appropriate scales and reasonable cost?)				LIDAR data matrix classified with FIREMON data points
		Change in fire environment?				Surface wind speed? Fuel moisture?
		What are the effects on long-term soil carbon dynamics?				
			Overstory Similarity Index developed for idealized cohort 1, 2, and 3 type stands (AWSA 1999)			
		Is the *functional diversity of stands* increased watershed-wide as a result of treatment?	??			
			Blister rust survey			
		Do treatments in the project area increase fecundity for Northern Spotted Owl				

			Species diversity/richness • Butterflies • Pollinators • Small mammals • Soil inverts			
			Shrub species Edge v interior			
			Other Soils: Available Soil Moisture Soil humus Soil water holding capacity? Soil temperature Ground water Soil microbial biomass? Fungal biomass? Soil microbial diversity?			moisture blocks.
			• H20 Temperature			

September 4, 2001

Dear Members of the Regional Interagency Executive Committee*:

We are environmental scientists with long experience in the Pacific Northwest and expertise that includes conservation biology, disturbance ecology, geomorphology, zoology, ecosystem science, and the ecology of lichens, fungi, invertebrates, and mollusks. The purpose of this letter is to request that you exercise the adaptive management provisions of the Northwest Forest Plan to protect all remaining late successional/old-growth forests[1] (LSOG) on federal lands in the region covered by the plan. In making this request we echo a central recommendation of the National Research Council's Committee on Environmental Issues in Pacific Northwest Forest Management (NRC 2000):

> Forest Management in the Pacific Northwest should include the conservation and protection of most or all of the remaining late-successional and old-growth forests…. The remaining late-successional and old-growth forests could form the cores of regional forests managed for truly and indefinitely sustainable production of timber, fish, clean water, recreation, and numerous other amenities of forested ecosystems.

We believe the science is clear: when habitats have been sharply reduced, the probability of maintaining viable populations of organisms that depend on those habitats increases directly with the amount of remaining habitat protected. Moreover, the increasing recognition of thresholds in species viability implies the relationship is nonlinear: relatively small changes in protection can translate to large effects on viability (Kareiva and Wennergren 1995). The extent to which old-growth forests have been lost in the Pacific Northwest is well documented. The Committee on Environmental Issues in Pacific Northwest Forest Management estimates that when Euro-Americans arrived in the mid-1800s, "…as much as 80% of the forests in western Oregon and Washington were older than 80 years and about two-thirds were older than 200 years" (NRC 2000). By the 1990's, researchers estimated only 13% to 18% of forested area in western Oregon and Washington was in old-growth, a reduction of over 75% (NRC 2000). Federal lands are the last repositories of the unique ecological wealth represented by these old forests.

From the standpoint of conservation ecology there are a variety of reasons for protecting all remaining LSOG, of which five in particular stand out:

- Many species that occupy stable habitats—of which old forests are a prime example—have poor dispersal capabilities, hence risk isolation, genetic deterioration, and ultimate extinction when suitable habitat is spread too widely (Kareiva and Wennergren 1995). Studies and modeling over the last few years suggest that many LSOG associates in the PNW may be limited more by dispersal than by the abundance of habitat per se, including

[1] The structural and habitat attributes that define these mature and old-growth forests may be present at various ages depending on locale and stand history, and their development is a continuous process. However, for purposes of policy, in most cases these attributes will have manifested by 80 years for mature forests and 150-180 years for old-growth.

species of lichens, bryophytes, mollusks, fungi, and invertebrates (Boughton 2001, Sillett et al. 2000). This implies that every remaining piece of suitable habitat becomes an important focus for eventual colonization of the surrounding landscape. Potential problems with dispersal are exacerbated in the Pacific Northwest because young forests presently dominating the matrix do not have the structural complexity and legacies characteristic of naturally disturbed forests (e.g. Tappeiner et al. 1997), resulting in a much starker contrast between old and young forests than occurred historically. Of particular concern are low levels of coarse woody debris (important for some fungi, including many truffle-formers), hardwoods (important for some lichens and many species of Lepidoptera), and dense young conifers (detrimental to lichens). Harvesting practices that maintain biological legacies show promise as lifeboats for at least some of the species of concern, but not enough is known about that potential to accept "new forestry" as a substitute for protection.

- Species, species assemblages, and the genetic structure of populations may vary at relatively fine scales for small organisms (which account for by far the largest share of diversity), raising the possibility that each remaining older forest is to some degree unique in its biological structure. For instance, many mollusk species are restricted to one region, or even one river drainage (Frest and Johannes 1993). Recent research shows that, when compared within a locale that is reasonably uniform environmentally, old-growth virtually always differs from younger forests with respect to the soil and litter arthropod community. However, different locales within a given province (i.e., within the Cascades, Coast Range, or SW Oregon) are generally distinct from one another, and the different provinces are strikingly so (Madson 1997).
- Once thought to have relatively poor habitat value, small fragments of older forest are now known to be significant biological reservoirs. Amaranthus et al. (1994) found that 3.5-ha fragments of mature forest harbored 13 species of truffle-forming mycorrhizal fungi not found in surrounding plantations. Studying forest-floor arthropods, Work (2000) found an edge effect extending 100 m into older forest, after which a distinctive old forest community occurred. It follows that fragments larger than 3-4 ha have conservation value for arthropods as well as fungi.
- Regarding stream protection, old-growth differs from younger forests in two respects: they reduce the likelihood of debris flows and, if flows do occur, those from older forests are more likely to be beneficial to streams because of inclusion of large wood and limited runout lengths.
- Natural disturbances are likely to destroy some of the remaining old-growth and mature habitat before younger forests have aged sufficiently to provide suitable replacement habitat, a risk significantly increased by the combined effects of changing climate (which could result in more wildfires), and the increased vulnerability of older forests when embedded within a matrix of fire-prone young forests. The more saved now, the greater the buffering against such losses.

It is impossible to state precisely what is at stake biologically and ecologically, because as Jack Thomas succinctly pointed out, these forests are not only more complex than we think, they are more complex than we can think. But there is little question that "(m)uch of the biological diversity of the Pacific Northwest is associated with late-successional and old-growth forests" (NRC 2000). Although scientists have been aware of the unique biological richness associated with older forests for at least 40 years, the vast majority of species are small, cryptic, and difficult to study; therefore much remains to be learned about habitat requirements, genetic diversity, dispersal capabilities, and many other factors that underpin species viability. There are significant unanswered questions about the degree to which a reserve system designed spatially to accommodate vertebrate dispersal meets the needs of small organisms. We know at least some of the organisms in question, such as nitrogen fixing lichens and truffle forming fungi, perform vital functions within ecosystems. The experience with Pacific yew has taught us that some may have as yet undiscovered properties that directly and significantly benefit humans.

We view this action as falling naturally within the adaptive management provisions of the Northwest Forest Plan. For many biologists, saving all remaining old-growth and mature forests was always the best option from a conservation standpoint (e.g. USDA et al. 1993, Fig. II-7). However, the scientists who developed the Plan had a clear mandate to balance conservation with economic and social concerns, and in our opinion did a remarkable job of accomplishing that. Several things have changed, however, which taken together argue strongly that this is the appropriate time to extend protection to all remaining older forests. As we pointed out above, more is known about the habitat preferences and dispersal capabilities of lichens, fungi, and mollusks, resulting in greater certainty that some are intimately tied to older forest habitats and likely to disperse poorly through the matrix. Moreover, in the past 10 years human-induced climate change has gone from a contentious hypothesis to near scientific certainty, with unknown but in all likelihood stressful future impacts on ecosystems. Humans have set forces in motion that are beyond our control, and the chances are high that some of the older forest now set aside will be lost. Protecting all that remains buys some insurance.

Finally, the social and economic scene has changed significantly since the Plan was formulated. Recent polls show a substantial majority of both urban and rural residents in the Pacific Northwest support protection of remaining old-growth. Economically, the Pacific Northwest has broadened its economic base and wood products have diminished in importance. By 1996, wood products industries accounted for only 1.9% of all jobs in Oregon and Washington. New job creation in the region has far outpaced job losses in the timber industry, and all but two of the 38 counties in the spotted owl region of Oregon and Washington had higher total employment in 1996 than in 1990 (Niemi et al. 1999). As Niemi et al. state, “the sky did not fall.” By necessity, the timber industry has become less dependent on federal logs. In 1998, the latest data we were able to access, only 1 of 71 sawmills in western Oregon depended on federal timber for more than 2/3 of their supply, 3 depended on federal timber for 1/3 to 2/3 of their supply, and 40 processed no federal timber (ODF 2000). As of 1996 in western Washington, 75% of sawmills processed no federal timber, and only one mill depends on federal timber for more than 1/3 of its supply (WDNR 1996).

Despite the drop in overall dependence on federal timber, a number of mills still depend on federal timber for 1/3 or less of their supply (42 in western Oregon and Washington in 1998). We suggest at least part of any shortfall resulting from LSOG protection could be made up by thinning younger stands, including those in LSR’s. Done correctly, thinning younger stands can produce logs while at the same time enhancing ecological and conservation values by reducing susceptibility to fire and other disturbances, improving habitat for lichens, and structurally diversifying stands. In dry forest types we understand some judicious underthinning of older forests, removing only trees that have established since fire exclusion, may be warranted to reduce fire hazard. For any thinning in LSR’s, or to reduce fire hazard in dry forests, we encourage you to consult with silvicultural and biological scientists familiar with the issues when formulating general guidelines.

In summary, we believe the science is clear: saving all remaining LSOG significantly enhances the probability of LSOG-dependent species persisting through this period of extreme habitat bottleneck. Moreover, the social and economic scene in the Pacific Northwest has changed sufficiently during the 1990's to make this an acceptable and, judging from polls, even popular decision. We hope you will give it serious consideration.

Sincerely,

David A. Perry
Professor (emeritus)
Ecosystem Studies and Management
Oregon State University

Reed F. Noss
Past-President
Society for Conservation Biology

Timothy D. Schowalter
Professor
Entomology
Oregon State University

Terrence J. Frest
Malcologist
Senior partner
Deixis Consultants
Bruce McCune
Professor

Lichenologist and Plant Ecology
Oregon State University

David R. Montgomery
Associate Professor
Geology
University of Washington

James R. Karr
Professor
Aquatic Sciences and Zoology
University of Washington

<u>Literature Cited</u>:

Amaranthus, M.P., J.M. Trappe, L. Bednar, and D. Arthur. 1994. Hypogeous fungal production in mature Douglas-fir forest fragments and surrounding plantations and its relation to coarse woody debris and animal mycophagy. Canadian Journal of Forest Resources. 24(11): 2157-2165.

<u>Boughton, D.A., cf. Duncan, S. 2001. Paradoxes in science: A new view of rarity. Science Findings of Pacific Northwest Research Station 35 (July 2001).</u>

Frest, T.J, and E.J. Johannes. 1993. Mollusc species of special concern within the range of the northern spotted owl. Final Report. Prepared for the Forest Ecosystem Management Assessment Team. USDA Forest Service. Portland, Oregon.

Kareiva, P., and U. Wennergren. 1995. Connecting landscape patterns to ecosystem and population processes. Nature. 373: 299-302.

Madson, S.L. 1997. Correlation between structural heterogeneity and arthropod biodiversity: Implications for management of Pacific Northwest forests. M.S. Thesis. Oregon State University. Corvallis, Oregon.

National Research Council. 2000. Environmental Issues in Pacific Northwest Forest Management. National Academy Press. Washington, D.C.

Niemi, E., E. Whitelaw, and A. Johnston. 1999. The sky did Not fall: The Pacific Northwest's response to logging reductions. ECONorthwest. Eugene, Oregon.

Oregon Department of Forestry. 2000. A study of Oregon's forest products industry, 1998. Oregon Department of Forestry. Salem, Oregon.

Sillett, S.C., B. McCune, J.E. Peck, T.R. Rambo, and A. Ruchty. 2000. Dispersal limitations of epiphytic lichens result in species dependence on old-growth forests. Ecological Applications. 10: 789-799.

Tappeiner, J.C., D. Huffman, D. Marshall, T.A. Spies, J.D. Bailey. 1997. Density, ages, and growth rates in old-growth and young-growth forests in coastal Oregon. Canadian Journal of Forest Resources. 27: 638-648.

USDA, USDC, USDI, and EPA. 1993. Forest Ecosystem Management: An ecological, economic, and social assessment. USDA Forest Service. Washington, DC.

Washington Department of Natural Resources. 1996. Washington Mill Surveys – 1996. Washington Department of Natural Resources. Olympia, Washington.

Work, T.T. 2000. Edge effects of clear cut harvesting on ground arthropod species composition and predator community structure in old-growth Douglas-fir forests. Ph.D. Dissertation. Oregon State University. Corvallis, Oregon.