RECORD OF DECISION

for

SCHOOL FIRE SALVAGE RECOVERY PROJECT

[Forest Plan Amendment to modify Eastside Screens' wildlife standard at 6d. (2) (a)]

and

FINDING OF NON-SIGNIFICANT AMENDMENT

USDA Forest Service
Umatilla National Forest

Pomeroy Ranger District
Columbia and Garfield Counties, Washington

Sections 13, 24 and 25 T. 9N., R. 40E.; Sections 1-4, and 8-36 T. 9N., R. 41E.; and
Sections 1-12, 14-23, and 29-32 T. 9N., R. 42 E., Willamette Meridian.

Background

The following narrative describes a series of events that have led up to this record of decision for the School Fire Salvage Recovery Project. A clear understanding of this history will help place this decision into context with documents and events that preceded this decision.

The final environmental impact statement (FEIS) for School Fire Salvage Recovery Project was issued July 2006 and a record of decision (ROD) signed August 14, 2006, which authorized about 9,430 acres of salvage harvest. Also in August, three timber sales (Milly, Oli and Sun) were awarded covering about 3,670 acres with an estimated volume of 28 million board feet (MMBF).

On August 15, 2006, the Lands Council, Oregon Natural Resources Council, Hells Canyon Preservation Council, and Sierra Club (plaintiffs) filed suit against Forest Supervisor Kevin Martin and the Forest Service in The Lands Council et al. v. Martin et al., Civ. No. 06-229, District Court of the Eastern District of Washington (District Court), challenging School Fire Salvage Recovery Project. Plaintiffs alleged the Forest Service failed to adequately analyze impacts to certain undeveloped areas, failed to consider a reasonable range of alternatives, failed to comply with the Eastside Screens to protect old-growth trees, failed to adequately consider the scientific controversy regarding "Factors Affecting Survival of Fire-Injured Trees" (Scott et al. 2002, 2006), and failed to adequately analyze cumulative environmental impacts. Timber sale purchasers, Boise Building Solutions Manufacturing, LLC and Dodge Logging, Inc., along with American Forest Resource Council joined the lawsuit as Defendant-Interveners.

On September 11, 2006, the District Court denied plaintiffs' request for a temporary restraining order and preliminary injunction, finding that the Forest Service had not failed in its duty to take the requisite "hard look" at the environmental consequences. Thereafter, the three awarded salvage timber sales began operations. On September 15, the District Court denied plaintiffs' request for stay and on September 18, the 9th Circuit Court of Appeals (Appeals Court) denied plaintiffs' request for an injunction pending appeal.

On February 5, 2007, the Appeals Court heard oral argument on the District Court's denial of the preliminary injunction. The Appeals Court issued an opinion on February 12, 2007, that the Forest Service had adequately disclosed the impacts to the unroaded areas, but that the Forest Service violated the Forest Plan (Eastside Screens) prohibition of cutting "live trees" $\geq$ 21 inches diameter at breast height (dbh) when it designated dying trees for harvest. The intent of the Eastside Screens interim management direction was to restrict timber harvest in those areas that scientific analysis indicated were important to certain fish, wildlife, and ecosystem structure.

The Appeals Court reasoned that in the absence of an adopted technical definition of "live trees," the common understanding of the word "live" from the Merriam Webster's Collegiate Dictionary (10^{th} ed. 1993) meant "to be alive," which meant "not dead," and concluded "the common meaning of the term 'all live trees' is all trees that have not yet died." Opinion at 12. Thus, according to the Appeals Court, dying trees designated for harvest were not yet dead, and remained "live" for the purposes of the Eastside Screens. The Appeals Court further opined that "[t]he Forest Service is free, of course, to amend the Eastside Screens to allow logging of old-growth dying trees, either by adding a definition of the term "live trees" or by changing the requirement to maintain all live trees of a certain size." Opinion at 14.

The Appeals Court remanded the case to the District Court to issue an injunction consistent with its findings. The District Court issued an injunction on February 14, 2007, requiring that "The Forest Service shall not harvest from the three timber sales areas any "live tree" $\geq$ 21 inches dbh." This includes any tree of requisite size with green needles or that is not yet dead." District Court Order at 2. The Appeals Court definition of a "live tree" does not reflect Forest Service silvicultural practice and interpretation, and it deters the Forest Service from achieving the purpose and need of the School Fire Salvage Recovery Project.

After careful consideration and weighing all the options available, I decided to amend the Umatilla National Forest's Land and Resource Management Plan (Forest Plan) and prepare a draft supplemental environmental impact statement (DSEIS). The DSEIS was listed in the Federal Register on March 9, 2007 (Vol. 72 No.46 Page 10749) for a 45-day comment period. The supplemental statement provided documentation of a Forest Plan amendment to modify Eastside Screens' wildlife standards at 6d. (2) (a) to define both live and dead trees in support of the School Fire Salvage Recovery Project FEIS and ROD (signed August 14, 2006).

The final supplemental EIS (FSEIS) and this record of decision (ROD) tier to and reference the 2006 FEIS and ROD. The two environmental impact statement documents therefore, must be thought of and used together as if they are one statement. This ROD supports and compliments the ROD signed August 14, 2006.

The decision to be made with this ROD is whether or not the Forest Supervisor should amend the Forest Plan and modify the Eastside Screens' wildlife standard at 6d. (2) (a) to define both live and dead trees only for the site-specific project called School Fire Salvage Recovery Project. This ROD documents that choice.

Paper copies of School Fire Salvage Recovery Project 2006 FEIS and ROD, and 2007 FSEIS, and ROD are available upon request by contacting Terri Jeffreys at Pomeroy Ranger District. These documents may be viewed or downloaded from the following Internet site:

http://www.fs.fed.us/r6/uma/projects/readroom/

Decision

After careful review and consideration of public comments and analyses disclosed in the School Fire Salvage Recovery Project FEIS, FSEIS, and project file I have decided to select Alternative B as described in the FSEIS, Chapter 2, pp. 2-1 to 2-2. My decision amends the Umatilla National Forest's Land and Resource Management Plan Eastside Screens' wildlife standard at 6d. (2) (a) to read as follows:

> *Maintain all remnant late and old seral and/or structural live trees ³ 21² dbh that currently exist within stands proposed for harvest activities. Live trees are defined as trees rated to have a high probability of surviving the effects of fire, and trees rated to have a moderate probability of survival where sampling indicates that at least 50 percent of their basal cambium is alive. Dead trees are defined as trees rated to have a low probability of surviving the effects of fire, and trees rated to have a moderate probability of survival where sampling indicates that more than 50 percent of their basal cambium is dead. Survival probability is determined using "Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains" (Scott et al. 2002, as amended) (commonly referred to as the Scott Guidelines).*

This amendment applies to, and only for the duration of, the site-specific project called School Fire Salvage Recovery Project. Other than amend the Forest Plan, this decision supports the decision made in, but does not change any other aspect of, School Fire Salvage Recovery Project ROD, signed August 14, 2006.

Reasons for the Decision

I carefully considered the issues and concerns raised by those who participated and commented in this analysis to help make my decision. I considered eleven alternatives, two were analyzed in detail and nine were considered but eliminated from detailed study for the reasons stated in the FSEIS, Chapter 2, pp. 2-2 to 2-5. The following narrative presents why I did not select Alternative A (no action). I also discuss how my decision responds to the purpose and need and how I considered the issues most relevant to me in making my decision.

Reasons for Not Selecting No Action

I considered, but did not select Alternative A (no action) because with no amendment to the Eastside Screens' wildlife standard there would be no additional salvage harvest of dying trees $\geq$21 inches dbh. Large diameter dead and dying trees have greater economic value as compared to smaller diameter dead and dying trees. Potential economic benefits of salvaging dead and dying trees would be reduced by excluding larger diameters from the sale package. Thus, this alternative does not address the purpose and need to salvage harvest as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits.

The Appeals Court's definition of a "live tree," which does not reflect Forest Service silvicultural practice and interpretation, frustrates the ability of the Forest Service to achieve the purpose and need of the School Fire Salvage Recovery Project as stated above. No action would have excluded further harvest of any "live trees" $\geq$ 21 inches dbh, including any tree of requisite size with green needles or that is not yet dead.

Purpose and Need

In detailing the purpose and need, I chose to keep the scope and context as narrow and focused as possible to address only those findings in the Appeals Court's opinion they believed were not appropriately addressed. Their remanded direction to the District Court was very specific and only addressed a conflict in our interpretation and definition of a "live tree." I believe my decision affirmatively addresses and fulfills the purpose and need for action and this decision and amendment will satisfy the Appeals Court's findings and allow the remainder of the School Fire Salvage Recovery Project to continue.

Issues

Both individuals and groups raised issues and concerns during the development of this project and I considered them to help me make my decision. More detailed information about issues considered can be found in Chapter 2, pp. 2-4 to 2-9 and Chapter 3 of the FEIS and Chapters 1, 2, and 3 of the FSEIS. The decision rationale for issues (pp.6-9) described in the August 14, 2006 ROD apply to, and are unchanged by this decision to amend the forest plan.

Harvest of Dying Trees

I recognize there remains a high degree of controversy about the harvest of fire damaged trees. Several respondents commented that our basis for differentiating between dying and living trees is either questionable or untenable for scientific and other reasons. Often these comments specifically addressed use of the Scott Guidelines (Scott et al. 2002, 2003) and assert there are more appropriate methods that would better predict tree mortality for the School Fire Salvage Recovery Project.

Controversy about this topic has been evident to me even before I decided to proceed with this project following the School Fire in the fall of 2005. The FEIS and my August 14, 2006 decision considered and acknowledged this important issue. Indeed the need for the FSEIS and this ROD arose from this very controversy.

I believe I have considered the most recent science regarding what constitutes a living tree and dead tree in a post-fire context and how that determination is made. In an attempt to further explore the issue, I re-visited an in-depth comparison of the most recent scientific methods for assessing tree mortality from Appendix K of the School FEIS. Since that time, the Scott Guidelines have been amended to reflect new science and monitoring data. With so much at stake, I felt this comparison was important enough to disclose in the body of the FSEIS and not hide it in an appendix. Therefore, pages 3-5 through 3-25 are specifically designed to highlight the comprehensive comparison of each of the different tree mortality assessment methods and conclusively demonstrate that the Scott Guidelines are most appropriate for School Fire Salvage Recovery Project. With this comparison, I conclude the Scott Guidelines are the best available scientific process and procedure for our local geographic area, timber types, fire types, and associated insects and diseases to determine whether a fire damaged tree is living, expected to live, dead, or expected to die. In addition, I believe the Scott Guidelines to be the best comprehensive assessment of potential tree mortality relative to other associated prediction methods because it considers the effect of fire injuries on the whole tree rather than just one or more of its parts.

The amended wording to the Eastside Screens' wildlife standard at 6d. (2) (a) provides a clear definition of live trees and dead trees. Lastly, I believe my decision is fully consistent with and affirmatively responds to the Appeals Court's recommended remedy of adding a definition of "live trees" to the Eastside Screens (Forest Plan).

Public Involvement

The Forest Service sought information, comments, and assistance from federal, state, local tribes, local agencies, elected officials and from other groups and individuals interested in or affected by the proposed action. The Forest's *Schedule of Proposed Activities* (SOPA) was updated quarterly to inform the public of changes in project status beginning with the fall 2005 SOPA edition. A detailed list of contacts, contact dates, and actions taken to involve and make information known to interested parties is disclosed in the FEIS, Chapter 2, pp. 2-1 to 2-4. Meeting notes are in the project file.

Date	Action
October 25, 2005	Notice of Intent (NOI) in the Federal Register for School Fire Salvage Recovery Project
October 27, 2005	Project description and proposed action letters mailed to 230 interested parties
April 20, 2006	Letters regarding the availability of the Draft EIS and 45-day comment period mailed to 297 interested parties.
April 28, 2006	EPA's Notice of Availability (NOA) of the Draft EIS in the Federal Register
April 29, 2006	Legal Notice in the *East Oregonian* (newspaper of record) on the availability of Draft EIS and request for comments
June 12, 2006	Comment period on Draft EIS ends (22 responses received)
July 10, 2006	Letters regarding the availability of the Final EIS mailed to 297 interested parties
July 14, 2006	EPA's Notice of Availability (NOA) of Final EIS in Federal Register
August 14, 2006	Record of Decision (ROD) signed and letters mailed to 297 interested parties announcing ROD was signed and included information on appeal procedures.
August 15, 2006	Legal Notice in the *East Oregonian* that a ROD was signed along with information on appeal procedures.
September 29, 2006	Appeal Period ends (2 appeals received)
November 8, 2006	Letters (2) from the Appeal Deciding Officer to affirm the Forest Supervisor's decision and to deny requested relief to appellants.
February 26, 2007	Notice of Intent (NOI) in Federal Register to prepare a Supplemental EIS to School Fire Salvage Recovery Project to amend the Forest Plan
February 28, 2007	Letters mailed to 297 interested parties regarding the availability of a Draft Supplemental EIS and a request for comments.
March 7, 2007	Legal Notice in the *East Oregonian* on the availability of the DSEIS and request for comments
March 9, 2007	EPA's Notice of Availability (NOA) and request for comments on the DSEIS
April 23, 2007	Comment period on DSEIS ends (12 responses received)
May 2, 2007	Letters mailed to 297 interested parties announcing availability of Final Supplemental EIS (FSEIS)
May 11, 2007	EPA's Notice of Availability (NOA) of FSEIS

Alternatives Considered

The 2006 FEIS considered in detail three alternatives, including no action. Twelve other alternatives were considered but not analyzed in detail. All alternatives are described in detail in Chapter 2 of the 2006 FEIS and are summarized in the ROD (August 14, 2006).

The FSEIS considered in detail, no action and a Forest Plan amendment to modify the Eastside Screens' wildlife standard at 6d. (2) (a) to define both live and dead trees. This amendment will apply to, and only for the duration of, the site-specific project called School Fire Salvage Recovery Project. Nine alternatives were considered but not analyzed in detail (FSEIS, Chapter 2).

Findings Required by Other Laws

National Forest Management Act

The ROD (August 14, 2006) for School Fire Salvage Recovery Project documented consistency with the National Forest Management Act (page 12). This decision to amend the Forest Plan for School Fire Salvage Recovery Project does not change the 2006 findings. This decision is also consistent with the National Forest Management Act (NFMA). A detailed discussion of NFMA compliance is included in Chapter 3 of the FEIS as supplemented.

The 2006 FEIS and ROD for School Fire Salvage Recovery Project documented consistency with the Umatilla National Forest Land and Resource Management Plan Final Environmental Impact Statement, Record of Decision, the accompanying Land and Resource Management Plan, as amended, (USDA Forest Service 1990), dated June 11, 1990 (FEIS Chapter 3, pp. 3-21, 3-45, 3-46, 3-47, 3-100, 3-101, 3-102, 3-121, 3-150, 3-165, 3-171, 3-221, 3-222, 3-230, 3-244, 3-249, 3-253, 2-269, and 3-272 and ROD, p. 12). This decision to amend the Forest Plan for School Fire Salvage Recovery Project does not change the 2006 findings.

Finding of Non-Significant Amendment

Consistent with 36 CFR 219.14, as amended by the September 29, 2004 Interpretive Rule, this amendment uses the provisions of the planning regulation in effect before November 9, 2000. The Forest Service Land and Resource Management Planning Handbook (Forest Service Handbook 1909.12) lists factors to be used when determining whether a proposed change to a Forest Plan is significant or not significant: timing; location and size; goals, objectives and outputs; and management prescriptions.

Timing: The timing factor examines at what point over the course of the Forest Plan period the plan is amended. Both the age of the underlying document and the duration of the amendment are relevant considerations. The handbook indicates that the later in the time period, the less significant the change is likely to be. As noted in the FSEIS (Chapter 1 p. 1-3, and Chapter 2 p. 2-1) and this ROD (page 3) the amendment is limited in time in that the amendment would only apply to, and for the duration of, the School Fire Salvage Recovery Project. The Forest Plan was signed in 1990 and this amendment occurs in year 17 in the life of the plan. The Forest Plan is in the process of being revised.

Location and Size: The key to location and size is context, or the relationship of the affected area to the overall planning area. The smaller the area affected, the less likely the change is to be a significant change in the Forest Plan. The planning area for the Umatilla National Forest is about 1.4 million acres (Forest Plan, p. 1-4). The amendment will affect less than half of one percent of the Forest planning area.

Goals, Objectives, and Outputs: The goals, objectives, and outputs factor involves the determination of whether the change alters the long-term relationship between the level of goods and services in the overall planning area. This criterion is always analyzed when considering effects on the overall Forest Plan and other various multiple-use resources that may be affected. In this criterion, time remaining in the 15-year planning period to move toward multiple-use goals and achieve objectives and outputs are relevant considerations.

The amendment adds narrative wording to the Eastside Screens' wildlife standard at 6d. (2) (a) to define a "live tree" and applies to, and only for the duration of, the School Fire Salvage Recovery Project.

The amendment does not delete wording from the Forest Plan. The amendment does not change standards and guidelines for other resources in the Forest Plan. The amendment does not change the goals and objectives for other resources in the Forest Plan.

The amendment is not expected to preclude or require other actions across the forest and incorporation of this management direction will not change the amount of timber made available for public use outside this project area; will not require changes in grazing permits; plans of operation for mining; or the access and travel management plan (FSEIS, Chapter 3). Therefore, anticipated changes brought about by this amendment in the levels of resource activities and outputs (Forest Plan, page 4-16) projected for this planning period are expected to be non-significant and immeasurable.

Management Prescriptions: The management prescriptions factor involves the determination of (1) whether the change in a management prescription is only for a specific situation or whether it would apply to future decisions throughout the planning area; and (2) whether or not the change alters the desired future condition of the land and resources or the anticipated goods and services to be produced. In this criterion, time remaining in the 15-year planning period and changes in desired future conditions or the anticipated goods and services to be produced are relevant considerations.

This amendment is specific to, and only for the duration of, School Fire Salvage Recovery Project and will not apply to future decisions throughout the planning area (FSEIS, Chapters 1, and 2, and this ROD page 3). The desired future condition and land allocations are not changed by this decision (FSEIS Chapters 1, and 2, and this ROD page 3). As discussed above in "goals, objectives, and outputs," the long-term levels of goods and services projected in the current plan for the 15-year planning period are non-significantly changed by modifying the Eastside Screens' wildlife standard at 6d. (2) (a).

Finding: On the basis of information and analysis contained in the FSEIS, and all other information available as summarized above, it is my determination that adoption of the management direction reflected in my decision will result in a non-significant amendment to the Forest Plan.

Environmentally Preferred Alternative

This decision to amend the Forest Plan for the School Fire Salvage Recovery Project does not change the 2006 identification of the environmentally preferable alternative (2006 ROD, p. 16).

Emergency Situation Determination

On June 11, 2007 Chief Gail Kimbell found that an emergency situation existed. An emergency situation is defined in 36 CFR 215.2 as "A situation on National Forest System (NFS) lands for which immediate implementation of all or part of a decision is necessary for relief from hazards threatening human health and safety or natural resources on NFS or adjacent lands; or that would result in substantial loss of economic value to the federal government if implementation of the decision were delayed." The determination that an emergency situation exists does not exempt an activity from appeal. The determination only eliminates the automatic stays built into the appeal review process. Pursuant to 36 CFR 215.10 (b), Chief Kimbell granted an emergency exemption from stay for the remaining portions of Oli and Sun Salvage Timber Sales as well as Chicken Bone and Ricochet Salvage Timber Sales. The Milly Sale is basically complete and is not in consideration for this request. Chief Kimbell has determined that failure to act quickly will result in substantial economic loss to the Federal Government.

Implementation Date

Implementation of School Fire Salvage Recovery Project determined to be an emergency may proceed immediately (36 CFR 215.10).

Appeal Process and Rights

This decision is subject to appeal pursuant to Forest Service regulations at 36 CFR Part 215. Only individuals or organizations who submitted comments or expressed an interest in the project during the comment period may appeal. Any appeal of this decision must be in writing and fully consistent with the content requirements described in 36 CFR 215.14. A written appeal must be postmarked or received by the Appeal Deciding Officer (the Regional Forester) within 45 days of the date of publication of the legal notice regarding this decision in the *East Oregonian* newspaper.

Send appeals to:

Linda Goodman, Regional Forester
USDA Forest Service
ATTN: Appeals Office
PO Box 3623
Portland, Oregon 97208-3623

Street location for hand delivery is 333 SW First Ave., Portland, OR (office hours: 8-4:30 M-F). Send faxes to (503) 808-2255. Appeals may be e-mailed to:

appeals-pacificnorthwest-regional-office@fs.fed.us.

Electronic appeals must be submitted as part of the actual e-mail message, or as an attachment in Microsoft Word, rich text format or portable document format only. E-mails submitted to e-mail addresses other than the one listed above or in other formats that those listed or containing viruses will be rejected. Any written appeal, including attachments must be postmarked or received (via regular mail, fax, e-mail, hand-delivery, express delivery, or messenger service) within 45 days of the date of publication of this legal notice. The publication date of the legal notice in the East Oregonian newspaper is the exclusive means for calculating the time to file an appeal (§215.5 (a)). Those wishing to appeal should not rely upon dates or timeframe information provided by any other source.

For further information regarding these appeal procedures contact Glen Westlund, Acting Forest Environmental Coordinator, at (541) 278-3869.

Contact Person

For further information about this project, contact Dean R. Millett, Project Team Leader, Pomeroy Ranger District, 71 West Main St., Pomeroy, WA 99347, phone (509) 843-1891.

Kevin Martin

KEVIN D. MARTIN
Forest Supervisor
Umatilla National Forest

6-11-07
Date

Publication Number F-14-POM-02-07

School Fire Salvage Recovery Project

Final Supplemental Environmental Impact Statement

Pomeroy Ranger District, Umatilla National Forest
Columbia and Garfield Counties, Washington

United States Department of Agriculture

Forest Service

May 2007

Publication Number F14-POM-02-07

School Fire Salvage Recovery Project
Final Supplemental Environmental Impact Statement
Columbia and Garfield Counties, Washington

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Abstract: The USDA Forest Service is proposing to amend the Umatilla National Forest Land and Resource Management Plan (Forest Plan) to address a recent opinion of the 9th Circuit Court of Appeals (Appeals Court) concerning the School Fire Salvage Recovery Project (the Project).

On February 12, 2007 the Court issued an opinion that the Project was inconsistent with the Forest Plan (Eastside Screens) by inappropriately implementing the "prohibition on logging of any “live tree" $\geq$ 21 inches diameter at breast height (dbh) that currently exists in the sales areas – i.e., any tree of the requisite size that is not yet dead." The Appeals Court went on to conclude that the agency could not harvest “dying” trees because they were not dead. The Appeals Court recognized that the Forest Service could correct this situation by amending the Forest Plan to include a definition of the term “live tree.” On February 15, 2007 the Eastern District Court of Washington (District Court) issued an injunction requiring that “the Forest Service shall not harvest from the three timber sales areas any “live tree" $\geq$ 21 inches dbh. This includes any tree of requisite size with green needles or that is not yet dead." The proposed action addressed in this Final Supplemental Environmental Impact Statement (FSEIS) clarifies the agency's definitions of live and dead trees.

Two alternatives, including the No Action alternative, are analyzed in the FSEIS. Alternative A is the No Action alternative. It would be implemented as enjoined by the Appeals Court, and would exclude further harvest of any "live trees" $\geq$ 21 inches dbh, including any tree of requisite size with green needles or that is not yet dead. Alternative B, the proposed action and preferred alternative, would amend the Forest Plan to modify the Eastside Screens to include definitions of live and dead trees. The amendment applies to, and only for the duration of, the Project.

Emergency Situation Determination:
The Forest Supervisor will seek a determination from the Chief of the Forest Service that an emergency situation exists in the Project area pursuant to 36 CFR 215.10 (b). This emergency situation exists because substantial loss of economic value to the Federal Government would occur if implementation of the decision were delayed. The final determination by the Chief will be published in the legal notice of the decision, 36 CFR 215.10 (d), that the Forest Service made a determination that all or part of a project decision is an emergency situation.

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SUMMARY

INTRODUCTION

The Forest Service has prepared this Final Supplemental Environmental Impact Statement (FSEIS) in response to a recent opinion of the 9th Circuit Court of Appeals (Appeals Court) concerning the School Fire Salvage Recovery Project (the Project). The Final Environmental Impact Statement (FEIS) for the Project was issued July 2006 and a Record of Decision (ROD) signed August 14, 2006, which authorized about 9,430 acres of salvage harvest. Also in August 2006, three timber sales (Milly, Oli, and Sun) were awarded covering about 4,200 acres with an estimated volume of 28 million board feet (MMBF).

On February 12, 2007 the Appeals Court issued an opinion that the Project was inconsistent with the Forest Plan (Eastside Screens) by inappropriately implementing the prohibition on logging of any "live tree" $\geq$ 21 inches dbh that currently exists in the sales areas – i.e., any tree of requisite size that is not yet dead. The Appeals Court reasoned that in the absence of an adopted technical definition of "live trees," the common understanding of the word "live" from the Merriam Webster's Collegiate Dictionary (10th ed. 1993) meant "to be alive" which meant "not dead." The Appeals Court went on to conclude that the agency could not harvest "dying" trees because they were not dead. The Appeals Court recognized that the Forest Service could correct this situation by amending the Forest Plan to include a definition of the term "live trees."

On February 15, 2007 the Eastern District Court of Washington (District Court) issued an injunction requiring that "the Forest Service shall not harvest from the three timber sales any "live tree" $\geq$ 21 inches dbh. This includes any tree of requisite size with green needles or that is not yet dead." The proposed action addressed in this FSEIS clarifies the agency definitions of live and dead trees.

PURPOSE AND NEED FOR ACTION

As stated in the Project FEIS on page 1-4 of the Purpose and Need, "there is a need to salvage harvest [burned timber] as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits." The Appeals Court opinion and District Court injunction described in the Introduction above, prohibits salvage harvest of any "live tree" greater than or equal to 21 inches dbh for the Project. The Appeals Court definition of a "live tree," which does not reflect Forest Service silvicultural practice and interpretation, frustrates the ability of the Forest Service to achieve the purpose and need of the Project stated above.

PROPOSED ACTION

The Forest Service proposes to amend the Umatilla National Forest Land and Resource Management Plan to modify Eastside Screens wildlife standard at 6d. (2) (a) to define both live and dead trees. The amendment narrative is based on information disclosed in the FEIS, Appendix B[1], (Implementation and Marking Guides) and Appendix K (Response to Beschta and Others). Appendix B and K are appended to this DSEIS. This amendment applies to, and only for the duration of, the School Fire Salvage Recovery Project.

[1] Appendix B, predicting tree survival scoring guide was modified to be consistent with the August 30, 2006 amendment to the Scott Guidelines.

Existing Eastside Screen wildlife standard at 6d. (2) (a) reads: *Maintain all remnant late and old seral and/or structural live trees ≥ 21″ dbh that currently exist within stands proposed for harvest activities.*

Amended Eastside Screen wildlife standard at 6d. (2) (a) would read: *Maintain all remnant late and old seral and/or structural live trees ≥ 21″ dbh that currently exist within stands proposed for harvest activities. Live trees are defined as trees rated to have a high probability of surviving the effects of fire, and trees rated to have a moderate probability of survival where sampling indicates that at least 50 percent of their basal cambium is alive. Dead trees are defined as trees rated to have a low probability of surviving the effects of fire, and trees rated to have a moderate probability of survival where sampling indicates that more than 50 percent of their basal cambium is dead. Survival probability is determined using "Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains" (Scott et al. 2002, as amended) (commonly referred to as the Scott Guidelines).*

ALTERNATIVES

The FSEIS considered eleven alternatives, two were analyzed in detail (the no action and proposed action), and nine were considered but eliminated from detailed study for reasons stated in Chapter 2 of this document.

Alternative A – No Action

In this document the no action alternative means the August 14, 2006 decision (Alternative B as described in the Project FEIS) would be implemented with actual harvest limited to those trees not enjoined by the District Court of the Eastern District of Washington. Specifically "no harvest of "live trees " ≥ 21 inches dbh including any tree of requisite size with green needles or that is not yet dead." All other activities could proceed as disclosed previously.

Alternative B – Proposed Action (Preferred Alternative)

The Forest Service proposes to amend the Forest Plan to modify the Eastside Screens wildlife standard at 6d. (2) (a) as stated above in the Proposed Action.

The following table is a comparison of alternatives.

Table 1 - Summary Comparison of Alternatives

Activity	Unit of Measure	Alternative A (No Action)	Alternative B (Proposed Action)
Amendment to Forest Plan to modify Eastside Screens Wildlife Standard 6d. (2) (a) to include definition of "live" and "dead" trees	Yes/No	No	Yes
Milly Oli and Sun sales (Round-One) Remaining to be Harvested	MMBF	11*	13*
	Acres	1,800	1,800
Round-Two Remaining to be harvested	MMBF	12*	15*
	Acres	5,200	5,200
*Volume figures express actual volumes realized and experienced deterioration, and therefore, differ from the FEIS			

Chapter 1

Purpose and Need

CHANGES BETWEEN DRAFT SEIS AND FINAL SEIS

- This FSEIS only contains discussion of information that is new or different.
- Other sections of the July 2006 FEIS are unchanged
- Minor editorial changes to text in all sections of the chapter.

INTRODUCTION

The Forest Service has prepared this Final Supplemental Environmental Impact Statement (FSEIS) in response to a recent opinion of the 9th Circuit Court of Appeals (Appeals Court) concerning the School Fire Salvage Recovery Project (the Project). The Final Environmental Impact Statement (FEIS) for the Project was issued July 2006 and a ROD signed August 14, 2006, which authorized about 9,430 acres of salvage harvest. Also in August, three timber sales (Millly, Oli and Sun) were awarded covering about 3,670 acres with an estimated volume of 28 million board feet (MMBF).

On August 15, 2006, the Lands Council, Oregon Natural Resources Council, Hells Canyon Preservation Council, and Sierra Club (plaintiffs) filed suit against Forest Supervisor Kevin Martin and the Forest Service in The Lands Council et al. v. Martin et al., Civ. No. 06-229, District Court of the Eastern District of Washington, challenging the Project. Plaintiffs alleged the Forest Service failed to adequately analyze impacts to certain undeveloped areas, failed to consider a reasonable range of alternatives, failed to comply with the Eastside Screens to protect old-growth trees, failed to adequately consider the scientific controversy regarding “Factors Affecting Survival of Fire-Injured Trees” (Scott et al. 2002, 2006), and failed to adequately analyze cumulative environmental impacts. Timber sale purchasers, Boise Building Solutions Manufacturing, LLC and Dodge Logging, Inc., along with American Forest Resource Council joined the lawsuit as Defendant-Interveners.

On September 11, 2006, the District Court denied plaintiffs’ request for a temporary restraining order and preliminary injunction, finding that the Forest Service had not failed in its duty to take the requisite "hard look" at the environmental consequences. Thereafter, the three awarded salvage timber sales began operations. On September 15, the District Court denied plaintiffs’ request for stay and on September 18, the Appeals Court denied plaintiffs’ request for an injunction pending appeal.

On February 5, 2007, the Appeals Court heard oral argument on the District Court’s denial of the preliminary injunction. The Appeals Court issued an opinion on February 12, 2007, that the Forest Service had adequately disclosed the impacts to the unroaded areas, but that the Forest Service violated the Forest Plan (Eastside Screens) prohibition of cutting "live trees" $\geq$ 21 inches dbh when it designated dying trees for harvest. The intent of the Eastside Screens interim management direction was to restrict timber harvest in those areas that scientific analysis indicated were important to certain fish, wildlife, and ecosystem structure.

The Appeals Court reasoned that in the absence of an adopted technical definition of "live trees," the common understanding of the word "live" from the Merriam Webster's Collegiate Dictionary (10th ed. 1993) meant "to be alive," which meant "not dead," and concluded "the common meaning of the term 'all . . . live trees' is all trees that have not yet died." Opinion at 12. Thus, according to the Appeals Court, dying trees designated for harvest were not yet dead, and remained "live" for the purposes of the Eastside Screens. The Appeals Court further opined that "[t]he Forest Service is free, of course, to amend the Eastside Screens to allow logging of old-growth dying trees, either by adding a definition of the term "live trees" or by changing the requirement to maintain all live trees of a certain size." Opinion at 14.

The Appeals Court remanded the case to the District Court to issue an injunction consistent with its findings. The District Court issued an injunction on February 15, 2007, requiring that "The Forest Service shall not harvest from the three timber sales areas any "live tree" $\geq$ 21 inches dbh." This includes any tree of requisite size with green needles or that is not yet dead." District Court Order at 2. The Appeals Court definition of a "live tree" does not reflect Forest Service silvicultural practice and interpretation, and it frustrates the ability of the Forest Service from achieving the purpose and need of the Project.

This plan amendment is being proposed under the National Forest Management Act (NFMA) implementing regulations in effect prior to November 9, 2000. The 2000 NFMA implementing regulations (36 CFR 219.14 (d) (2)) as amended by the September 29, 2004 Interpretative Rule (Federal Register Vol. 69, No. 188) allow use of these procedures. Specific procedures for amending plans under the regulations in effect prior to November 9, 2000 are found in Forest Service Manual (FSM) 1926.5. Non-significant plan amendments may be made as a part of a project proposal, as is the case here. A plan amendment can be found to be non-significant if the amendment involves:

1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.
2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.
3. Minor changes in standards and guidelines.

BACKGROUND

Tree mortality is a complex biological process. Common measures of animal mortality are not useful for trees; tree death is not signified by cessation of a heartbeat, for example. In fact, a tree's "heart" can rot and yet the tree might remain alive for decades or even centuries (Schmitt and Filip 2005).

Trees die when they cannot acquire or transport sufficient resources (water, mineral nutrients, etc.) to recover from attack by insects and pathogens, or from injuries caused by environmental stress, wildfire, and other disturbance agents (Waring 1987).

A wildfire typically creates a relatively broad spectrum of tree injuries. When fire injuries are acute, trees die almost immediately; when injuries are moderate, delayed mortality may occur over a period of several years; and when injuries are minor, trees may appear to be unaffected or uninjured by the fire.

Acute fire injuries cause obviously dead trees with blackened stems and a complete absence of needles, or trees with crowns having all brown needles, or trees with crowns having "fading" or "dry-appearing" (off-color) needles throughout the crown.

Moderate fire injuries result in a relatively broad array of tree response. Experience indicates that about half of the trees with moderate injuries will survive, and about half of them will die (Scott et al. 2002). Unlike monitoring human physiology with measures such as pulse rate and blood pressure, there is no definitive measure for determining near-term mortality (up to five years) for moderately injured trees.

Because a definitive measure of delayed tree mortality does not exist, the traditional approach to post-fire assessment is to evaluate direct (first-order) fire effects to predict a tree's survival probability. This traditional approach has a long historical precedence in the western United States dating back to the 1920s and 1930s (Flint 1925, Miller and Patterson 1927, Salman 1934, Starker 1934, Connaughton 1936, Herman 1954, Lynch 1959, Mann and Gunter 1960, Wagener 1961, Martin 1963, and Dieterich 1979).

PURPOSE AND NEED FOR ACTION

As stated in the Project FEIS on page 1-4 of the Purpose and Need, "there is a need to salvage harvest [burned timber] as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits." The Appeals Court opinion and District Court injunction described in the Introduction above "prohibits salvage harvest from the three timber sales areas of any "live tree" greater than or equal to 21 inches dbh. This includes any tree of requisite size with green needles or that is not yet dead." The Appeals Court definition of a "live tree," which does not reflect Forest Service silvicultural practice and interpretation, frustrates the ability of the Forest Service to achieve the purpose and need of the Project as stated above.

PROPOSED ACTION

The Forest Service proposes to amend the Forest Plan to modify Eastside Screens wildlife standard at 6d. (2) (a) to define both live and dead trees. The amendment narrative is based on information disclosed in the Project FEIS, Appendix B[2] (Implementation and Marking Guides), and Appendix K (Response to Beschta and Others). Appendix N (Appendix B, revised, of the environmental assessment for Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales, commonly referred to as the Eastside Screens), and Appendix B and K of the Project FEIS are appended to this FSEIS. This amendment applies to, and only for the duration of, the Project.

Existing Eastside Screen wildlife standard at 6d. (2) (a) reads: *Maintain all remnant late and old seral and/or structural live trees ≥ 21″ dbh that currently exist within stands proposed for harvest activities.*

Amended Eastside Screen wildlife standard at 6d. (2) (a) would read: *Maintain all remnant late and old seral and/or structural live trees ≥ 21″ dbh that currently exist within stands proposed for harvest activities. Live trees are defined as trees rated to have a high probability of surviving the effects of fire, and trees rated to have a moderate probability of survival where sampling indicates that at least 50 percent of their basal cambium is alive. Dead trees are defined as trees rated to have a low probability of surviving the effects of fire, and trees rated to have a moderate probability of survival where sampling indicates that more than 50 percent of their basal cambium is dead. Survival probability is determined using "Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative*

[2] Appendix B, predicting tree survival scoring guide was modified to be consistent with the August 30, 2006 amendment to the Scott Guidelines.

Probability of Survival of Conifers in the Blue and Wallowa Mountains" (Scott et al. 2002, as amended) (commonly referred to as the Scott Guidelines).

DECISION FRAMEWORK

The scope of the decision to be made is limited to the Forest Plan amendment to the Eastside Screens wildlife standard 6d. (2) (a) within the Project area. The Responsible Official for this proposal is the Forest Supervisor of Umatilla National Forest. The decision will be based on a consideration of public comments, responsiveness to the purpose and need, and a comparison of impacts disclosed by alternative.

Chapter 2

Alternatives

CHANGES BETWEEN DRAFT SEIS AND FINAL SEIS

- This FSEIS only contains discussion of information that is new or different.
- Other sections of the July 2006 FEIS are unchanged
- Minor editorial changes to text in all sections of the chapter.
- In response to comments made on the DSEIS additional alternatives were considered, but eliminated from detailed study.

ALTERNATIVES CONSIDERED IN DETAIL

Alternative A – No Action

In this document the no action alternative means the August 14, 2006 ROD (Alternative B selected as described in the Project FEIS) would be implemented as enjoined by the District Court of the Eastern District of Washington (District Court). Specifically, the no action alternative excludes further harvest of any "live trees" ≥ 21 inches dbh, including any tree of requisite size with green needles or that is not yet dead. All other activities would proceed as disclosed previously.

Alternative B – Proposed Action (Preferred Alternative)

The Forest Service proposes to amend the Forest Plan to modify Eastside Screens wildlife standard at 6d. (2) (a) to define both live and dead trees. The amendment narrative is based on information disclosed in the Project FEIS, Appendix B[3] (Implementation and Marking Guides) and Appendix K (Response to Beschta and Others). Appendix N (Appendix B, revised, of the environmental assessment for Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales, commonly referred to as the Eastside Screens), and Appendix B and K of the Project FEIS are appended to this FSEIS. This amendment applies to, and only for the duration of, the Project.

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[3] Appendix B, predicting tree survival scoring guide was modified to be consistent with the August 30, 2006 amendment to the Scott Guidelines.

indicates that more than 50 percent of their basal cambium is dead. Survival probability is determined using "Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains" (Scott et al. 2002, as amended) (commonly referred to as the Scott Guidelines).

ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY

Assess Probability of Tree Mortality Using Methods Other Than Scott Guidelines

Several respondents to the Project commented that our basis for differentiating between dying and living trees is either questionable or untenable for scientific and other reasons. Often, these comments specifically addressed use of the Scott Guidelines (Scott et al. 2002, 2003) and assert there are other and more appropriate methods that would better predict tree mortality for the Project.

The Scott Guidelines provide a methodology for predicting the relative probability of survival for fire-injured trees growing on a wide variety of site conditions, exposed to varying levels of pre-fire factors that can predispose a tree to fire-induced mortality depending upon their severity or magnitude (occurrence of dwarf mistletoe, root disease, and bark beetles), and experiencing widely varying levels of first-order fire effects to their crowns, stems and roots. The possible combinations of these factors are almost limitless, leading inevitably to a decision to develop a prediction system relating site and tree factors (explanatory variables) to a probabilistic estimate of tree mortality.

The Forest Service agrees there are other methods available to predict tree mortality and differentiate between dying and living trees. The Project FEIS, Appendix K, compared and evaluated alternative methods to the Scott Guidelines that were suggested during public involvement. Additional information on these alternative methodologies can be found in Chapter 3 of this document. The Forest Service recognizes there will always be uncertainty associated with any probabilistic rating system, because accounting for every combination of variables that could potentially result in tree death is not currently possible. Based on the analysis here and in Chapter 3 the Forest Service believes that the Scott Guidelines, which are based on peer-reviewed science, represent the best available science for assessing tree mortality in the Project.

In order for a methodology to be appropriate for this project, it must:

- Address all of the principal commercial species within the project area (ponderosa pine, Douglas-fir, grand fir/white fir, lodgepole pine, Engelmann spruce, and western larch);
- Be valid for the geographic area of the School Fire Salvage Recovery Project; and
- Be operationally practical to potentially evaluate hundreds of trees per acre, over thousands of acres.

The following alternatives were considered but were not analyzed in detail for the reasons stated below.

Waring Report One respondent provided a report (prepared by Richard Waring) describing an evaluation of the Scott Guidelines for the Easy and High Roberts salvage sales on the Malheur National Forest. In this report, Waring concluded that using indirect indicators (such as the "crown and bole scorch" factors from the Scott Guidelines) to assess a tree's predisposition to fire-caused mortality is inappropriate, and that direct measurement of a tree's physiological processes (photosynthesis or transpiration) provides a better estimate of survival potential.

Waring's report contends that measurements of water stress, using either a pressure chamber (Waring and Cleary 1967) or by collecting increment cores and then analyzing the sapwood's relative water content (Waring and Running 1978), provides definitive estimates of tree health and survival potential.

A plant moisture stress measurement can be obtained by using a portable pressurized chamber, as described by Waring and Cleary (1967), but this procedure is feasible primarily in a laboratory setting and not during the designation (marking) phase of a timber sale. The sapwood water storage article (Waring and Running 1978) describes how transpiration and photosynthesis relationships were examined over a multi-year period in the laboratory, but it does not provide a procedure or methodology for determining tree survivability.

The Waring Report was not evaluated using the six evaluation criteria (Project FEIS, Appendix K) because Waring's Report is not a tree mortality prediction system, and the criteria were selected for their relevance to mortality prediction systems.

Ryan (2000) studied the effect of varying levels of fire-caused cambium injury on the water relations of ponderosa pine. He found that trees in the 100 percent basal-heating class, which experienced cambium kill over an average of 95 percent of the circumference at their base, had higher midday xylem pressure potentials (i.e., less water stress) than non-girdled trees (Ryan 2000). This result was apparently due to phloem unloading that created a net water flow to the xylem tissue (Kozlowski 1992).

It is our judgment that the Waring Report (Waring, No Date) is inappropriate for use with the Project for two reasons:

- Since the Ryan (2000) study shows that mortality of basal-girdled trees can be delayed for more than two growing seasons after a fire, and because it shows that fire-girdled trees can have a positive ("healthy") water status soon after a fire, it refutes Waring's contention that a one-point-in-time measurement of water stress provides a suitable methodology for differentiating between living and dying trees: and
- As described above, evaluating trees based on water stress or sapwood water content is not a practical approach, because of operational considerations and feasibility, for large burned areas such as School Fire area.

The **McHugh and Kolb (2003) model** was developed using data from three wildfires in northern Arizona. It includes one conifer species (ponderosa pine) and it relates predicted tree mortality to two fire effects: total crown damage (scorch plus consumption), and bole char severity. It is our judgment that the McHugh and Kolb (2003) model is inappropriate for use with the Project for the following reasons:

- Its geographical scope is limited (northern Arizona), and it pertains to an area far removed from the School Fire analysis area;
- It assesses the crown and stem systems only; no direct consideration of fine-root damage or basal stem girdling at the root crown (Ryan and Frandsen 1991) is included;
- Its tree species coverage is limited (ponderosa pine only).

The **Peterson and Arbaugh (1986) model** was based on tree survival patterns after late-summer wildfires in the northern Rocky Mountains. It includes two conifer species (Douglas-fir and lodgepole pine) and it relates predicted tree mortality to a wide variety of tree characteristics and fire effects: tree diameter, tree height, crown diameter and ratio, bark thickness, scorch height, crown scorch volume, basal scorch, bark char, and insect damage. Although the variety of predictive factors included with this model

is impressive, it is our judgment that the Peterson and Arbaugh (1986) model is inappropriate for use with the Project for the following reasons:

- Its geographical scope is limited (northern Rocky Mountains of Montana, northwestern Wyoming, and Idaho);
- It assesses the crown and stem systems only (no direct consideration of the root system); and
- Its tree species coverage is limited (Douglas-fir and lodgepole pine only).

The **Ryan and Reinhardt (1988) model** was developed to predict tree mortality following prescribed fires in Idaho, Montana, Oregon, and Washington. It includes seven conifer species and it relates predicted tree mortality to two factors: bark thickness, and crown volume killed by fire. The authors of the Scott Guidelines used the Ryan and Reinhardt (1988) model when developing their rating procedure, in addition to other models and criteria that better account for the totality of fire effects (including root damage). It is our judgment that the Ryan and Reinhardt (1988) model is inappropriate for use with the Project for the following reasons:

- Its geographical scope is limited because the Oregon data came from the western or northern Cascade Mountains, or from the southwestern portion of the state near Medford;
- It assesses the crown and stem systems only, with no factors relating to root damage;
- Its tree species coverage is somewhat limited because it does not include grand fir or ponderosa pine, two abundant tree species in the School Fire area; and
- It was developed using prescribed fire data only, and this is believed to limit its potential applicability for wildfire situations such as the School Fire.

The **Stephens and Finney (2002) model** was developed to predict tree mortality following prescribed fire in the southern Sierra Nevada Mountains of California. It includes five conifer species and it relates predicted tree mortality to four factors: tree diameter, percent crown volume scorched, forest floor (duff) consumption, and crown scorch height. It is our judgment that the Stephens and Finney (2002) model is inappropriate for use with the Project for the following reasons:

- Its geographical scope is limited (southern Sierra Nevada Mountains);
- Its tree species coverage is limited (of the five conifers included in this model, only ponderosa pine occurs in the School Fire area); and
- It was developed using prescribed fire data only, and this is believed to limits its potential applicability for wildfire situations such as the School Fire.

The **Thies et al. (2006) model** was developed to predict tree mortality following prescribed fire in the southern Blue Mountains of northeastern Oregon. It includes one tree species (ponderosa pine) and it relates predicted tree mortality to five factors: live crown proportion, needle scorch proportion, bud kill proportion, basal char severe, and bole scorch proportion. The size class variation for trees included in this study is quite limited due to similar stand replicates. Pre-treatment tree diameter at breast-height (dbh) for control units averaged 28.4 cm (11.2 inches), and the diameters for trees in the fall and spring burning treatments averaged 26.6 cm (10.5 inches) and 27.4 cm (10.8 inches), respectively. This is a very different range of tree diameters from that found in the Project. The authors of this study also caution about extrapolating its results, and using its mathematical models, beyond the geographical area of the sampled stands or with tree species other than ponderosa pine, until datasets are produced to validate the models for other geographical areas or tree species. It is our judgment that the Thies et al. (2006) model is inappropriate for use with the Project for the following reasons:

- Its geographical scope is limited (a specific set of sampled stands in the southern Blue Mountains);
- Its ecological scope is limited (sampled stands are in the ponderosa pine potential vegetation series, and only 1.6 percent of the School Fire area is included in this series; see table E-3 in the Project FEIS);
- Its tree species coverage is limited (ponderosa pine only);
- The tree-size variation included in the model-development dataset (a range of 10.5 to 11.2 inches average stand diameter across all replicates) is limited when compared with tree-size variation encountered in the School Fire area;
- It assesses the crown and stem systems only (no direct consideration of the root system); and
- It was developed using prescribed fire data only, and this is believed to limits its potential applicability for wildfire situations such as the School Fire.

Treat small-diameter fuels - This alternative was proposed by the public and would treat small-diameter fuel now and while delaying treatment of other fuels until they exceed desired levels. It is suggested that this approach would provide an interim recovery period and decrease the impacts of the proposed project. This alternative is outside the scope of the purpose and need to salvage harvest (burned timber) as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits. Nor does it clarify the Appeals Court definition of live trees which frustrates the ability of the Forest Service to achieve the stated purpose and need. An alternative similar to this was considered in the Project FEIS (Chapter 2, p. 2-28).

Non-Commercial Restoration Only - This alternative was proposed by the public and would focus on the removal of small-diameter flash fuels, the restoration of area soil, and the removal of unneeded roads and old logging roads. It is suggested that it would provide local jobs and reduce fuel loads by removing the small-diameter flash fuels. This alternative is outside the scope of the purpose and need to salvage harvest (burned timber) as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits. Nor does it clarify the Appeals Court definition of live trees which frustrates the ability of the Forest Service to achieve the stated purpose and need. An alternative similar to this one was considered in the Project FEIS (Chapter 2, p. 2-27).

Protect Old Growth - The public proposed several variations on ways to modify the Eastside Screens to protect old growth. One suggestion was to protect trees 21 inches or greater. This suggestion is essentially the no action alternative (Alternative A) as analyzed in this document.

Other suggestions were to modify the Eastside Screens and reduce the diameter limit from 21 to 19 or 20 inches. The Eastside Screens (see Appendix N) define old growth (LOS) to be dominated by trees of 21 inches diameter or greater. The Appeals Court did not dispute this tree-size criteria, so alternate tree-size limits are not consistent with the purpose and need to salvage harvest (burned timber) as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits. Nor does it clarify the Appeals Court definition of live trees which frustrates the ability of the Forest Service to achieve the stated purpose and need.

Another suggestion was to protect old growth, except for particular circumstances where a tree has a very high likelihood of dying in the near future (1 or 2 years after fire) based on a commonly accepted scientific method. This alternative would be similar to the alternatives using methods other than Scott Guidelines.

COMPARISON OF ALTERNATIVES

The following table shows a comparison of alternatives.

Table 1 - Summary Comparison of Alternatives

Activity	Unit of Measure	Alternative A (No Action)	Alternative B (Proposed Action)
Amendment to Forest Plan to modify Eastside Screens Wildlife Standard 6d. (2) (a) to include definition of "live" and "dead" trees	Yes/No	No	Yes
Milly Oli and Sun sales (Round-One) Remaining to be Harvested	MMBF	11*	13*
	Acres	1,800	1,800
Round-Two Remaining to be harvested	MMBF	12*	15*
	Acres	5,200	5,200
*Volume figures express actual volumes realized and experienced deterioration, and therefore, differ from the FEIS			

Chapter 3
Affected Environment
and
Environmental Consequences

CHANGES BETWEEN DRAFT SEIS AND FINAL SEIS

- This FSEIS only contains discussion of information that is new or different.
- Other sections of the July 2006 FEIS are unchanged
- Minor editorial changes to text in all sections of the chapter.
- Appendix K of the DSEIS and additional information has been incorporated into the Environmental Consequences section.

INTRODUCTION

The Forest Service has prepared this Final Supplemental Environmental Impact Statement (FSEIS) in response to a recent opinion of the 9th Circuit Court of Appeals (Appeals Court) concerning the School Fire Salvage Recovery Project (the Project). The physical, biological, social, and economic effects of the Project were fully disclosed in the July 2006 Final Environmental Impact Statement (FEIS) and are not repeated here except as they are affected by the Appeals Court opinion.

AFFECTED ENVIRONMENT

School Fire burned approximately 51,000 acres in August 2005, about 28,000 acres of which were on National Forest System land administered by the Umatilla National Forest. Tree mortality varied from completely dead (total needle consumption) to underburned areas where delayed individual tree mortality is expected. The FEIS for the Project was issued July 2006 and a ROD signed August 14, 2006, which authorized about 9,400 acres of salvage harvest. Based on initial field reconnaissance, timber industry capability, and expected deterioration rates, the Umatilla National Forest decided to implement salvage operations in two steps.

Shortly after the August 14, 2006 decision, three timber sales were awarded covering about 4,200 acres with an estimated volume of 28 million board feet (MMBF). This first round of salvage harvest consisted of three sales (Milly, Oli, and Sun) of the most severely burned areas (the majority of trees were dead or expected to die). When the three sales were enjoined on February 15, 2007 approximately 16 MMBF from 2,400 acres had been salvage harvested. There is an estimated 13 MMBF of volume within the remaining 1,800 acres left to be harvested. Of that volume, approximately 2 MMBF consists of trees that meet the definition of "live" as defined in the opinion of the Appeals Court.

The second round of salvage harvest under the August 14, 2006 decision has not been sold, however, salvage harvest was intended to occur on these remaining 5,200 acres for an estimated 15 MMBF beginning in the 2007 field season. As of February 15, 2007, an estimated 3 MMBF of volume across round-two acres would be potentially affected by the Appeals Court ruling. The second round of sales consists of areas with mixed and/or delayed mortality, and may include areas of high mortality. Given these conditions, the Forest Service anticipated extensive use of the Scott Guidelines to predict the relative probability of tree survival for the round-two salvage timber sales.

ENVIRONMENTAL CONSEQUENCES

No Action Alternative

Direct, indirect, and cumulative effects were disclosed for Alternative B in the Project July 2006 FEIS. Timber harvest would still occur in the same areas and along the same roads as originally described for Alternative Bin the FEIS. Logging systems would remain the same and no new trees would be designated for harvest. The size and location of Riparian Habitat Conservations Areas would remain the same as would the measures to protect those areas. Seasonal restrictions on operations to minimize impacts on big game winter range, soils, and snowmobile uses would remain the same. The only change would be the retention of scattered "live" trees $\geq$ 21 inches dbh including any tree of requisite size with green needles or that is not yet dead.

The addition of $\geq$ 21 inch dbh fire injured trees retained in these units could have a beneficial effect to wildlife. The majority of these $\geq$ 21 inch dbh fire injured trees are expected to be dead within the next five years, contributing additional snags. Although unlikely, some trees may survive and could provide green component habitat in the burned forest ecosystem. Snags $\geq$ 21 inches dbh remain standing longer than smaller dbh snags and therefore provide habitat for a variety of species for a longer period of time. Where retention of scattered trees $\geq$ 21 inches dbh occurs, additional dead wood (snag) habitat would be created. Effects to woodpeckers from scattered increases in greater than 21 inch dbh dead wood habitat may change slightly compared to effects disclosed in the Project FEIS. However, these changes are not expected to be measurable across the project area because the harvest prescriptions leave substantial numbers of large snags, and it is unknown whether the scattered additional snags would result in any additional habitat value. Therefore, effects disclosures in the Project FEIS would remain essentially unchanged. Leaving additional scattered large diameter trees would not contribute significantly to the fire hazard. In fact, leaving them would result in the generation of slightly less timber harvest activity fuels that would have to be treated to reduce post-harvest fire hazard. There would be no new measurable environmental effects for other resources beyond those already identified for Alternative B in the Project FEIS.

For the first round of sales the net effect of not being able to remove the enjoined trees $\geq$ 21 inches dbh would vary among the three sales. Milly sale is 90 percent complete and relies extensively on helicopter yarding. The economic effect would be an undetermined reduction in volume and value across the remaining acres within the Milly sale area. The Oli and Sun timber sales would be affected by the Appeals Court opinion to a greater extent than the Milly timber sale. They are 35 percent and 60 percent completed, respectively. Both have a significant portion of unlogged units that were designed to utilize skyline and helicopter yarding systems. Skyline yarding falls in the mid-range of yarding cost, while helicopter yarding is the most expensive system. Since a larger portion of the volume of these two sales remains unharvested, the inability to harvest enjoined trees from these sales would have a greater economic effect. The inclusion of larger diameter trees offsets the costs of yarding smaller less valuable trees. This is most apparent when higher cost yarding systems like helicopter and skyline are used.

Inability to harvest enjoined trees could render the majority of the unlogged portions of the Oli and Sun sales economically unviable.

Within the second round of sales about 5,200 acres trees ≥21 inches dbh that meet the Appeals Court definition of live are expected to result in an estimated 3 MMBF. While they only denote 20 percent of the anticipated volume, they represent the predominance of the remaining value. Wood deterioration has progressed at a faster rate than was initially anticipated in the Project FEIS due to weather conditions, higher than predicted activity of bark beetles, and other factors. This has rendered much of the small diameter volume unmerchantable for traditional lumber products. Larger diameter trees deteriorate at a slower rate and have a higher initial value. Inclusion of these trees is an essential component of the economic viability of these sales. Loss of volume and value associated primarily with the larger diameter trees and coupled with fluctuating lumber markets, could render the majority of helicopter and skyline portions of round-two sales as economically unviable.

There would be no effect on multiple-use goals and objectives for long-term land and resource management from the no action alternative because there is no plan amendment proposed under this alternative. No adjustments to management area boundaries are proposed, therefore, there would be no change in land allocation. There would be no effect on standards and guidelines from the no action alternative because there is no plan amendment proposed under this alternative.

Proposed Action Alternative

Direct, Indirect, and Cumulative Effects

Effects to resources would be as described for all resources under Alternative B in the Project FEIS. Timber harvest would still occur in the same areas and along the same roads as originally described in the Project FEIS. Logging systems would remain the same and no new trees would be designated for harvest. The size and location of Riparian Habitat Conservation Areas would remain the same as would the measures to protect those areas. Seasonal restrictions on operations to minimize effects on big game winter range, soils, and snowmobile uses would remain the same. Therefore, as a result of this amendment, there would be no changes on the ground, or to environmental effects beyond those already described in the Project FEIS.

The Forest Plan allows for salvage from all of the lands included in the Project. A summary of the related Forest Plan management direction is found in the Project FEIS, pp. 1-10 through 1-14. The Forest Plan (p. 4-67) includes the following goal: "Provide for production of wood fiber consistent with various resource objectives, environmental constraints, and considering cost efficiency." Management direction for the various land allocations in the Forest Plan recognizes the need or desire to salvage wood fiber following natural disturbance (Forest Plan pp. 4-94 through 4-105). The proposed action helps meet the goal of wood fiber production by allowing salvage of dead and dying timber that would not otherwise be salvaged. The Project FEIS (Chapter 3) addresses the environmental effects of the project in light of the full suite of Forest Plan management direction. In the Project's ROD these effects are evaluated and a finding is made that the selected alternative from that EIS is consistent with the Forest Plan, as amended (ROD p. 12).

The amendment proposed in this FSEIS is short-term (the life of this project) and of limited scope (28,000 acres of the 1.5 million acre Umatilla National Forest) and it amends the Forest Plan in a way that contributes to achieving plan goals. The proposed action includes modification of one Forest Plan standard, limited to the duration and geographic scope of the Project. The amendment would not change management intent of the Eastside Screens wildlife standard nor would there be changes in how the standard would be applied to the Project compared to the effects disclosed in the July 2006 Project FEIS.

This amendment clarifies the definitions of live and dead trees to be consistent with normal agency practice and current science. There would be no effect on any other standards and guidelines except the Eastside Screens wildlife standard. No adjustments to management area boundaries are proposed, therefore, there would be no change in land allocation. This amendment would not preclude or require other actions across the forest. Therefore, this amendment would not meaningfully affect multiple-use goals and objectives for long-term land and resource management for the remainder of the planning period.

EFFECTS COMMON TO ALL ALTERNATIVES

Columbia Complex Fire

Columbia Complex Fire burned in Garfield and Columbia Counties during August and September of 2006. A portion of the Columbia Fire footprint is immediately adjacent to the School Fire area and a small portion (approximately 100 acres) overlapped the School Fire perimeter.

Columbia Complex Fire was primarily wind and terrain dominated which resulted in the fire spreading from ridge top to ridge top and it subsequently backing into drainages. This resulted in less intense fire effects along lower slopes and in drainage bottoms. School Fire was plume dominated which resulted in a large smoke columns developing and then collapsing. This spread fire across the entire landscape and higher intensities burning from the bottoms of drainages to the top.

On September 8, 2006, the Pomeroy District Ranger documented to the Forest Supervisor qualitative observations and information from a field assessment by the District Fish Biologist. The Fish Biologist concluded that there should be a low probability for sediment to enter the Tucannon River from Columbia Complex Fire. His conclusion was based on the following qualitative criteria:

- Most riparian zones were still intact. The fire consumed predominately ground fuels, not crowns, and there were few examples of stand replacing fire.
- Some dry draws showed signs of higher burn intensities, but wet riparian draws demonstrated rare instances of higher burn intensities.
- The three highest burn intensity drainages from School Fire (Tucannon River, Cummings and Tumalum Creek) had recovered significantly in one year. Since no evidence of scorched red soils were observed in Columbia Complex Fire drainage bottoms, it is very likely that these areas will recover even faster than School's high intensity burn drainages.
- Very little area between the two fires overlap (approximately 100 acres) there has been virtually no fire damage to BAER or district rehabilitated areas in School Fire perimeter.

School Fire Salvage Recovery Project was designed to limit the effects of salvage harvest on sediment delivery. Examples of design criteria include, but are not limited to (See FEIS, Chapter 2 for complete list):

- Utilizing forwarder logging systems in place of rubber tire or track ground based yarding.
- Emphasizing helicopter yarding to reduce ground disturbance.
- Adding additional grass seeding requirements.
- Adding 25-foot ephemeral buffers, in addition to standard PACFISH requirements.

Several of these design criteria were more restrictive than current Forest Plan standards and guidelines. This resulted in only a modeled 1.5 percent increase in of sediment over baseline values, while harvesting 9,432 acres across 27,000 acres (35 percent of all federal acres).

Columbia Complex Fire may have slightly increased natural baseline sedimentation, but cumulative effects of salvage harvest from the School Project (which includes activities resulting from this proposed action) and Columbia Complex Fire would be negligible. Currently, only 500 acres are proposed for salvage harvest across 48,000 acres (1 percent of all federal acres) of the Columbia Complex. The combination of both fires results in the over-all percent of acres being salvage harvested across a burned landscape dropping from 35 percent to 13 percent

A small portion of Columbia Complex Fire did burn into the School Fire perimeter and created a 100-acre overlap. This area is less than one-tenth of one percent (00.1 percent). No BAER or district rehabilitation efforts were located in that 100-acre overlap. Cumulative effects relative to sedimentation and fish habitat would be minimal.

Cumulative effects for dead wood should be positive. The Columbia Complex burned and additional 48,000 acres of which only 500 acres is proposed for salvage harvest. This results in an increase in percentage of acres available for wildlife needs from 65 percent to over 87 percent.

Alternate or Conflicting Science

Several respondents to the School Fire Salvage Recovery Project and this supplement have commented on alternate or conflicting science. Some have suggested that methods used by the Forest Service do not represent the "best" science available. The methods and science used by the Forest Service to analyze effects of all alternatives does have an affect on the results documented here and in the FEIS. This section documents: (1) science the Forest Serve considered (2) applicability of the science to this project, (3) why the Forest Service chose to use one methodology over another, and (4) why the Forest Service did not use the methodology and why not. The Forest Service recognizes there will always be uncertainty associated with some aspects of this project, however this section discloses what the Forest Service believes represents the "best" science available.

VEGETATION

Science Criteria. The Eastside Screens are interim direction used to amend the Land and Resource Management Plans for every national forest located east of the Cascade Mountains in Oregon and Washington. The current version of the Eastside Screens is Regional Forester's Forest Plan Amendment #2 (USDA Forest Service 1995).

After the Eastside Screens were issued, the Pacific Northwest Regional Forester appointed an Eastside Screens Oversight Team (Norris 2005) and charged them with reviewing and monitoring Screens implementation. The team's objective was to ensure that the Eastside Screens were being applied consistently across all of the Eastside national forests.

The Oversight Team provided clarification and interpretation of the Eastside Screens by periodically reviewing sample projects on each national forest, producing a letter describing their findings, and then circulating the letter to other Eastside national forests as a "lessons learned" communication tool. These letters, which are signed by the Regional Forester or the Director of Natural Resources, are not considered advisory because they are used as administrative direction for Eastside Screens implementation.

The Eastside Screens has a requirement to consider "best available science" (item 4 in scenario A of the wildlife screen) and during Screens implementation, questions arose about how to interpret this phrase.

In response to the Colville National Forest's request for clarification about the "best available science" requirement, the Oversight Team produced an administrative policy letter stating that (Devlin 1998a):

> "Science of course means peer reviewed and published by credible sources, and does not include articles, comments, or input that is simply opinion or editorials by scientists. 'Expert opinion' can be helpful, but is not the same as 'new science'."

Although the criteria provided by the Oversight Team (Devlin 1998a) are not the only ones that could be used to identify "best available science," it is our judgment that:

(1) They are suitable for this purpose; and

(2) Using them for this purpose is consistent with administrative policy of the Pacific Northwest Region of the USDA Forest Service since at least 1998 (Devlin 1998a).

For these two reasons, the Devlin (1998a) science criteria will be used in this appendix to identify if reports and articles mentioned in comments to the School Fire Salvage Recovery Project are peer reviewed and published by credible sources, and whether they are articles, comments, or input considered to be opinion or editorials by scientists.

Note that the Devlin (1998a) letter did not provide explicit criteria for what constitutes "credible sources" of science information. We used accepted, government-agency standards of what qualifies as a credible source. Criteria supplied by the National Academy of Sciences was consulted, such as "publication in a peer-reviewed journal remains the standard means of disseminating scientific results" (Committee on Science, Engineering and Public Policy 1995), but research papers and notes, and general technical reports, particularly those published by the Forest Service's research branch, were typically handled as credible sources because they are produced using a peer-review process similar to what is employed for scholarly journals.

Beschta et al. Reports

The original Beschta Report (Beschta et al. 1995) was commissioned by Pacific Rivers Council. Apparently, it was neither peer-reviewed nor published in a credible source.

A similar version (Beschta et al. 2004) was subsequently published in a peer-reviewed journal called Conservation Biology. Since this version was peer reviewed and is available from a credible source, it is considered to have more scientific credibility than the original report.

Although the second Beschta report (Beschta et al. 2004) cited more literature than the first report to support the authors' points of view, it is considered to be an editorial or opinion piece.

One or both of the Beschta reports was mentioned by numerous respondents during public scoping or in response to the draft environmental impact statement. The Beschta report respondents generally advocated that natural recovery of burned landscapes, with little or no human intervention, is the optimal policy for public forests, and that this policy is supported by other literature such as American Lands Alliance (2005), DellaSala et al. (2006), Donato et al. (2006), Karr et al. (2004), Lindenmayer et al. (2004), and McIver and Starr (2000, 2001a).

The non-intervention respondents often stated that recovering economic value from dead trees is an inappropriate objective, particularly for public lands such as national forests, or that other values associated with dead trees (wildlife habitat, etc.) provide more net public benefit than revenue and related socioeconomic benefits (employment, income) derived from recovering the salvaged timber.

When US Forest Service research scientists reviewed the original Beschta report, they concluded that it was biased toward a custodial (hands off) approach (Everett 1995), and that it is generally accepted in the science community that limiting post-fire management to just a single approach (whether custodial or commodity) is inappropriate because forest sites encompass a wide range of variability, and this variability points to the need for site-specific plans addressing each salvage situation on a case-by-case basis (Everett 1995, McIver and Starr 2001b).

The Everett response (Everett 1995) to the original Beschta report (Beschta et al. 1995) was apparently not peer-reviewed or published in a credible source.

Relevance to the Forest Vegetation portion of the School Fire Salvage Recovery Project. We reviewed the Beschta Report (Beschta et al. 1995) and the Beschta journal article (Beschta et al. 2004). In our judgment, the School Fire Salvage Recovery Project includes an alternative that would react to the burned forest in a manner similar to what is recommended by Beschta et al. (1995, 2004) – the No Action alternative.

Specifically, the no action alternative would satisfy most or all of the Beschta et al. (1995, 2004) recommendations because it would not harvest trees in areas with steep slopes, sensitive soils, or severe fire intensity; it would not harvest trees in riparian areas; it would not build roads (whether temporary or permanent) to access harvest units; it would not harvest live trees (regardless of how tree mortality was determined); and it would not artificially regenerate (reforest) burned sites.

With these Beschta et al. (1995, 2004) limitations in place, most of the salvage timber harvest units in the proposed action (alternative B) would not be available for harvest, which means that the purpose and need for economic recovery of dead and dying trees would not be achieved.

A lack of agreement between the Beschta et al. (1995, 2004) recommendations and the School Fire Salvage Recovery Project proposed action is not surprising because the Beschta reports address ecosystem restoration goals, while the School Fire Salvage Recovery Project focuses on recovery of economic value.

American Lands Alliance "After the Fires" Report

The objective of the American Lands Alliance (ALA) report (American Lands Alliance 2005) is to "raise awareness among policy makers about the short- and long-term adverse ecological and economic impacts of post-fire logging." It draws extensively from the recent Beschta et al. (2004) article in Conservation Biology.

The ALA report provides an extensive list of individuals and organizations that helped to produce it. However, the ALA report does not appear to be peer-reviewed (or credit for peer review was not claimed) and it was not published in a credible source. The American Lands Alliance "After the Fires" report is considered to be an editorial or opinion piece.

The United States Forest Service prepared a response to the ALA report. It concluded that "ALA makes highly selective use of the scientific information that addresses this complex topic [logging after fires], ignores the legal mandates placed on the agency by Congress, and downplays the effects of inaction on public forests and local communities" (USDA Forest Service 2005).

The US Forest Service response to the ALA report was apparently not peer-reviewed or published in a credible source.

We reviewed the ALA "after the fires" report and the US Forest Service response to it. In our judgment, the School Fire Salvage Recovery Project includes an alternative that would react to the burned forest in a manner similar to what is recommended by the American Lands Alliance (2005) – the No Action alternative.

Our discussion about the Beschta et al. (1995, 2004) reports and their relevance to the School Fire Salvage Recovery Project, specifically the No Action alternative, also pertains to the ALA report, and it is incorporated here by reference.

McIver and Starr Salvage Logging Literature Synthesis and Review

The McIver and Starr report is entitled "Environmental effects of post-fire logging: literature review and annotated bibliography" (McIver and Starr 2000). The acknowledgments section of this report indicates that it was peer reviewed before being published by the Pacific Northwest Research Station in Portland, Oregon.

Results from the original General Technical Report (McIver and Starr 2000) were also reported in a peer-reviewed journal called the Western Journal of Applied Forestry (McIver and Starr 2001a), and this journal is a credible source.

The McIver and Starr report reviews the existing body of scientific literature about logging (timber harvest) following wildfire. Twenty-one post-fire logging studies were reviewed and interpreted. McIver and Starr concluded that while the practice of salvage logging after fires is controversial, the debate is conducted without the benefit of much scientific information (McIver and Starr 2000, 2001a).

They also concluded that the immediate environmental effects of post-fire logging are extremely variable and dependent on a wide variety of factors such as fire severity, slope steepness, soil texture and composition, the presence of preexisting roads, construction of new roads, timber harvest systems, and post-fire weather conditions (McIver and Starr 2000, 2001a).

Relevance to the Forest Vegetation portion of the School Fire Salvage Recovery Project. The McIver and Starr literature synthesis identified 21 studies worldwide that examined the environmental effects of post-fire salvage harvest (McIver and Starr 2000, 2001a).

Only 14 of the 21 studies included an unharvested control, which allows the effect of timber harvest to be isolated from unharvested areas with similar site conditions. Only 7 of the 14 studies with unharvested controls were replicated, which allows inferences from one study to be extrapolated or generalized to other areas with similar biophysical conditions (McIver and Starr 2000, 2001a).

Although 14 controlled studies might seem like an acceptable number, it is actually not very many when considering the extensive variability of site and ecosystem conditions exposed to salvage logging, particularly since the McIver and Starr report considered literature from around the world.

It is our judgment that any of the McIver and Starr salvage studies from areas outside the interior Pacific Northwest, the geographical region of the western United States containing the School Fire area, are likely to include site and ecosystem conditions differing from those found in the School Fire area.

Of the 14 primary studies with unharvested controls, seven of them do not apply to the School Fire area because they were conducted in geographical areas outside the interior Pacific Northwest: two studies from Australia, one study from Israel, and United States studies from central California, northwestern Wyoming, northern Arizona, and northwestern (coastal) California.

Because scientific information about salvage harvest was so sketchy, particularly for the geographic scope of their review ("the dry forested intermountain West"), McIver and Starr argued for the use of adaptive management techniques to monitor the effects of salvage logging, and to use monitoring results to adjust site-specific practices and prescriptions accordingly (McIver and Starr 2001a).

We reviewed the McIver and Starr report (McIver and Starr 2000) and its associated journal article (McIver and Starr 2001a). In our judgment, the McIver and Starr literature synthesis findings do not

adopt a definitive position with respect to the suitability (or unsuitability) of salvage timber harvest as an activity for recovering economic value from dead and dying trees, so it is difficult to judge their relevance to the purpose and need for the School Fire Salvage Recovery Project.

Much of the salvage logging literature considered by McIver and Starr (2000, 2001a) is rather dated and was based on older techniques, equipment and silvicultural prescriptions. Of the 14 primary studies with unharvested controls, only seven of them are relevant to the School Fire area and the dates for these studies range from 1970 to 1997. Note that four of the seven relevant studies were replicated experiments and the other three were unreplicated experiments or modeling studies.

We are aware of little or no research examining the effects of salvage timber harvest in the context of contemporary techniques, equipment and prescriptions. For this reason, it is likely that some aspects of the McIver and Starr literature synthesis are not relevant to the School Fire Salvage Recovery Project.

McIver and Ottmar Postfire Logging Article

One respondent mentioned a recent article published in a journal called Forest Ecology and Management (McIver and Ottmar 2007). This article describes a modeling study based on preliminary information about postfire development following a 1996 wildfire in the central Blue Mountains (the Summit fire on the Malheur National Forest). This article was published in a peer-reviewed journal and is available from a credible source.

We reviewed the McIver and Ottmar (2007) article, and concluded that it has some relevance to the School Fire Salvage Recovery Project because it suggests (as based on computerized modeling) that reburn potential could be influenced more by postfire development of herbaceous vegetation and shrubs than by using salvage harvest to remove woody fuels from the burned sites.

Although minimizing future reburn potential was not included in the School Fire Salvage Recovery Project purpose and need, and therefore it had no influence on the selection of proposed actions for the School Fire area, the risk of reburn was discussed as a regeneration concern in Appendix F of the School Fire FEIS.

The McIver and Ottmar (2007) article notes the importance of treating post-harvest slash as one option for protecting residual and developing tree stands, and the School Fire FEIS included such treatments for portions of the School Fire where slash loading was predicted to pose an unacceptable risk, but this article suggests that the time period when fuel loading differences between logged and unlogged areas might not be meaningful depending upon wildfire return intervals and other assumptions.

The McIver and Ottmar (2007) article recognized the variability associated with wildland sites, and it concluded that “in general, how logging-generated slash fuels influence future stand development will tend to vary from site to site, in accordance with a wide variety of factors.” This conclusion reiterates that natural variation would be expected to influence how results from this study could be extrapolated to other areas.

This modeling study suggests that future reburn potential might not be affected as much by large and small woody fuels as by non-woody fuels such as grasses and shrubs; regardless of what the fuel source was, this article suggests that a future reburn could result in a need to replant certain areas in order to bring stocking levels back up to Forest Plan minimums, particularly if reburning occurred within the first few decades after tree planting.

ICBEMP Scientific Assessment for Ecosystem Management

At least one respondent to the School Fire Salvage Recovery Project scoping activity mentioned that salvage logging is not compatible with ecosystem management (specifically, the comment referred to a section on page 178 in Quigley et al. (1996) called "Can salvage timber sales be compatible with ecosystem-based management?").

The acknowledgments section of this Interior Columbia Basin Ecosystem Management Project (ICBEMP) report indicates that it was peer reviewed before being published by the Pacific Northwest Research Station in Portland, Oregon.

The ICBEMP scientific assessment section referred to in this comment deals primarily with removal of large-diameter trees, and it is discussed in the context of the "Taylor Salvage Rider" bill passed by the US Congress in 1995 (PL 104-19). Note that the Taylor Salvage Rider legislation is no longer in effect.

The section referenced above concludes that "ecosystem-based management would emphasize removing smaller green trees with greater attention to prevention of mortality rather than removal of large dead trees."

Relevance to the Forest Vegetation portion of the School Fire Salvage Recovery Project. We reviewed the ICBEMP salvage timber sales section (Quigley et al. 1996) referenced by the respondent. In our judgment, this section is not relevant to the School Fire Salvage Recovery Project for four reasons:

1. The purpose and need for the salvage timber harvest component of the School Fire Salvage Recovery Project does not include "ecosystem-based management" objectives;
2. The proposed action for the School Fire Salvage Recovery Project does not include any removal of smaller green trees, as was recommended by the ICBEMP salvage section;
3. The School Fire Salvage Recovery Project proposes to remove a range of tree diameters involving trees that are exclusively dead or dying, rather than emphasizing larger trees, "both green and recent dead," of economically desirable species (as is mentioned in the ICBEMP section);
4. The School Fire Salvage Recovery Project is not formulated or proposed in the context of the Taylor Salvage Law (PL 104-19), and most of the ICBEMP discussion deals with provisions or implementation characteristics associated with the Taylor salvage bill.

Donato et al. Article

On January 5, 2006, a short article was published in Sciencexpress, an on-line affiliate of a print journal called Science, with this title: "Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk." The same or a slightly modified version was subsequently published as a single-page article in the full journal (Science) on January 20, 2006 (Donato et al. 2006a, 2006b).

The Donato article (Donato et al. 2006a, 2006b) was published in a peer-reviewed journal and is available from a credible source.

An analysis of the Donato methodology indicates that there might be serious flaws with the study and its design, including the statistical analysis of data (Baird 2006). The Baird (2006) analysis was apparently not peer-reviewed or published in a credible source (although it was apparently submitted to Science to be considered as a peer-reviewed rebuttal to the original Donato et al. article).

The Donato et al. article (2006a, 2006b) presents preliminary results from a post-fire study conducted in the 2002 Biscuit Fire area of southwestern Oregon. It concluded "that postfire logging, by removing naturally seeded conifers and increasing surface fuel loads, can be counterproductive to goals of forest regeneration and fuel reduction."

This conclusion was based on an examination of early conifer regeneration and fuel loadings, and it used a spatially nested sampling design of both logged and unlogged plots replicated across a portion of the Biscuit Fire area.

Relevance to the Forest Vegetation portion of the School Fire Salvage Recovery Project. We reviewed the Donato et al. (2006a, 2006b) article and believe it is relevant to the School Fire Salvage Recovery Project in at least two respects:

1. The School Fire action alternatives (alternatives B and C) include artificial regeneration (tree planting) for all areas that would be affected by the salvage timber harvest activity. The Donato study showed that postfire logging reduced natural regeneration by 71% (Donato et al. 2006a, 2006b), so the tree planting portion of the School Fire proposed action would help mitigate for any salvage-caused loss of naturally regenerated seedlings.
2. As described in the Regeneration Analysis for the School Fire (appendix D), many of the regeneration areas are considered to be at high risk of complete tree loss if another fire occurs in the next 10-30 years, primarily because of uncharacteristically high fuel loads created by the School Fire (Martin 2006). The risk of a future reburn is one reason for reducing large fuels in the School Fire area, and salvage timber harvest is a proposed activity for reducing large fuels.

Because the Donato article lacks specifics about when the salvage harvest occurred, it is not definitively known how many growing seasons occurred between the fire and the salvage harvest activity. If it is assumed that three growing seasons occurred between these events, then the finding about salvage logging causing a 71% reduction in natural regeneration is not unexpected because:

1. If post-fire weather conditions were conducive to germination of tree seeds, and if tree seeds were actually present, then we would expect some amount of natural tree regeneration to be established by three growing seasons after the fire (and if tree seed sources were functional during the entire 3-year period, the seedling amounts present in year 3 were probably greater than those in year 2, and the seedling amounts present in year 2 were probably greater than those in year 1);
2. If post-fire weather conditions were conducive to establishment of natural tree regeneration, and if obvious amounts of natural regeneration became established by avoiding mortality from competing vegetation or animal herbivory, then we would expect salvage harvest to have a negative effect on tree seedlings because they are too small to be avoided by harvest equipment, and they are too vulnerable to survive harvest-caused damage.

As described earlier in this document, the proposed salvage timber harvest activity is expected to occur during the first growing season following the School Fire, although some of it is also expected to occur during the second and third growing seasons.

Since the time interval between the School Fire and the majority of the proposed salvage harvest is shorter than the time interval associated with the Donato study, it is our judgment that the effect of salvage on natural regeneration would be less than what was reported by Donato because less natural regeneration is expected to be established by the first or second year after the fire than would be present if salvage occurred following the third growing season.

If the salvage timber harvest activity is implemented as proposed, thereby removing a reasonable proportion of the large-fuel component from affected areas, and if the associated small-fuel treatments are completed as proposed (see Martin 2006), then it is our judgment that regenerated stands (both natural and planted) would survive a future reburn to an extent that replanting would not be necessary to meet Forest Plan minimum stocking levels (table 1-2) (USDA Forest Service 1990a).

This conclusion about reburn outcomes is based on an assumption that future reburn potential would be affected primarily by a combination of large and small woody fuels; if future fire intensity is largely

related to non-woody fuels (such as grasses and shrubs), then a future reburn could still result in a need to replant certain areas in order to meet minimum stocking levels, particularly if reburning occurred within the first few decades after tree planting.

Shatford et al. Conifer Regeneration Article

One respondent mentioned a recent article published in the Journal of Forestry (Shatford et al. 2007). This article was published in a peer-reviewed journal and is available from a credible source.
We reviewed the Shatford et al. (2007) article, and concluded that some of its conclusions are similar to those from the Donato et al. (2006a, 2007b) article. The Donato article reported that conifer regeneration was variable but generally abundant for their study sites, and the Shatford et al. (2007) article reached similar conclusions, but with one important difference: the Shatford study sites have experienced a much longer period of postfire development (9-19 years) than the areas examined for the Donato study (3 years).

The Shatford et al. (2007) article does not examine the influence of salvage timber harvest on postfire conifer regeneration, or on post-treatment fuel loading. But with respect to the natural regeneration conclusions reached by both studies, they are similar, and since both studies occurred in the same ecoregion, the Shatford et al. (2007) article might indicate that we could expect the near-term results reported in the Donato article to be maintained over a longer term as well.
Note that both the Donato and Shatford articles pertain to an ecoregion (Klamath-Siskiyou) with substantial differences from the Blue Mountains section, particularly with respect to climate and geology, and these differences are perceived to have an important influence on whether results from either study could be appropriately extrapolated to the Blue Mountains.

Appendix F of the School Fire FEIS presents a regeneration analysis for the School Fire area. It describes how the potential for natural regeneration within the School Fire area was analyzed (see Map F-1): when an acceptable seed source was expected to result in natural regeneration, then it was emphasized as the regeneration method instead of tree planting. If regeneration results similar to what was reported in the Shatford et al. (2007) article also occur in the School Fire area, then it is likely that more natural regeneration will occur than was predicted in the School Fire FEIS.

However, an increase of natural regeneration in the School Fire area, as compared to what was predicted in the School Fire FEIS, is not expected to have an effect on the environmental consequences section of the FEIS because it is anticipated that the species composition of the natural regeneration would be similar to what would have been planted (the recommended planting mix is described in Chapter 2, table 2-2 of the School Fire FEIS), resulting in little or no change to predicted development of future composition and structure in the School Fire analysis area.

Lindenmayer et al. Salvage Harvest Article

The journal Science published a one-page article about salvage harvest on February 27, 2004 (Lindenmayer et al. 2004). Its position is that (1) salvage harvest undermines the ecosystem benefits of major disturbances; (2) removing biological legacies (large wood) can negatively affect many taxa; (3) salvage harvest can impair ecosystem recovery; and (4) some taxa might be maladapted to the interactive effects of two disturbance events in rapid succession (fire and salvage logging).

The Lindenmayer article (Lindenmayer et al. 2004) was published in a peer-reviewed journal and is readily available from a credible source. It is considered to be an editorial or opinion piece.

We reviewed the Lindenmayer et al. (2004) article. In our judgment, the School Fire Salvage Recovery Project includes an alternative that would respond to the burned forest in a manner similar to what is recommended by Lindenmayer et al. (2004) – the No Action alternative.

Our discussion about the Beschta et al. (1995, 2004) reports and their relevance to the School Fire Salvage Recovery Project, specifically the No Action alternative, also pertains to the Lindenmayer et al. (2004) article, and it is incorporated here by reference.

Society for Conservation Biology Scientific Panel Report

The Society for Conservation Biology published a white paper or report reviewing ecological science pertaining to fire management policies for western United States forests on February 24, 2006 (Noss et al. 2006).

The Society for Conservation Biology report (Noss et al. 2006) was apparently not peer reviewed (or credit for peer review was not claimed) and it was not published in a scientific journal or in another credible source.

The Society for Conservation Biology report is considered to be an editorial or opinion piece. This conclusion is based partially on the fact that no literature citations are provided for any of the key findings (or for any other statement or conclusion in the report), and the report does not include a "literature cited" section. These omissions make it more difficult for the reader to determine whether key findings and other statements are based on scientific literature, and to judge the veracity of key findings.

This report offers one or more "key findings" for each of the following primary topic or issue areas: (1) variable effects of fire exclusion, logging, livestock grazing, and plantations; (2) forests characterized by high-severity fires; (3) forests characterized by mixed-severity fires; (4) forests characterized by low-severity fires; (5) priorities and principles of ecologically-based forest restoration; (6) protected areas are essential for managing fire for ecological diversity; (7) management activities during wildfire; and (8) forest management after wildfire.

We reviewed the Society for Conservation Biology report (Noss et al. 2006). In our judgment, this report includes one topic or issue area that obviously pertains to the School Fire Salvage Recovery Project: the "forest management after wildfire" topic. This topic includes 10 key findings, and each of them will be discussed individually.

1. Research by both ecologists and foresters provides evidence that areas affected by large-scale natural disturbances often recover naturally.

   Response: although this key finding provides no explicit definition or criteria for what constitutes natural recovery, it is our judgment that the School Fire Salvage Recovery Project includes an alternative that would respond to the burned forest in a manner similar to what is reported here: the No Action alternative. The No Action alternative adopts a passive management approach emphasizing natural recovery of burned landscapes and little or no human interaction with ecosystem recovery processes.

2. Post-fire logging does not contribute to ecological recovery; rather it negatively impacts recovery processes, with the intensity of such impacts depending upon the nature of the logging activity.

   Response: although this key finding provides no explicit definition or criteria for what constitutes ecological recovery, it is our judgment that the School Fire Salvage Recovery Project includes an alternative that would respond to the burned forest in a manner similar to what is reported here: the No Action alternative. Since the No Action alternative adopts a passive management approach emphasizing natural recovery of burned landscapes, it responds to the philosophy that removal of

dead trees (using salvage timber harvest) makes an unfortunate situation even worse (Beschta et al. 1995, 2004).

3. Post-fire logging destroys much of whatever natural tree regeneration is occurring on a burned site.

   Response: this finding is similar to one of the two primary conclusions of the Donato et al. (2006) study, which is discussed earlier in this section. The School Fire action alternatives (alternatives B and C) include tree planting for all areas that would be affected by the salvage timber harvest activity. It is our judgment that this tree planting activity would help mitigate for any salvage-caused loss of natural tree regeneration.

4. Evidence from empirical studies is that post-fire logging typically generates significant short- to mid-term increases in fine and medium fuels.

   Response: the School Fire Salvage Recovery Project fuels analysis shows that salvage timber harvest will contribute to fuel loads that warrant treatment after harvest, but this result is expected for some of the salvage harvest units but not for all of them. When post-salvage fuel loads are predicted to exceed Forest Plan thresholds, then fuel treatments are proposed to reduce the salvage activity fuels to acceptable levels. This issue is addressed in more detail in the fuels analysis.

5. In forests subjected to severe fire and post-fire logging, streams and other aquatic ecosystems will take longer to return to historic conditions or may switch to a different (and often less desirable) state altogether.

   Response: this finding is beyond the scope of forest vegetation, so no response is offered. It is likely that this issue is addressed in the fisheries analysis.

6. Post-fire seeding of non-native plants generally damages natural ecological values, such as reducing the recovery of native plant cover and biodiversity, including tree regeneration.

   Response: this finding is beyond the scope of forest vegetation, so no response is offered. It is likely that this issue is addressed in the noxious weeds analysis.

7. Post-fire seeding of non-native plants is often ineffective at reducing soil erosion.

   Response: this finding is beyond the scope of forest vegetation, so no response is offered. It is likely that this issue is addressed in the noxious weeds and soils analyses.

8. There is no scientific or operational linkage between reforestation and post-fire logging; potential ecological impacts of reforestation are varied and may be either positive or negative depending upon the specifics of activity, site conditions, and management objectives. On the other hand, ecological impacts of post-fire logging appear to be consistently negative.

   Response: it is our judgment that the School Fire Salvage Recovery Project includes a direct linkage between reforestation and post-fire salvage harvest, and this linkage is mandatory because Forest Service policy is that the National Forest Management Act requires salvage harvest units to be reforested within 5 years of harvest (Goodman 2002). It is our judgment that the claim that "ecological impacts of post-fire logging appear to be consistently negative" is opinion, and that it is not supported by scientific literature or other evidence (and Noss et al. cite no scientific literature in support of this claim).

9. Accelerated reestablishment of extensive closed forest conditions after fire is usually not an appropriate objective on sites managed with a major ecological focus.

   Response: although this key finding provides no explicit definition or criteria for what constitutes "sites managed with a major ecological focus," it is our judgment that the School Fire Salvage Recovery Project includes ecologically appropriate regeneration recommendations (see table 1-3) because they vary by potential vegetation category (i.e., plant association group). Sites whose

ecological temperature-moisture regime is hot or warm, and dry, have dramatically lower seedling density levels (in table 1-3) than sites with a cool or moist temperature-moisture regime. It is our judgment that varying the regeneration recommendations by plant association group, as has been done in table 1-3, will reduce the potential for "extensive closed forest" getting reestablished on sites where it is an ecologically inappropriate condition (and closed forest is ecologically appropriate for some sites).

10. Where timber production, other societal management goals, or special ecological needs are the focus, planting or seeding some native trees and other plants using local seed sources may be appropriate.

    Response: Forest Service policy is that the National Forest Management Act has established a legal requirement to reforest salvage harvest units within 5 years of harvest (Goodman 2002). If natural tree regeneration is predicted to be insufficient or ineffective at meeting this legal requirement, then tree planting (artificial tree regeneration) is proposed in the School Fire Salvage Recovery Project. The rationale for natural and artificial regeneration assumptions is provided in the Regeneration Analysis for the School Fire (appendix D of this document). Tree seedlings and other native plant materials are always produced from local seed sources.

Lindenmayer and Noss Salvage Logging Article

One respondent mentioned a recent article published in a journal called Conservation Biology (Lindenmayer and Noss 2006).

This article was published in a peer-reviewed journal and is available from a credible source. We reviewed the Lindenmayer and Noss (2006) article, and concluded that its recommendations are similar to those offered by the Lindenmayer et al. (2004) salvage harvest article, and the Society for Conservation Biology scientific panel report (Noss et al. 2006). Our responses to those items are also applicable to the Lindenmayer and Noss (2006) salvage logging article.

Note that the Lindenmayer and Noss (2006) article is a literature survey or synthesis; it does not report research results from a new or previously unpublished salvage logging study. As such, it can be considered to be an opinion piece offering commentary by two scientists, and one of its stated objectives is to build on the literature surveys conducted by McIver and Starr (see earlier section entitled "McIver and Starr Salvage Logging Literature Synthesis and Review").

Noss et al. (2006) Postfire Management Article

One respondent mentioned a recent article published in a journal called Frontiers in Ecology and the Environment, a journal published by the Ecological Society of America (Noss et al. 2006). This article was published in a peer-reviewed journal and is available from a credible source.

We reviewed the Noss et al. (2006) article, and concluded that its recommendations are similar to those offered by the Society for Conservation Biology scientific panel report (Noss et al. 2006). Our response to that item is also applicable to the Noss et al. (2006) postfire management article.

Note that the Noss et al. (2006) article is a literature survey or synthesis; it does not report research results from a new or previously unpublished salvage logging study. As such, it can be considered to be an opinion piece offering commentary by five scientists, as illustrated by this example: "Post-fire logging usually has no ecological benefits and many negative impacts; the same is often true for post-fire seeding."

It is our judgment that the commentary expressed in the Noss et al. (2006) is similar to the commentary discussed previously in this section (Beschta reports, American Lands Alliance report, McIver and Starr literature syntheses, ICBEMP scientific assessment, Lindenmayer et al. salvage article, and Society for Conservation Biology report).

Logging and Forest Health (Insects and Diseases)

One respondent mentioned that salvage timber harvest (or any logging for that matter) should not be used as justification for reducing insect and disease effects in timber stands. This comment also asked that we consider the large body of research indicating that logging, roads and other human-caused disturbance promotes the spread of tree diseases and insect infestations.

Although not mentioned specifically in the comment, this sentiment is similar to what was embodied in a recent report called "Logging to control insects: the science and myths behind managing forest insect 'pests'" (Black 2005).

The Black report might have been peer-reviewed (as based on its acknowledgments section). It was not published in a scientific journal or similar source.

The United States Forest Service prepared a response to the Black report (USDA Forest Service 2006). It concluded that:

> "the Black report contains many examples of erroneous statements that are not even supported by the report's cited literature. Professional foresters and land managers will be able to see this deficit. Unfortunately, this report may be viewed by others as refuting hundreds of published papers on effectively managing forest insects and diseases, which it does not. It will be more unfortunate when a poorly written but popular document such as the Black report is used as supporting information during litigation. During any project analysis, such a document should be considered in the context of its biased authorship, limited credibility, and dubious scientific value. It is recommended that analysis teams refer directly to the appropriate refereed or peer-reviewed literature and site-specific data, rather than popular review reports such as this."

The US Forest Service response to the Black report was peer reviewed by professional entomologists and pathologists of the Pacific Northwest Region of the U.S. Forest Service. The Forest Service response to the Black report is not available to the wider scientific community from a credible science source such as a journal.

We reviewed the Black (2005) report. In our judgment, the School Fire Salvage Recovery Project appropriately considers "insect and disease damage" by using the Scott Guidelines to predict tree mortality (Scott et al. 2002, 2003), and the Scott Guidelines incorporate three insects or diseases as predisposing factors influencing post-fire tree mortality: dwarf mistletoe occurrence, root disease occurrence, and bark beetle pressure within or adjoining the fire area (Scott et al. 2002, 2003).

Using the Scott Guidelines for tree mortality estimation means that bark beetle activity in close proximity to the salvage harvest areas was considered as one criterion (in addition to outward indicators of first-order fire effects such as bark scorch, scorched or consumed foliage, and duff consumption at the tree base) when predicting tree mortality.

Filip et al. (2007) Conifer Mortality Article

The Regional Forester of the Pacific Northwest Region of the U.S. Forest Service issued a policy letter in 2005 (Goodman 2005) in which she attempted to clarify how tree mortality should be determined, specifically in the context of Regional Forester's Plan Amendment #2 (commonly referred to as the Eastside Screens). This letter included an enclosure called "Understanding and Defining Mortality in Western Conifers" (commonly referred to as the "conifer mortality" paper) (Schmitt and Filip 2005).

The conifer mortality paper was subsequently submitted to a scientific journal for peer review and eventual publication. After several rounds of peer review, the conifer mortality paper was published in a peer-reviewed journal and is available from a credible source (Filip et al. 2007).

As was the case for many other items reviewed in this section, the conifer mortality article (Filip et al. 2007) is a literature survey or synthesis; it does not report research results from a new or previously unpublished conifer mortality study. As such, it can be considered to be an opinion piece offering commentary by four scientists.

We reviewed this article, and concluded that it applies directly to the DSEIS because it examines many of the fire effects that ultimately cause mortality for fire-injured conifers, and it discusses the fire effects that have been found to be most useful for predicting whether tree mortality is imminent (imminent is defined by this article as mortality occurring within 5 years of a fire).

The Filip et al. (2007) article proposes that a "dead tree" designation is justified for most tree species when at least three of the four quadrants around the base of the root collar have cambium, inner bark, or phloem that are discolored or dead. This definition of a dead tree was adopted for the School DSEIS, although the DSEIS also includes mortality criteria other than the Filip et al. (2007) basal cambium standard.

Comments About the Scott Guidelines

Several respondents to the School Fire Salvage Recovery Project commented that the project's basis for differentiating between dying and living trees is either questionable or untenable for scientific and other reasons. Often, these comments specifically addressed use of the Scott Guidelines (Scott et al. 2002, 2003), which is a protocol used to evaluate fire-injured trees and to predict their survival for up to one year after the fire (beyond one year after fire for mature or overmature ponderosa pine and grand fir or white fir).

The Scott Guidelines were apparently not peer-reviewed or published in a credible source.

Waring Report. One respondent provided a report (prepared by Richard Waring) describing an evaluation of the Scott Guidelines for the Easy and High Roberts salvage sales on the Malheur National Forest.

In this report, Waring concluded that using indirect indicators (such as the "crown and bole scorch" factors from the Scott Guidelines) to assess a tree's predisposition to fire-caused mortality is inappropriate, and that direct measurement of a tree's physiological processes (photosynthesis or transpiration) provides a better estimate of survival potential.

The Waring report was apparently not peer-reviewed or published in a credible source.

Waring's report contends that measurements of water stress, using either a pressure chamber (Waring and Cleary 1967) or by collecting increment cores and then analyzing the sapwood's relative water content (Waring and Running 1978), provides definitive estimates of tree health and survival potential.

We disagree with Waring's contention. Assessing the moisture status of fire-injured trees, such as measuring moisture stress with a pressure chamber (Waring and Cleary 1967) or by analyzing sapwood water content (Waring and Running 1978), indicates only that the tree's vascular system was functional when the measurement is taken. It provides no assurance that the tree's vascular system will continue to function in the future.

Ryan (2000) studied the effects of varying levels of fire-caused cambium injuries on the water relations of ponderosa pine, and he found that crown scorch and basal girdling had only minor effects on summer water relations.

He found that trees in the 100% basal-heating class, which experienced cambium kill over an average of 95% of the circumference at their base, had higher midday xylem pressure potentials (i.e., less stress) than non-girdled trees (Ryan 2000). This result was apparently due to phloem unloading that created a net water flow to the xylem tissue (Kozlowski 1992).

For the 100% basal-heating class, half of the trees died quickly and the other half were still alive at the end of the second growing season (two growing seasons was the length of the study period). The six surviving trees suffered no apparent decline in water relations despite the fact that three of them had basal girdling affecting 96% or more of their circumference.

If we assume that an extreme amount of basal girdling (96% or more of the circumference) will eventually result in tree death, then one possible conclusion from this study is that the ultimate effect of extreme basal girdling was not exhibited within two growing seasons of the injury (Ryan 2000).

Because mortality of basal-girdled trees can be delayed for several years (Agee 2003; Herman 1954; Kaufmann and Covington 2001; Kolb et al. 2001; McHugh and Kolb 2003; Ryan and Amman 1994, 1996; Sackett and Haase 1998; Swezy and Agee 1991; Thies et al. 2005, 2006; and Thomas and Agee 1986), and because the Scott Guidelines specifically address this basal-injury issue, it is our judgment that the Ryan (2000) study supports the Scott Guidelines as a physiologically appropriate protocol for predicting tree mortality.

Since the Ryan (2000) study also suggests that mortality of basal-girdled trees can be delayed for more than two growing seasons, it also refutes Waring's contention that a one-point-in-time measurement of water stress (i.e., Waring and Cleary 1967) provides a better methodology than the Scott Guidelines for differentiating between living and dying trees.

Relevance to the Forest Vegetation portion of the School Fire Salvage Recovery Project. In our judgment, it is appropriate that the School Fire Salvage Recovery Project adopted the Scott Guidelines to help predict which of the fire-affected trees might succumb to their injuries over a specific period of time (one year for all species and size classes except for mature and overmature ponderosa pine or grand fir and white fir, for which the time period is beyond one year after fire).

The decision to use the Scott Guidelines to predict tree mortality follows established administrative policy for the Pacific Northwest Region of the USDA Forest Service. Two administrative policy letters issued in 1998 (Devlin 1998a, 1998b) allow injured (dying) trees to be identified as dead if there is a professional determination that the trees will die within five years:

> "…dying trees can be counted as snags **if** there is a professional determination that the tree will definitely be dead within 5 years. Careful documentation is important. Trees that are weakened or defoliated from stress or disease, but which do not meet documented, professional criteria that they will definitely be dead in 5 years can not be counted as snags" (2430/2600 memo of September 10, 1998) (Devlin 1998a).
>
> "Rigorous application of a Forest Pest Management-written standard for identifying the level of infestation expected to be fatal, is sufficient to identify trees as dead. The standard should be included or referenced in the project planning documents" (2430/2600 memo of August 27, 1998) (Devlin 1998b).

It is our judgment that using the Scott Guidelines (Scott et al. 2002, 2003), which were prepared by professional entomologists and a pathologist in the field of Forest Health Protection (e.g., Forest Pest Management), to determine the probability of tree survival is a "professional determination" as defined by the Pacific Northwest Region (Devlin 1998a, 1998b).

Our judgment is supported by an administrative policy letter issued by the Pacific Northwest Regional Forester (Goodman 2005) in which she specifically referred to the Eastside Screens Oversight Team letters (Devlin 1998a, 1998b), and she further stated that:

> "These 'Scott' guidelines establish a scientific basis for determining the relative probability of post-fire tree survival. They describe conditions that result in tree death or will lead to delayed tree mortality and hence, implicitly define 'tree mortality.'"

It is our judgment that this administrative policy and direction means that:

(1) Administrative policy states that a "professional determination," defined as a Forest Pest Management-written standard, is sufficient to identify fire-injured trees as dead (Devlin 1998a, 1998b);

(2) The Regional Forester states that the Scott Guidelines are a scientific (professional) determination of tree survival (Goodman 2005);

(3) The Scott Guidelines were prepared by entomologists and a pathologist assigned to the Forest Health Protection group (this organization was previously called Forest Pest Management), so they qualify as a Forest Pest Management-written standard;

(4) In the context of the Eastside Screens amendment to the Forest Plan, delayed tree mortality identified using the Scott Guidelines is considered as dead trees (Devlin 1998a, 1998b; Goodman 2005);

(5) Although dead trees are used to meet the snag and down wood requirements, most of the Eastside Screens amendment applies to live trees only (Norris 2005, USDA Forest Service 1995);

(6) The Eastside Screens requirement in scenario A to "maintain all remnant late and old seral and/or structural live trees ≥ 21" DBH" (emphasis added) does not apply to dead trees; and

(7) The Eastside Screens do require that snags ≥ 21" DBH be maintained, but not necessarily all of them because snag retention is based on 100% potential population levels for primary cavity excavators.

It is our observation that using the Scott Guidelines for the School Fire Salvage Recovery Project is consistent with similar projects in the Pacific Northwest Region of the USDA Forest Service; the Scott Guidelines have recently been used with the Flagtail, Monument, High Roberts, and Easy fire salvage projects (Malheur National Forest); the B&B complex (Deschutes National Forest); and the Fischer fire (Okanogan-Wenatchee National Forests) (Scott 2005).

Critics of the Scott Guidelines contend that they overestimate tree mortality when compared with alternative tree mortality prediction models. Alternative models frequently mentioned by respondents to the School Fire Salvage Recovery Project are McHugh and Kolb (2003), Peterson and Arbaugh (1986), Ryan and Reinhardt (1988), Stephens and Finney (2002), and Thies et al. (2006).

In the context of the School Fire Salvage Recovery Project, we believe that the Scott Guidelines are more appropriate for predicting tree mortality than any of the alternative models individually. Our basis for this belief is that a comprehensive assessment of tree injury, and any associated prediction of fire-caused tree mortality, must consider the effect of fire injuries on the whole tree rather than just one or more of its parts (Connaughton 1936, Dieterich 1979, Fowler and Sieg 2004, Johnson and Miyanishi 2001, Lynch 1959, Regelbrugge and Conard 1993, Ryan 1990, Salman 1934, Wagener 1961, Weatherby et al. 2001).

As Jiminez (2004) observed: "*It is possible for a tree to survive if the cambial tissue is destroyed on only a portion of its circumference (Peterson and Arbaugh 1986, 1989, Peterson and Ryan 1986, Brown and DeByle 1987, Durcey et al. 1996, McHugh and Kolb 2003). But the combined effects of root, crown, and stem damage may kill a tree, even if the stem itself is not completely girdled (Ryan 2000, Dickinson and Johnson 2001, McHugh and Kolb 2003).*"

It is well established in the scientific literature that a comprehensive model of post-fire tree mortality should account for injuries to fine roots caused by smoldering combustion during duff consumption (e.g., Brown et al. 1991, Fowler and Sieg 2004, Hille and Stephens 2005, Johnson et al. 2001, Miller 2000, Miyanishi 2001, Miyanishi and Johnson 2002, Pyne et al. 1996, Ryan and Frandsen 1991, Stephens and Finney 2002, Swezy and Agee 1991, and others).

Cambial damage accompanying surface fire does not account for fine-root injury because surface fires are rarely of sufficient duration to cause this type of tree injury in the absence of smoldering combustion (Peterson and Ryan 1986).

Prescribed Fire Versus Wildfire. Some tree mortality prediction models have been developed using data from prescribed fires only (Scott et al. 2002). Since the School Fire was a wildfire, it might not be appropriate to use a mortality-prediction model based exclusively on prescribed fire effects.

A primary objective of prescribed fire is to modify the existing fuel loading of an area by igniting fire during weather conditions when fire behavior is expected to remain within designated parameters (Stratton 2004). The fire behavior parameters are designed to meet specific fire effects objectives such as minimizing unwanted tree mortality or unacceptable amounts of mineral soil exposure and associated erosion.

Fire effects are managed by selecting favorable weather conditions for prescribed fire. Prescribed fire is generally conducted under relatively benign weather conditions (e.g., 70° F. temperature, high relative humidity, low wind speeds, etc.) varying dramatically from late-summer conditions when the School Fire occurred (e.g., temperatures in the high 90s, low relative humidity, moderate or high wind speeds, etc.).

Unlike certain other regions of the country, prescribed fire in the Blue Mountains is typically implemented during time periods outside of the normal wildfire season (prescribed fire is implemented in April-May or October, whereas wildfire occurs in July-September). These timing differences provide another indication that prescribed fire differs from wildfire.

When comparing prescribed fire and wildfire, differing weather conditions produce differing fire behavior, which in turn produces differing fire effects. Since tree mortality prediction relies on some combination of fire effects (to the crown, stem and roots), the comparatively narrow range of fire effects for prescribed fire could limit a model's applicability for the broad range of fire effects associated with late-summer wildfires (Bevins 1980).

Because the School Fire was a late-summer wildfire with fire effects exceeding those typically produced by prescribed fire, it is our judgment that a tree mortality prediction model developed exclusively from prescribed fire data is not appropriate for use with the School Fire.

Our rationale for selecting the Scott Guidelines for use with the School Fire Salvage Recovery Project, rather than one or more of the suggested alternatives (McHugh and Kolb 2003, Peterson and Arbaugh 1986, Ryan and Reinhardt 1988, Stephens and Finney 2002, and Thies et al. 2006), is explained below.

1. The McHugh and Kolb (2003) model was developed using data from three wildfires in northern Arizona. It includes one conifer species (ponderosa pine) and it relates predicted tree mortality to two fire effects: total crown damage (scorch plus consumption), and bole char severity.

   It is our judgment that the McHugh and Kolb (2003) model is inappropriate for use with the School Fire Salvage Recovery Project for four reasons (table F-1):

   a. Its geographical scope is limited (northern Arizona);

   b. It assesses the crown and stem systems only (no direct consideration of the root system);

   c. Its tree species coverage is limited (ponderosa pine only); and

d. It lacks a measure addressing fine-root damage or basal stem girdling at the root crown (Ryan and Frandsen 1991).

2. The Peterson and Arbaugh (1986) model was based on tree survival patterns after late-summer wildfires in the northern Rocky Mountains. It includes two conifer species (Douglas-fir and lodgepole pine) and it relates predicted tree mortality to a wide variety of tree characteristics and fire effects: tree diameter, tree height, crown diameter and ratio, bark thickness, scorch height, crown scorch volume, basal scorch, bark char, and insect damage.

Although the variety of predictive factors included with this model is impressive, it is our judgment that the Peterson and Arbaugh (1986) model is inappropriate for use with the School Fire Salvage Recovery Project for three reasons (table F-1):

a. Its geographical scope is limited (northern Rocky Mountains of Montana, northwestern Wyoming, and Idaho);

b. It assesses the crown and stem systems only (no direct consideration of the root system); and

c. Its tree species coverage is limited (Douglas-fir and lodgepole pine only).

3. The Ryan and Reinhardt (1988) model was developed to predict tree mortality following prescribed fires in Idaho, Montana, Oregon and Washington. It includes seven conifer species and it relates predicted tree mortality to two factors: bark thickness, and crown volume killed by fire.

Several fire effects and fire behavior computer software applications have adopted the Ryan and Reinhardt (1988) model to predict post-fire tree mortality, thus making it widely available to fire analysts. It has been used to predict tree mortality in applications such as the "First Order Fire Effects Model" (FOFEM) (Reinhardt et al. 1997) and "BehavePlus" (Andrews and Bevins 1999).

The Ryan and Reinhardt (1988) equations are based on the assumption that differences in fire-caused tree mortality can be accounted for primarily by differences in bark thickness and the proportion of tree crown killed (Reinhardt et al. 1997). This model mainly addresses first-order fire effects – those occurring as a direct result of the fire combustion process (Reinhardt et al. 2001).

The authors of the Scott Guidelines used the Ryan and Reinhardt (1988) model when developing their rating procedure, in addition to other models and criteria that better account for the totality of fire effects (including root damage). It is well established that accurate predictions of tree mortality should account for injuries to all of the primary physiological systems of a tree: the crown, stem and roots (e.g., Fowler and Sieg 2004, Johnson and Miyanishi 2001, Ryan 1990, Wagener 1961).

It is our judgment that the Ryan and Reinhardt (1988) model is inappropriate for use with the School Fire Salvage Recovery Project for three reasons (table F-1):

(1) Its geographical scope is limited because the Oregon data came from the western or northern Cascade Mountains, or from the southwestern portion of the state near Medford;

(2) It assesses the crown and stem systems only, whereas the Scott Guidelines account for injuries to all three physiological systems (crown, stem, and roots) (Ryan and Frandsen 1991); and

(3) It was developed using prescribed fire data (see discussion above about the differences between prescribed fire and wildfire).

4. The Stephens and Finney (2002) model was developed to predict tree mortality following prescribed fire in the southern Sierra Nevada Mountains of California. It includes five conifer species and it relates predicted tree mortality to four factors: tree diameter, percent crown volume scorched, forest floor (duff) consumption, and crown scorch height.

It is our judgment that the Stephens and Finney (2002) model is inappropriate for use with the School Fire Salvage Recovery Project for three reasons (table F-1):

a. Its geographical scope is limited (southern Sierra Nevada Mountains);

b. Its tree species coverage is limited (of the five conifers included in this model, only ponderosa pine occurs in the School Fire area); and

c. It was developed using prescribed fire data (see discussion above about the differences between prescribed fire and wildfire).

5. The Thies et al. (2006) model was developed to predict tree mortality following prescribed fire in the southern Blue Mountains of northeastern Oregon. It includes one tree species (ponderosa pine) and it relates predicted tree mortality to five factors: live crown proportion, needle scorch proportion, bud kill proportion, basal char severe, and bole scorch proportion.

The size class variation for trees included in this study is quite limited due to similar stand replicates: pre-treatment tree diameter at breast-height (DBH) for control units averaged 28.4 cm (11.2 inches), and the diameters for trees in the fall and spring burning treatments averaged 26.6 cm (10.5 inches) and 27.4 cm (10.8 inches), respectively.

The authors of this study also caution about extrapolating its results, and using its mathematical models, beyond the geographical area of the sampled stands or with tree species other than ponderosa pine, until datasets are produced to validate the models for other geographical areas or tree species.

It is our judgment that the Thies et al. (2006) model is inappropriate for use with the School Fire Salvage Recovery Project for six reasons (table K-1):

(1) Its geographical scope is limited (a specific set of sampled stands in the southern Blue Mountains);

(2) Its ecological scope is limited (sampled stands are in the ponderosa pine potential vegetation series, and only 1.6% of the School Fire area is included in this series; see table B-1);

(3) Its tree species coverage is limited (ponderosa pine only);

(4) The tree-size variation included in the model-development dataset (a range of 10.5 to 11.2 inches average stand diameter across all replicates) is limited when compared with tree-size variation encountered in the School Fire area;

(5) It assesses the crown and stem systems only (no direct consideration of the root system); and

(6) It was developed using prescribed fire data (see discussion above about the differences between prescribed fire and wildfire).

Summary: The Scott Guidelines provide a methodology for predicting the relative probability of survival for fire-injured trees growing on a wide variety of site conditions, exposed to varying levels of pre-fire factors that can predispose a tree to fire-induced mortality depending upon their severity or magnitude (occurrence of dwarf mistletoe, root disease, and bark beetles), and experiencing widely varying levels of first-order fire effects to their crowns, stems and roots.

The possible combinations of these factors are almost limitless, leading inevitably to a decision to develop a prediction system relating site and tree factors (explanatory variables) to some type of probabilistic estimate of tree mortality. This regression or modeling approach is commonly used in science, particularly for complex situations such as wildland ecosystems (Rubinfeld 2000).

Since it is not possible to account for every combination of variables that could potentially result in tree death, there will always be some amount of uncertainty associated with a probabilistic rating system such as the Scott Guidelines.

This same statement about uncertainty applies to the alternative modeling approaches suggested by Dr. Royce and other respondents to the School Fire Salvage Recovery Project (i.e., McHugh and Kolb 2003, Peterson and Arbaugh 1986, Ryan and Reinhardt 1988, Stephens and Finney 2002, and Thies et al. 2006) because they provide an estimate (prediction) of tree mortality or tree survival, not an absolute or definitive determination

Table 3-1. Comparison of Post-Fire Tree Mortality Models.

	McHugh and Kolb (2003)	**Peterson and Arbaugh (1986)**	**Ryan and Reinhardt (1988)**	**Scott et al. (2002, 2003)**	**Stephens and Finney (2002)**	**Thies et al. (2006)**
Geographical area included	Northern Arizona	Idaho, Montana, northwestern Wyoming	Idaho, Montana, western and southwestern Oregon, Washington	Northeastern Oregon (Blue and Wallowa Mountains)	Central California (Sequoia NP)	Northeastern Oregon (southern Blue Mountains)
Tree species included	Ponderosa pine	Douglas-fir Lodgepole pine	Douglas-fir Western larch Engelmann spruce Lodgepole pine Subalpine fir Western red cedar Western hemlock	Ponderosa pine Douglas-fir Engelmann spruce Lodgepole pine Western larch Grand/white fir Subalpine fir Western white pine	White fir Sugar pine Ponderosa pine Incense cedar Giant sequoia	Ponderosa pine
Fire type used for model development	Wildfire (spring, early summer, late summer)	Wildfire (late summer)	Prescribed fire (May through October)	Wildfire (mid to late summer)	Prescribed fire (fall)	Prescribed fire (spring and fall)
Tree mortality prediction factors or variables used	Crown damage Bole char severity	Crown scorch Basal scorch Bark char ratio Bark thickness Insect damage	Crown volume killed Bark thickness	Season of fire Pre-fire vigor, growth rate, site quality Down woody material Dwarf mistletoe occurrence Root disease	DBH Percent crown volume scorched Duff consumption Crown scorch height	Live crown proportion Needle scorch proportion Bud kill proportion Basal char severe Bole scorch proportion

	McHugh and Kolb (2003)	Peterson and Arbaugh (1986)	Ryan and Reinhardt (1988)	Scott et al. (2002, 2003)	Stephens and Finney (2002)	Thies et al. (2006)
				occurrence Bark beetle pressure Crown volume scorch Bole scorch/char Total scorch height Duff consumption Bole/root char at ground surface		
Tree physiological systems included	Crown Stem/bole	Crown Stem/bole	Crown Stem/bole	Crown Stem/bole Roots	Crown Stem/bole Roots	Crown Stem/bole
Considers insect or disease agents	No	Yes	No	Yes	No	No
Other comments			Widely used for fire effects modeling (FOFEM, BehavePlus, etc.)			Tree-size variation included in study replicates was very narrow

Sources: McHugh and Kolb (2003), Peterson and Arbaugh (1986), Ryan and Reinhardt (1988), Scott et al. (2002, 2003), Stephens and Finney (2002), and Thies et al. (2006).

HYDROLOGY/WATER QUALITY

Beschta et al. Reports 1995, 2004

Relevance to the Hydrologic Analysis. Both the 1995 and 2004 documents were reviewed. Concerns were expressed regarding the sensitivity of riparian areas and recovery rates of stream ecosystems from fire effects, including providing for structural components for their recovery. Design features (Chapter 2, Table 2-3) for the proposed alternatives include designation of PACFISH RHCAs which provide protection to near channel areas by precluding harvest. Existing structural components would remain available to stream ecosystems and recovery rates would not be slowed. Other design features and BMPs have been identified to control and minimize effects of proposed actions, including temporary road construction and road use.

Everett, R. 1995, Memorandum to John Lowe, Review of Beschta Document.

Relevance to the Hydrologic Analysis. Dr. Everett states that some studies have shown increased soil disturbance and erosion following post fire logging. He cites literature that was reviewed, and in one case cited (Klock, 1975) in the hydrologic effects analysis. Soil disturbance and erosion is expected to increase following salvage logging, based on the hydrologic analysis. The analysis shows that increased erosion due to salvage and related activities would be small relative to increases resulting from the School Fire and would be of relatively short duration. Design features (Chapter 2, Table 2-3) and best management practices have been identified which would control and limit the magnitude of ground disturbance and erosion in action alternatives.

American Lands Alliance, After the Fires do No Harm

Relevance to the Hydrologic Analysis. This publication was reviewed. Concerns regarding riparian areas, recovery of stream ecosystems, and providing for structural components for that recovery were similar to those expressed in the Beschta et al. reports. The discussion for Beschta et al. pertains to the ALA report.

McIver, James D., Starr, Lynn, tech. eds. 2000

Relevance to the Hydrologic Analysis. McIver and Starr found 9 studies that looked erosion/sedimentation or water yield, two without an unlogged wildfire control. Differing results for the study parameters appear to be due to variability between sites, treatments, and weather patterns and does not reflect scientific controversy. Summarized results are consistent with other literature reviewed during the preparation of the EIS and was used in the discussion of environmental effects.

Other sources cited in comments

Relevance to the Hydrologic Analysis. Several sources were cited in comments which discussed elevated erosion from roads, effects of increased sediment loads and peakflows on channel morphology, and peakflow effects of green tree logging and road construction. These sources are within the body of scientific literature that informs hydrologic analysis. Other studies and especially the most recent literature available pertaining to post fire conditions and fire salvage logging were used in the analysis for this EIS. Erosion from roads post fire and from road use during proposed salvage logging was discussed and extensively analyzed in the hydrologic effects analysis. Peakflow and channel morphology changes were also discussed and analyzed.

FISHERIES

As noted by Bisson et al. (2003), wildfire, fuels management and fire suppression activities can all alter aquatic ecosystems, and recent developments in disturbance ecology have led conservation biologists and ecologists to recognize that landscapes are dynamic and should be managed in that context to restore natural processes to aquatic and terrestrial where they are operating outside the natural range of variability (Rieman et al.. 2003; Karr et al.; Everett et al. 1995). There is recognition by some supporters of passive recovery that active management following a fire could still be appropriate under certain circumstances. Beschta et al. 1995, for example, recommended removal of roads at hydrologic risk following fires to help to restore hydrologically appropriate drainage patterns at watershed-scale, as well as restore within-channel connectivity. As Bisson et al. (2003) noted, each fuels treatment or response to wildland fire is unique in its ecological circumstances and in its social context. As Rieman et al. (2003) noted, there are no universal answers that would apply to fire and fuels conditions on every forest and watershed in the western United States, given the ecological variability across the landscape that shapes the debate at local scales.

Beschta et al. Reports; Everett et al. 1995; McIver and Starr 2000, 2001

One or the other of the Beschta reports was mentioned by numerous respondents during the public scoping phase of the School Fire Salvage Recovery Project. The original Beschta Report (1995) was commissioned by Pacific Rivers Council. A similar version (Beschta et al. 2004) was subsequently published in a peer-reviewed journal called Conservation Biology. Beschta et al. (2004) was published in the Forum section of the Journal of Conservation Biology, which is a section of the journal reserved for commentary, policy advocacy and related articles based on scientific research and professional observation. In their 2004 article, they cited McIver and Starr (2000) (discussed below) in support of their recommendations. McIver and Starr (2000, 2001) reviewed and discussed commentaries by Beschta et al. (1995) and Everett et al. (1995). They noted that Everett et al. (1995) were more oriented towards active management strategies and case-by-case evaluations of salvage logging, whereas, Beschta et al. (1995) focused on re-establishment of natural disturbance regimes and supported post-fire logging, reseeding and replanting only under limited circumstances. The fisheries analysis assessed the effects to aquatic habitats and fish species from both active management alternatives and from natural disturbance processes associated with the No Action alternative

Both the 1995 and 2004 documents authored by Beschta and his associates were reviewed. Concerns were expressed regarding the sensitivity of riparian areas and recovery rates of stream ecosystems from fire effects, including providing for structural components for their recovery. Design features (Chapter 2, Table 2-3) for the proposed alternatives include designation of PACFISH RHCAs which provide protection to near channel areas by precluding harvest. Existing structural components would remain available to stream ecosystems and recovery rates would not be slowed. Other design features (Chapter 2, Table 2-3) and BMPs have been identified to control and minimize effects of proposed actions on sediment delivery and large wood recruitment, including temporary road construction and temporary use of pre-existing unauthorized roads, road use and hazard tree management.

When US Forest Service research scientists (Everett et al. 1995) reviewed the 1995 report by Beschta and his associates, they noted that forest ecosystems and fires as they have operated in recent decades encompass a wide range of variability and varying degrees to which disturbance processes and regimes have been altered, and that this variability points to the need for site-specific plans addressing each salvage situation on a case-by-case basis. This report, like Beschta et al. (1995), was categorized by McIver and Starr (2000, 2001) as commentary by scientists. McIver and Starr (2000) was explicitly instigated by the exchange of views in the two 1995 commentaries, and was published as a Forest Service

technical report following peer review. They compiled and evaluated available information published through August 1998 on the subject of post-fire salvage harvest on erosion, sediment production, and sediment delivery. McIver and Starr (2001) was essentially the same report, peer-reviewed and published in a non-Forest Service scientific journal.

McIver and Starr (2000, 2001) were able to find only seven scientific studies in the western United States which directly investigated effects of post-fire salvage harvest on erosion, sediment movement (sedimentation) and sediment delivery (to stream channels), with controls for comparison of effects of salvage following fire. During their review and annotation of those seven studies, they found that four of the seven studies detected increased erosion and sediment movement following post-fire logging. Two studies, Helvey (1980) and Helvey et al. (1985) in the eastern Cascades of Washington, detected increased sediment yields with post-fire logging relative to sediment yields generated by the fire itself. Chou et al. (1994b) found increased sedimentation from post-fire salvage logging in steep basins. Klock (1975) evaluated the relative effects of five different logging systems on soil erosion during post-fire salvage operations. He found that erosion effects varied depending on the method, and that erosion was highest with tractor logging, with decreasing impacts respectively with cable and helicopter logging

Maloney et al. (1995) monitored sediment transport following post-fire salvage on Boise National Forest. That study detected significant sediment delivery only where a skid trail crossed a class II (non-anadromous perennial stream). Other than at that one site, Maloney et al. (1995) found no management-related increases in erosion or sediment transport when best management practices (BMPs) were implemented. They found that, provided that appropriate BMPs were applied, ground-based logging and new temporary roads did not increase erosion or sediment transport. Potts et al. (1985) found that modeling results indicated that sediment yield from post-fire logging, though measurable, was still less than sediment yields from the fire alone. Potts et al. (1985) also noted that sediment yield increases were only severe when associated with steep slopes and large fires. In the remaining study, Chou et al. (1994a) was unable to detect management-related differences in sediment movement due to high variance in logging intensity and timing of implementation among sites logged, despite ecological similarities among sites compared.

McIver and Starr (2001a) were unable to find any studies that distinguished the effects of post-fire road building and use per se, but allowed that roads likely contribute as much to erosion in a post-fire setting as they do in an unburned environment, given findings by Helvey (1980) following the Entiat fire in the eastern Washington Cascades (McIver and Starr 2000, 2001a).

Based on review of those seven studies, and a couple studies done without controls, McIver and Starr (2000, 2001) concluded that the immediate environmental effects of post-fire logging in terms of soil disturbance leading to erosion and excess sedimentation to streams are variable and depend on a wide variety of factors such as fire severity, slope steepness, soil texture and composition, the presence of pre-existing roads, construction of new roads, timber harvest systems, and post-fire weather conditions. Because scientific information about salvage harvest following wildfire was so sketchy, they urged caution and encouraged the use of adaptive management by approaching post-fire activities as opportunities for learning which could add to the existing knowledge base on the effects of management in a post-fire environment (McIver and Starr 2000, 2001a).

Relevance to the Fisheries portion of School Fire Salvage Recovery Project. Beschta et al. 1995) and Beschta et al. 2004, together with Everett et al. 1995 and McIver and Starr (2000, 2001) were reviewed.

Concerns were expressed in both Beschta articles regarding the sensitivity of riparian areas and recovery rates of stream ecosystems from fire effects, including providing for structural components for their recovery. The no action alternative (Alternative A) would satisfy most or all of the Beschta et al. (1995, 2004) recommendations related to logging, erosion, and sedimentation impacts to aquatic habitats because it would not harvest trees in areas with steep slopes, sensitive soils, or severe fire intensity; it would not

harvest trees in riparian areas; it would not build roads (whether temporary or permanent) to access harvest units; it would not harvest live trees (regardless of how tree mortality was determined).

Consistent with concerns expressed by Beschta et al. (1995) and Beschta et al. (2004), the sensitivity of riparian areas and recovery rates of stream ecosystems from fire effects, including providing for structural components for their recovery were also recognized in development of both action alternatives. Design features (Chapter 2, Table 2-3) for the proposed alternatives include protection of PACFISH RHCAs and stream-floodplain connectivity for PACFISH Category I, II and 4 streams by applying non-harvest buffers with additional operational restrictions, and go beyond PACFISH requirements by providing buffers and operational restrictions to protect ephemeral draws upslope of intermittent drainages, even though these were places the team did not feel met criteria for Category 4 RHCAs even in the post-fire environment. Structural components in these buffers would remain available to stream ecosystems and recovery rates would not be slowed. Road use will be restricted whenever risk of erosion and sediment delivery is high due to soil moisture, and dust control measures will help prevent dry ravel and sediment movement during dry conditions. Other design features (Chapter 2, Table 2-3) and BMPs have been identified to control and minimize effects of proposed actions including temporary road construction. Although Maloney et al. (1995) detected significant sediment delivery in Idaho where a skid trail crossed a class II (non-anadromous perennial stream), School Fire Salvage Recovery Project design features expressly prohibit placement of skid trails across any drainages, even ephemeral draws, and require full suspension across such sites.

Some of the recommendations provided by Beschta et al. (1995 and 2004) are incompatible with the purpose and need of the School Fire Salvage Recovery Project, which is focused solely on recovery of economic value, consistent with laws relevant to fisheries resources on NFS lands in the Tucannon subbasin, such as Section 7 of the Endangered Species Act and the National Forest Management Act. Accordingly, action alternatives that meet the specified purpose and need are unable to fully adopt recommendations offered by Beschta et al. (1995, 2004), and alternatives were analyzed to address those concerns site-specifically.

Even so, both of the action alternatives (Alternatives B and C) would satisfy some but not all of the above recommendations: Regardless of whether the no action or one of the action alternatives is selected, no tree harvest would take place in riparian areas and post-suppression rehabilitation of firelines has already taken place, as has curtailment of livestock grazing until soils and vegetative recovery are determined to be sufficient to support resumed grazing. No construction of near- or instream structures are contemplated as post-fire restoration actions, nor is the seeding of non-native species for erosion control, consistent with recommendations from Beschta and his associates.

As Everett et al. (1995) acknowledged, some studies have shown increased soil disturbance and erosion following post-fire logging. They cite literature that was reviewed, and in one case cited (Klock, 1975). Soil disturbance and erosion are expected to increase following salvage logging, based on the hydrologic analysis for School Fire EIS. The hydrologic analysis also shows that increased erosion due to salvage and related activities would be small relative to increases resulting from the School Fire and would be of relatively short duration. Design features (Table 2-3) and best management practices have been identified which would control and limit the magnitude of ground disturbance and erosion, and minimize the risk of accelerated sediment delivery in action alternatives.

Contrary to recommendations in the Beschta (1995, 2004) articles, the No Action alternative would not act to eliminate unauthorized roads present on the pre-fire landscape, however, such action would occur under both action alternatives and into the foreseeable future, consistent with recommendations provided by Beschta and his associates. Remedial action to eliminate unauthorized roads in the near future is most likely to be achieved through selection of an action alternative that meets the economic purpose and need for the project, and which could generate revenue to fund removal of some or most of the unauthorized roads within the next 5 years. McIver and Starr (2000; 2001) noted that even when the primary objective

of post-fire logging has been economic, often other objectives (e.g. erosion control) have also been achieved. In the case of School Fire Salvage Recovery Project, action alternatives were constructed with such "other" objectives in mind, allowing for natural rates of recruitment of large wood to deficient streams, reducing cumulative surface erosion from fire and salvage activities to near-natural levels through combinations of design features (Chapter 2, Table 2-3) and post-harvest decommissioning of some unauthorized roads in existence prior to the fire, facilitated by aspects of timber sale layout and contract specifications. McIver and Starr's (2000, 2001) summarized results and relevant studies they cited are consistent with other literature reviewed and used during the preparation of the Fisheries Analysis, and effects identified in the Fisheries Specialist Report are within the range of effects noted in literature reviewed by McIver and Starr.

American Lands Alliance (ALA) Report(s) 2005-"After the Fires"), 2003-"Salvaging Timber, Scuttling Forests"

The ALA "After the Fires" (2005) article was mentioned by numerous respondents during the public scoping phase of the School Fire Salvage Recovery Project. Concerns raised in the article relevant to aquatic ecosystems include loss of biological legacies (downed wood) and sediment runoff into streams. The article draws extensively from policy recommendations contained in the recent Beschta et al. (2004) article in Conservation Biology, and cites literature already considered, specifically McIver and Starr (2000), Beschta et al. (1995), Everett et al. (1995), as well as a variety of literature on general ecological processes related to landscape disturbance and recovery. An earlier more detailed article produced by Ingalsbee (2003) for the American Lands Alliance expressed similar concerns for additive effects of salvage logging on aquatic ecosystems with respect to sediment delivery, large wood recruitment and function. The Ingalsbee (2003) article was mentioned by one commenter. It cites relevant literature already discussed, specifically Helvey (1980), McIver and Starr (2000), Beschta et al. (1995), Everett et al. (1995) and Klock (1975).

Relevance to the Fisheries portion of School Fire Salvage Recovery Project. The ALA "After the Fires" report was reviewed, and the 2003 article by Ingalsbee which contained notably more citations was reviewed. The articles have relevance to School Fire Salvage Recovery project. In the professional judgment of the fisheries biologist, the action alternatives include design features (Chapter 2, Table 2-3) and mitigations which address concerns for aquatic ecosystems as expressed by both of the ALA-sponsored articles and the level of anticipated effects from active management are within the range of effects already noted in the literature. Relevant literature cited in the ALA (2003) report by Ingalsbee and Beschta et al. (2004) cited in the ALA (2005) article were previously assessed. Earlier comments on literature sources they cited are applicable to concerns raised in the two ALA articles. The earlier discussions above for Beschta et al. (1995, 2004), Everett et al. (1995), McIver and Starr (2000) and their review of relevant studies also pertain to the ALA reports.

Other literature cited by Ingalsbee regarding post-fire structure, function and processes in the aquatic environment is consistent with effects of alternatives and literature cited in the Fisheries Effects Analysis.

Lindenmayer Salvage Harvesting Policies Article

The journal Science published a short, one-page article on February 27, 2004 (Lindenmayer et al. 2004). Its position is that (1) salvage harvest undermines the ecosystem benefits of major disturbances; (2) removing biological legacies (large wood) can negatively affect many taxa; (3) salvage harvest can impair ecosystem recovery; and (4) some taxa might be maladapted to the interactive effects of two disturbance events in rapid succession (fire and salvage logging).

The article was published in the Policy Forum section of Science, which is a section of the journal reserved for articles of commentary, policy advocacy and related articles based on scientific research and professional observation on subjects of scientific interest. The discussion for Beschta et al. (1995, 2004),

McIver and Starr (2000, 2001), Everett et al., and ALA (American Lands Alliance 2005) reports also pertains to Lindenmayer et al. (2004) and is hereby incorporated by reference.

Relevance to the Fisheries portion of School Fire Salvage Recovery Project. The Lindenmayer et al. (2004) article was review. School Fire Salvage Recovery Project includes an alternative that would react to the burned watersheds in a manner similar to what is recommended by Lindenmayer et al. (2004) – the No Action alternative. Both action alternatives include design features (Chapter 2, Table 2-3) and mitigations which effectively address all four of the concerns listed by Lindenmayer and his associates as they pertain to listed, sensitive and management indicator fish species and their habitats. Most of the habitat indicators selected for analysis were based on primary and secondary habitat factors limiting recovery of bull trout, steelhead and Chinook salmon in the affected subwatersheds, which were previously identified in the Recovery Plan for listed species in southeast Washington (Snake River Salmon Recovery Board. 2005). Analysis of selected indicators discussed changes to indicators in terms of post-disturbance processes and ecosystem benefits, the degree to which biological legacies will be affected (Large Wood recruitment and retention), potential for impairment of aquatic ecosystem recovery, and resiliency of the respective sensitive, listed and management indicator fish species in the Upper Tucannon and Upper Pataha watersheds to two disturbance events, School Fire followed by either of the action alternatives.

Karr et al. 2004

The scientific journal BioScience, published a five-page peer-reviewed article by Karr et al. (2004) in the Forum section of the journal, which is reserved for articles of commentary, policy advocacy and related articles based on scientific research and professional observation on subjects of scientific interest. The article identified concerns for salvage logging impacts on aquatic ecosystems similar to those noted in commentary articles previously discussed, and cites several of those articles in support of their concerns and recommendations, including Beschta et al. 1995, 2004; Lindenmayer et al. 2004) and presented recommendations to curb ecological damage from post-fire salvage logging, which were very similar to recommendations offered by Beschta et al. (1995, 2004).

Other literature cited by Karr et al. regarding post-fire structure, function and processes in the aquatic environment is consistent with effects of alternatives and literature cited in the Fisheries Effects Analysis.

Other sources cited in comments

Relevance to the Fisheries portion of School Fire Salvage Recovery Project. Several sources were cited in comments which discussed elevated erosion from roads, effects of increased sediment loads on aquatic biota, pool development, temperature and ineffectiveness of BMPs to protect salmonids from cumulative degradation from roads and logging. These sources are within the range of scientific literature that informed the fisheries analysis. Other studies and especially the most recent literature available pertaining to post-fire conditions, erosion, sediment delivery and transport, and fire salvage logging were used in the analysis for this EIS. Erosion from roads post-fire and from road use during proposed salvage logging, including effectiveness of BMPs was discussed and extensively analyzed in the hydrologic effects analysis. Peakflow and channel morphology changes were also discussed and analyzed. Findings from the hydrology analysis informed the fisheries effects analysis. Effects to salmonids and other sensitive fish species, temperature and pool development from the fire itself and the additive effects of logging, road construction and road use were evaluated.

FUELS - FIRE HAZARD

Beschta et al. Reports

One or the other of the Beschta reports was mentioned by numerous respondents during the public scoping phase of the School Fire Salvage Recovery Project. These respondents generally advocated that

natural recovery of burned landscapes, with little or no human intervention, is the optimal policy for public forests, and that this policy is supported by literature other than Beschta et al. (1995, 2004) such as American Lands Alliance (2005), DellaSala et al. 2006, Donato et al.. 2006, Lindenmayer et al. (2004), McIver and Starr (2000, 2001), and others.

When US Forest Service research scientists reviewed the original Beschta report, they concluded that it was biased toward a custodial (hands off) approach, and that it is generally accepted in the science community that limiting post-fire management to just a single approach (whether custodial or commodity) is inappropriate because forest sites encompass a wide range of variability, and this variability points to the need for site-specific plans addressing each salvage situation on a case-by-case basis (Everett 1995).

Relevance to the Fire Hazard portion of School Fire Salvage Recovery Project. The Beschta Report (Beschta et al. 1995) and the Beschta journal article (Beschta et al. 2004) was reviewed. The School Fire Salvage Recovery Project includes an alternative (the No Action alternative) that would react to the burned forest in a manner similar to what is recommended by Beschta et al. (1995, 2004). From a fire hazard risk and fuels management perspective, we concur that making fire prevention a high priority management goal is a commitment to continuous fire suppression and fails to capitalize on the self-repairing and self-perpetuating capabilities of ecosystems. It is not a matter of if another fire will occur in this fire prone ecosystem, but when it will occur and how it will burn. The large woody fuel created by the dead trees falling will not increase the risk of wildfire in the short term, but it will influence fire behavior (intensity and rate of spread) in the future. The Federal Wildland Fire Management Policy mandates that wildland fire, as a critical natural process, must be reintroduced into the ecosystem and allowed to function as nearly as possible in its natural role to achieve the long-term goals of ecosystem health. School Fire Salvage Recovery project will allow this by removing the excess fuels which have accumulated because of fire suppression over the last century. The removal of this excessive fuel loading will help enable fire to play its historical ecological role in the ecosystem without unnecessary risk to forest resources, firefighters, and public. Past actions have increased probabilities that various series of natural events will be viewed as catastrophic (Beschta et al. 1995). Without removal of excess fuels, this problem will be perpetuated. The School Fire was uncharacteristic with high intensity, stand replacement fire in a historically low intensity fire environment. Without the removal of excess fuels, the next fire will also likely be high intensity stand replacement fire.

Fires in forested ecosystems normally burn in mosaic patterns that can range from a beneficial low intensity burn to very high intensity fires. Some forest types are not well adapted to extremely severe, uncharacteristic fire events. These forests will not recover quickly without management intervention. (USDA Forest Service 2005)

Beschta (1995, 2004) recommendations describe ecosystem restoration goals, which in the case of the School Fire area may be harder to attain in the absence of post fire salvage logging. Even though the School Fire Salvage Recovery Project is focused on recovery of economic value only, one effect of salvage logging is the reduction of large woody fuels and alteration of the way wildfire and prescribed fire will burn through stands in the future, as discussed in the Fire Hazard section of this document. Large fuels (greater than 3” diameter) do not contribute greatly to fire spread. but they do contribute to fire severity. Due to large dead and down woody fuel contributions to fire behavior and resistance to control, reducing the amount of large, dead and down woody debris would increase the potential for using fire (prescribed or natural), which in turn will help keep the fine fuel load at a relatively low level. Torching, crowning, and spotting, which contribute to large fire growth, are greater where large woody fuels have accumulated under a forest canopy and can contribute to surface fire heat release. If the large woody fuel is decayed and broken up (as it will be in 30 years), its contribution is considerably greater, similar to fire in heavy slash. Higher severity burning than would typically occur during earlier periods is possible depending on extent of soil coverage by large woody pieces (Brown 2003). If a conifer

overstory exists, crowning coupled with burnout of duff could amplify the burn severity. However, a fire involving optimum quantities of large woody debris should not lead to unusually severe fire effects. Historically, fires probably often occurred in the understory and mixed fire regime types when large downed woody fuels were in the optimum range (Brown 2003).

American Lands Alliance "After the Fires" Report

The ALA "After the Fires" (2005) article was mentioned by numerous respondents during the public scoping phase of the School Fire Salvage Recovery Project. The article draws extensively from policy recommendations contained in the recent Beschta et al. (2004) article in Conservation Biology, and cites literature already considered, specifically McIver and Starr (2000), Beschta et al. (1995), Everett et al. (1995), as well as a variety of literature on general ecological processes related to landscape disturbance and recovery.

Relevance to the Fire Hazard portion of School Fire Salvage Recovery Project. The ALA "After the Fires" report and the US Forest Service response to it was reviewed. Concerns regarding effects of salvage logging on fire hazard and fires natural role in the ecosystem were similar to those expressed in the Beschta et al. reports. The fire hazard discussion above for Beschta et al. (1995, 2004) also pertains to the ALA report.

McIver and Starr Salvage Logging Report

The McIver and Starr report is entitled "Environmental effects of post-fire logging: literature review and annotated bibliography" (McIver and Starr 2000). The McIver and Starr report reviews the existing body of scientific literature about logging (timber harvest) following wildfire. Twenty-one post-fire logging studies were reviewed and interpreted. McIver and Starr concluded that while the practice of salvage logging after fires is controversial, the debate is conducted without the benefit of much scientific information.

They also concluded that the immediate environmental effects of post-fire logging are extremely variable and dependent on a wide variety of factors such as fire severity, slope steepness, soil texture and composition, the presence of preexisting roads, construction of new roads, timber harvest systems, and post-fire weather conditions.

Relevance to the Fire Hazard portion of School Fire Salvage Recovery Project. The McIver and Starr report found only 14 studies that isolated the actual effect of logging burned timber as compared to an unlogged control. Because scientific information about salvage harvest was so sketchy, McIver and Starr argued for the use of adaptive management techniques to monitor the effects of salvage logging and to use monitoring results to adjust site-specific practices and prescriptions accordingly (McIver and Starr 2001).

McIver and Starr found no studies that looked at reduction in fire severity in burned stands that had been logged. The following are their findings in reference to fire hazard: "Although fuel accumulations owing to spruce budworm (*Choristoneura fumiferana*)-caused tree death can result in unusually severe wildfires (Stocks 1987), there is no similar information on severity of subsequent fires in stands killed by wildfire. In general, logging of large-diameter material in green tree stands will lead to decreases in total fuel accumulations over the intermediate term but increases in fine activity fuels (<3 in. in diameter) over the short term (Brown 1980). Logging in post-fire stands, however, would be expected to produce less fine activity fuel because the fine material burned, and one would expect removal of large diameter material to have an intermediate-term effect similar to green tree stands. Retrospective studies that look at twice burned stands in which different levels of fuel reduction were undertaken after the first fire would possibly shed light on the issue of postfire logging, fuel reduction, and reburn severity."

Donato et al. Article

On January 5, 2006, a short article was published in Sciencexpress, an on-line affiliate of a print journal called Science, with the title: "Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk."

The same or a slightly modified version was subsequently published as a one-page article in the full journal (Science) on January 20, 2006 (Donato et al. 2006a, 2006b).

The Donato et al. article (2006a, 2006b) concluded "that postfire logging, by removing naturally seeded conifers and increasing surface fuel loads, can be counterproductive to goals of forest regeneration and fuel reduction." This conclusion was based on a study of early conifer regeneration and fuel loads after the 2002 Biscuit Fire in southwestern Oregon

Relevance to the Fire Hazard portion of School Fire Salvage Recovery Project. The Donato et al. article (2006a, 2006b) was reviewed and is relevant to the School Fire Salvage Recovery Project in that many areas are considered to be at high risk of complete tree loss if another fire should occur, primarily because of uncharacteristically high fuel loads. This high severity fire potential is one reason for completing fuel reduction activities in the School Fire area, with salvage timber harvest proposed for reducing larger fuels and other activities for smaller fuels.

We concur that after logging, the mitigation of short-term fire risk is not possible without subsequent fuel reduction treatments. Short-term fire risk will be mitigated by implementing fuel treatments such as yarding tops attached and jackpot burning in conjunction with salvage timber harvest. Appropriate fuel treatments are planned to ensure small woody fuel loads do not pose undue fire hazard risk to existing and future forest stands.

The School Fire area is a fire dependent ecosystem. It is not a matter of if it will burn, but when and how. The proposed salvage timber harvest activity is expected to help manage fuels both in the short -erm and the long-term. If the salvage timber harvest activity is implemented as proposed, which would remove a reasonable proportion of the large-fuel component from these areas, and if the associated fine-fuel treatments are completed, then it is our judgment that salvage-related effects to reduce the potential intensity of future fires to ensure forest sustainability in treated stands would be both positive and efficacious.

Lindenmayer Salvage Harvesting Policies Article

The journal Science published a short, one-page article on February 27, 2004 (Lindenmayer et al.. 2004). Its position is that (1) salvage harvest undermines the ecosystem benefits of major disturbances; (2) removing biological legacies (large wood) can negatively affect many taxa; (3) salvage harvest can impair ecosystem recovery; and (4) some taxa might be maladapted to the interactive effects of two disturbance events in rapid succession (fire and salvage logging).

The Lindenmayer et al. (2004) article was reviewed. School Fire Salvage Recovery Project includes an alternative that would react to the burned watersheds in a manner similar to what is recommended by Lindenmayer et al. (2004) – the No Action alternative.

Relevance to the Fire Hazard portion of School Fire Salvage Recovery Project. The article did not raise specific issues in regard to fire hazard and fuels.

SOILS

Beschta et al. Reports - With regards to soils the following are statements from the Beschta reports:

"No management activity should be undertaken which does not protect soil integrity."

(a). “Soil loss and compaction are associated with both substantial loss of site productivity and with off-site degradation (water quality).”
(b). “Reduction of soil loss is associated with maintaining the litter layer.”
(c).“Although post-burn soil conditions may very depending upon fire severity, steepness of slope, inherent erodibility, etc., soils are particularly vulnerable in burned landscapes.”
(d). “Post-burn activities that accelerate erosion or create soil compaction must be prohibited.”

Relevance to the Soils portion of School Fire Salvage Recovery Project. The EIS includes analysis of soil conditions due to pre-fire management activity and those predicted as a result of proposed activities. Changes in surface conditions due to loss of down wood and litter (surface cover) from high and moderate burn severity are accounted for the in predicted effects. While the initial susceptibility of the soil to erosion is elevated due to loss of cover, the recovery of vegetation has and will continue to occur on these areas under uninhibited post-fire rates. Disturbance of recovering vegetation is limited to very small percentages of the units in the proposed action.

Logging in units within the fire area will produce soil disturbance, some exceeding criteria for detrimental levels in degree, primarily in the form of compaction, disturbance of vegetation by crushing and uprooting, especially in units using ground-based harvest and yarding systems. Harvest and yarding systems have been selected to minimize these impacts based on soil characteristics and slope. Helicopter and cable yarding systems are proposed for units averaging over 30 percent slopes. The ground-based system selected is the harvester/forwarder system which limits the area of compaction and exposes very little mineral soil subject to erosion. Units within high and moderate burn severity would increase surface cover of fine and some coarse wood as salvage operations would leave unmerchantable tops and branches scattered on site. Subsoiling rehabilitation would be used to relieve compaction on highly compacted areas, such as landings, including areas of preexisting compaction reused in this project.

“Recovery logging should be prohibited in sensitive areas.”
(a). “Logging on sensitive areas is often associated with accelerated erosion and soil compaction.”
(b). “Recovery logging by any method must be prohibited on sensitive sites, including: severely burned areas (no duff layer), on erosive soils, on fragile soils, in roadless areas, in riparian areas, on steep slopes, or any site where accelerated erosion is possible.”

Relevance to the Soils portion of School Fire Salvage Recovery Project. Selection of harvest and yarding systems, and erosion control and mitigation measures (Best Management Practices), were selected based on sensitivity (risk based on soil characteristics) of the soils in the project area, including burn severity from the fire. Hand-felling and helicopter and cable-yarding are to be used on units where slopes average over 30 percent. Unmerchantable tops and branches would be retained on site in high burn severity areas, lopped and scattered adding to ground cover in these units. No activities are proposed within inventoried roadless areas. Riparian buffers have been designed in with additional buffering of sensitive steep, ephemeral draws.

LITERATURE CITATIONS

CHANGES BETWEEN DRAFT SEIS AND FINAL SEIS

- This FSEIS only contains discussion of information that is new or different.
- Other sections of the July 2006 FEIS are unchanged
- Additional citations in the FSEIS

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This list of terms is intended to assist the reader in locating a broad scope of subject areas discussed in the FSEIS documentation. The reference to specific page numbers is not intended to be complete.

APPENDIX B

School Fire Salvage Recovery Project
Implementation/Marking Guides

CHANGES BETWEEN DRAFT SEIS AND FINAL SEIS

- Minor editorial changes to text.
- Clarification of marking procedures.

CHANGES AFTER FINAL EIS

After distribution of the Final EIS in July 2006 and after its Record of Decision was signed on August 14, 2006, minor changes were made to Appendix B of the Final EIS. The changes involved score values for one category of trees (Mature and Overmature Ponderosa Pine) in the "Scoring Guide for Rating Tree Survival for the School Fire" section of Appendix B (page B-3).

The score value changes incorporate revisions to a tree survival prediction system commonly referred to as the Scott Guidelines (*Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains* by Scott et al. 2002, as amended). A second amendment to the Scott Guidelines was issued on August 30, 2006 and distributed to the Umatilla National Forest via memorandum on September 18, 2006.

The only Appendix B change that occurred after the Final EIS and ROD was to revise the score values for mature and overmature ponderosa pine, as necessitated by amendment 2 of the Scott Guidelines.

SNAG RETENTION

The purpose of these marking guides is to implement the salvage harvest prescriptions for the School Fire Salvage Recovery Project.

The objectives of the salvage harvest prescription are to remove merchantable fire-killed trees; to remove trees that are expected to die within 1 year (beyond 1 year for mature or overmature ponderosa pine and grand fir or white fir) as a result of fire injuries sustained during the School Fire; to retain fire-injured trees that are predicted to survive for more than 1 year (and longer for mature or overmature ponderosa pine and grand fir or white fir); and to retain dead or dying trees needed as wildlife snags or for future coarse woody debris recruitment.

Most of the time it will not be difficult to determine if an individual tree in the School Fire Recovery Project area would be considered dead or dying. Dead trees can be identified by blackened boles and the complete absence of needles, or with crowns having all brown needles, or with crowns having "fading" or "dry-appearing" (off-color) green needles throughout the crown.

At other times, it will be more difficult to determine the survivability of fire-injured trees with partially or completely green crowns. To determine a survival prediction for fire-injured trees, the "Rating Guide for Tree Survival" section is included below.

Landscape Snag Strategy

General Theme: Retain three snags per acre greater than 21 inches at diameter breast height (DBH) across the landscape for areas where salvage harvest is prescribed. All units would also retain snag clumps on 15 acre grids that will be no smaller than one acre and no larger than three acres.

Criteria Common to All Salvage Harvest Areas:

- The minimum design criterion for snag retention is three snags per acre.
- Snags would be selected from trees that could potentially be designated as "removal or harvest trees" and meet the "expected to die" criteria from the Marking Procedure section below (Scott 2002, 2003).
- If a snag and/or clump identified for retention is required to be felled for operational reasons (i.e., danger trees), and its loss moves snag density below minimum design criteria levels, a snag and/or clump of equal or larger size planned for harvest would be left as replacement.
- Retain all existing down (green or black) material greater than 10 inches in diameter at the large end unless designated amounts are identified for removal by a group consisting of a wildlife biologist, silviculturist, forester, fuels planner and District Ranger.

Three Snags per Acre Guideline:

- **Species preference –** Select trees that are desirable for cavity nesters and/or likely to persist for the longest period on the landscape. Order of species preference is ponderosa pine, Douglas-fir, western larch, Engelmann spruce, lodgepole pine and grand fir.
- **Size –** Retain snags greater than 21 inch DBH. Substitute the next largest size available if none are available in the greater than 21 inch DBH class. Existing snags with high wildlife value, but with low commercial value, are preferred for retention, providing they do not create OSHA safety concerns.
- **Shape and Form –** Select snags with the largest limbs or broken tops and minimal lean (so they don't topple over prematurely) first. Do not select snags where fire damage to the bole (i.e., fire consumed boles, especially in the first 30 feet) or to the root system is severe.
- **Arrangement –** Spacing of multiple-diameter snags would be preferable to just retaining large-diameter snags in a limited area. Scatter snags throughout the unit and away from roads and landings. Some can be grouped in 15 acre grids if doing so would still maintain a good snag distribution across the unit.

Clumped Snag Guideline:

- **Objective –** Maintain snag habitat within clumps distributed across salvage harvest units. Clumps can incorporate a few of the larger trees (greater than 21 inches DBH).
- **Arrangement –** Consider logging systems when selecting clumps, especially helicopter and skyline, while striving to meet the desired clump configuration, which is more oblong or circular and less linear. Locate clumps on mid and upper slopes and away from unit edges and adjacent untreated areas. Clumps may be located on unit edges if few or no snags exist outside the boundary (i.e., old clearcuts, meadows, etc.).
- **Clump Size –** Will vary by unit. For each 15-acre grid, retain one clump that is no smaller than one acre and no larger than three acres. Units smaller than 15 acres should have adequate clumped habitat adjacent to them and will not require designated clumps.

PREDICTING TREE SURVIVAL

The tree survival scoring guide described below is adapted from a report entitled "**Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains**" (Scott et al. 2002, as amended). This report is commonly referred to as the "Scott Guidelines."

Adaptations of the Scott Guidelines for the School Fire Salvage Recovery Project includes incorporating changes suggested by the Scott Guidelines authors following additional field work in 2003 (Scott et al. 2003), and additional cambium sampling requirements (basal tree chopping near the root crown) for trees falling in the moderate scoring range.

Use the "Scoring Guide for Rating Tree Survival for the School Fire" to determine a probability for tree survival.

SCORING GUIDE FOR RATING TREE SURVIVAL FOR THE SCHOOL FIRE.

Young and Immature Ponderosa Pine (Small Trees < 16 in. dbh)

High Probability of Tree Surviving = Composite Rating Score	3-8
Moderate Probability of Tree Surviving = Composite Rating Score	10-15
Low Probability of Tree Surviving = Composite Rating Score	17-21

Young and Immature Ponderosa Pine (Large Trees > 16 in. dbh)

High Probability of Tree Surviving = Composite Rating Score	3-9
Moderate Probability of Tree Surviving = Composite Rating Score	13-18
Low Probability of Tree Surviving = Composite Rating Score	21-25

Mature and Overmature Ponderosa Pine (orange bark, ≥ 21 in. dbh)

High Probability of Tree Surviving = Composite Rating Score	1-7
Moderate Probability of Tree Surviving = Composite Rating Score	8-15
Low Probability of Tree Surviving = Composite Rating Score	16-24

Young and Immature Douglas-fir

High Probability of Tree Surviving = Composite Rating Score	3-6
Moderate Probability of Tree Surviving = Composite Rating Score	8-16
Low Probability of Tree Surviving = Composite Rating Score	17-25

Mature and Overmature Douglas-fir

High Probability of Tree Surviving = Composite Rating Score	3-10
Moderate Probability of Tree Surviving = Composite Rating Score	11-17
Low Probability of Tree Surviving = Composite Rating Score	19-31

All Size Classes of Lodgepole Pine

High Probability of Tree Surviving = Composite Rating Score	2-5
Moderate Probability of Tree Surviving = Composite Rating Score	6-10
Low Probability of Tree Surviving = Composite Rating Score	14-30

All Size Classes of Western Larch

High Probability of Tree Surviving = Composite Rating Score	3-6
Moderate Probability of Tree Surviving = Composite Rating Score	7-13
Low Probability of Tree Surviving = Composite Rating Score	14-17

Grand Fir and White Fir (Young and Immature Trees <30 in. DBH)

High Probability of Tree Surviving = Composite Rating Score	3-4
Moderate Probability of Tree Surviving = Composite Rating Score	5-10
Low Probability of Tree Surviving = Composite Rating Score	11-30

Grand Fir and White Fir (Mature and Overmature Trees >30 in. DBH)

High Probability of Tree Surviving = Composite Rating Score	2-12
Moderate Probability of Tree Surviving = Composite Rating Score	13-16
Low Probability of Tree Surviving = Composite Rating Score	17-21

Trees that are uncertain to survive, regardless of whether they die in the near future or live for many more years, would be a source of future snag recruitment. This situation would prolong the time period that snags are available for wildlife habitat. Additional tree mortality might occur after marking, but prior to the salvage timber harvest. If the additional mortality is in excess of snag requirements, it is acceptable to remove it.

MARKING PROCEDURE

1. Determine the number of snags and wildlife clumps needed for the unit being marked. Consult the proposed harvest unit data table to determine acres, number of snags >21 inch DBH, and number of clumps to be left. Also, determine the score from part A of the survival guidelines that would apply to all trees being considered in the unit.

2. Direction will be provided on using orange (leave tree) or blue (cut tree) marking paint to designate trees for retention or removal in each unit. For units with leave-tree marking, all merchantable trees that are not marked with orange paint are designated for removal. For units with cut-tree marking, all merchantable trees that are marked with blue paint are designated for removal. Merchantability standards are ≥9 inches DBH for all species on forwarder and skyline units. Merchantability standards for helicopter units are ≥11 inches DBH for pine, and ≥9 inches DBH for all other species.

3. In general, salvage units with greater than 50 percent mortality of merchantable size trees would be marked for leave trees (orange paint); units with less than 50 percent mortality of merchantable size trees would be marked for cut trees (blue paint). For either situation, mark a band at DBH encircling the entire tree for visibility from any angle. Put a butt mark on the uphill and downhill side of the tree, ensuring that some paint gets into bark crevices for implementation monitoring by sale administrators.

4. Use the laminated copies of the survival guidelines (from Scott et al. 2002, as amended), which were issued to each marking crew member prior to any marking activities, when evaluating any of the tree species included in the guidelines. Work through the two parts of the survival guidelines consecutively (first part A, and then part B), choosing the appropriate numerical rating value given in parentheses next to each factor.

5. Use grease pencils to rate individual trees until the guidelines become familiar. When marking, carry the laminated copy of the survival guidelines at all times to ensure their consistent application.

6. The "Scoring Guide for Rating Tree Survival for the School Fire" in the Predicting Tree Survival section shows how the composite rating score will be interpreted as a survival probability rating (low, moderate or high). Then use the following criteria to make a final determination about whether the tree is expected to survive over the next few years.
   a. If the rating score falls within the **High Probability to Survive** range, the tree should be marked for retention.

b. If the rating score falls within the **Low Probability to Survive** range, the tree should be marked for removal if it is not needed for wildlife habitat or for protecting ephemeral draws.

c. If the rating score falls within the **Moderate Probability to Survive** range, chop into the tree bark to check for dead cambium. The chopping should be done on four sides (faces) of the tree and in the interstices between major lateral roots at the root crown or root-collar region, where basal cambium is afforded greater protection from heat generated by smoldering duff.

1. (a) For all Scoring Guide situations except the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" category: If dead cambium equals or exceeds 75% (either 3 or 4 of the 4 quadrants), the tree is very likely to die and it should be marked for removal if not needed for wildlife habitat, or to protect ephemeral draws.

   (b) For the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" Scoring Guide category: If dead cambium equals 100% (all 4 of the sampled quadrants have dead cambium), the tree is very likely to die and it should be marked for removal if not needed for wildlife habitat, or to protect ephemeral draws.

2. If dead cambium is 50% (2 of the 4 quadrants), or 75% for the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" Scoring Guide category (3 of the 4 quadrants), the tree should be marked for retention.

3. If dead cambium is less than 50% (either 0 or 1 of the 4 quadrants), or less than 75% for the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" Scoring Guide category (either 0, 1 or 2 of the 4 quadrants), the tree is likely to live, and it should be marked for retention.

   Note: *If a numerical rating score falls in a gap between adjacent "probability to survive" categories, then assume the following:*

   - *If it falls between the low and moderate probability to survive categories, then assign the tree to the low category,*
   - *If it falls between the high and moderate probability to survive categories, then assign the tree to the high category.*

The marking procedure was demonstrated by the senior author of the Scott Guidelines (Don Scott) during marking crew training sessions conducted on November 2, 2005 and January 26, 2006 at the Pomeroy Ranger District (see Scott 2005, 2006 for memoranda describing these trainings).

7. Riparian Habitat Conservation Area (RHCA) delineations for the project area are based on stream-class and fish-occupancy records for the Umatilla National Forest. When located adjacent to proposed harvest units, the RHCAs have been excluded from the units by using boundary flagging, tags, and marking paint. RHCA design features are found in table 2-3 on page 2-10 of the School Fire Salvage Recovery Project DEIS. No tree marking will occur in the RHCAs.

8. Determine if the unit is likely to have an ephemeral riparian draw to be buffered, and its probable location, by using topographical maps. If an ephemeral buffer is needed, designate all merchantable sized trees (black and green) for retention, 25 feet slope distance on either side of the defining draw conditions as described by the project hydrologist.

9. Tally the number of trees larger than 9 inches DBH by live and dead categories (including trees predicted to die using the survival guidelines) and by size classes: 9-21 inches DBH, and greater than 21 inches DBH. Snags greater than 21 inches DBH, in excess of 3 per acre in the ephemeral-draw buffer zones, may substitute for other non-buffer-zone acres within the unit. Ephemeral buffers may

count toward the number of wildlife snag clumps requirement, providing they are between 1 and 3 acres in size.

10. Locate the necessary number of wildlife snag clumps needed within each unit, leaving a total of 1 to 3 acres for each 15 acres in the unit, and designate all trees within each clump for retention. Tally the number of trees by live and dead categories (including trees predicted to die using the survival guidelines) and by size classes: 9-21 inches DBH, and greater than 21 inches DBH. Snags greater than 21 inches DBH, in excess of 3 per acre in the clumps, may substitute for other non-clump acres within the unit.

11. Cover the remainder of the unit, designating all trees predicted to survive and additional snags greater than 21 inches DBH as required. Distribute the snags across the unit, leaving no areas larger than approximately three acres devoid of snags. If no snags greater than 21 inches DBH are present, then leave the next largest size class.

12. Spacing of multiple diameter snags would be preferable to just retaining large-diameter snags in one limited area. Tally the number of trees by live and dead categories (including trees predicted to die using the survival guidelines) and by size classes: 9-21 inches DBH, and greater than 21 inches DBH.

School Fire Salvage Recovery
Implementation/Marking Guides
Danger Trees

The purpose of these marking guides is to implement danger tree prescriptions for the School Fire Salvage Recovery project. One of the underlying needs of the project (FEIS, Chapter 1, p. 1-5) is to improve public safety for visitors within the project area by reducing hazards associated with danger trees in areas where they travel and recreate. The objective of these prescriptions is to identify and remove trees in those areas which pose a potential hazard. The majority of these trees have been damaged or killed by the School Fire.

Chapter 2 of the Final Environmental Impact Statement

Danger Tree Removal – Danger trees would be felled along all haul routes used for timber sale activity (regardless of Class) other designated Class 3, 4, and 5 Forest roads, in developed recreation sites (Boundary, Alder Thicket, Pataha, and Tucannon campgrounds; Rose Spring Sno Park; and Rose Spring and Stentz recreational residence areas), and in administrative sites (Tucannon Guard Station). Danger trees would be felled along an estimated 71 miles of road. Danger trees located within defined RHCAs would be cut and left to provide additional coarse woody debris. All other danger trees would be removed and sold as part of a salvage sale, if economically feasible.

A danger tree is defined as any standing tree that presents hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction or lean of the tree. Along roadways, danger trees would be evaluated in accordance with the Field Guide for Danger Tree Identification and Response, Pacific Northwest Region, 2005. Danger trees in recreation sites and administrative sites would be evaluated in the context of Long Range Planning for Developed Sites in the Pacific Northwest: The Context of Hazard Tree Management, Pacific Northwest Region, 1992.

Along roadways trees that have an imminent or likely potential to fail and the trees potential failure zone includes an open Class 3 or higher system road, any road designated for hauling, would be felled. Trees that have an imminent potential to fail are so defective or rotten that it would take little effort to make them fail. Trees considered likely to fail include all dead trees and some live trees with specific diseases and/or damage. A tree's potential failure zone is the area that could be reached by any part of a failed tree. This is generally one and one-half tree lengths, but can vary depending on slope, tree height, lean, individual tree characteristics, and other factors (see Appendix B – Implementation/Marking Guides).

School Fire Salvage Recovery
Danger Tree Implementation
Marking Procedure
Roadside Salvage Units

1. Use blue paint (cut tree) to designate merchantable danger trees for removal which are 9 inch DBH and larger. Paint a band at DBH encircling the entire tree for visibility from any angle. Put a butt mark on the downhill side of the tree, ensuring that some paint gets into the crevices for tracking by sale administration. Only designate for harvest those trees that have some certainty of being feasible to yard to the roadside or appropriate landing.

2. Danger trees smaller than 9 inches DBH, those that cannot be yarded reasonably, those within Riparian Conservation Areas (RHCAs), and danger trees within the Willow Springs Inventoried Roadless area should be marked only with a blue spot at DBH facing the road. This method will designate danger trees which are to be cut and left on site.

3. Marking crews are to tally danger trees marked, which road segment they are located in and whether or not they are within an existing fire salvage Unit (specify Unit # in notes), RHCA or roadless area.

4. For roadside danger units consult the *Field Guide for Danger Tree Identification and Response*, Pacific Northwest Region, 2005. This guide was distributed during the training given by Rick Toupin, Diane Hildebrandt and Craig Schmidt held on 01/24-25/2006. Danger trees are to be marked for removal if they fall into the imminent or likely potential to fail categories and based on their potential failure zones they could reach a designated haul route, open system road (class 3 or higher), or other designated area. See the descriptions below.

Potential Failure Zone

The **potential failure zone** is the area that could be reached by any part of a failed tree. When a tree fails, the tree or its parts may strike other trees and cause them to fail as well. The parts may slide or roll. This is especially true in dead timber.

When determining the failure zone, the following conditions must be evaluated:

- Portion of tree that has a potential to fail.
- Ground slope.
- Amount and direction of lean.
- Height of tree.

Imminent
Identify tree defects and determine the tree's potential to fail.

A tree may have an **imminent potential to fail,** if it is so defective or rotten, that it would take little effort to make it fail during project implementation. It is much more apt to fail than those trees rated as likely to fail.
Trees with an imminent potential to fail include those that have the following conditions (1, Pgs. 35-65).
• Root sprung.
• Recent lean.
• Missing bole wood due to fire or damage.
• Significant heart or sap rot.
• Loose bark.
• Dwarf mistletoe bole swellings if they have decay that extends to an area **more than half** the bole diameter.
• Fungus cankers on the bole when the canker width is **more than half** the bole diameter.
• Dead tops with significant sap rot.

Likely
Identify tree defects and determine the tree's potential to fail.

A tree may have a **likely potential to fail** if any of the following conditions exist. (1, Pgs. 35-65). Appendix A contains a detailed listing of symptoms and indicators.
• Root diseased but still alive.
• Old lean.
• Undermined or severed roots but not severely.
• Some heart, butt, or sap rot.
• Cracks or structural defect associated with some decay.
• Dead tops with some heart or sap rot.
• Dwarf mistletoe bole swellings if they have decay that extends to an area less than **half** the bole diameter.
• Fungus cankers on the bole when the canker width is less than **half** the bole diameter.
• Forked tops and crotches associated with decay, cracks, splits, or callus ridges. Pitch or resin is not always associated with likely failure potential. Pitch is often a sign in a healthy tree when it is defending itself against pathogen or insect attack.
• Dead trees that are still sound.
• Fire damaged or killed trees that are still sound.
• Hardwoods with sap rot approaching half their diameter.

5. For this project danger trees that are fire damaged or killed will be those trees that have been damaged structurally (cat faces, burned roots, etc.), are dead, or are not likely to survive as defined below.

6. Most of the time it will not be difficult to determine if an individual tree in the School Fire Recovery Project area will be considered dead or dying. Dead trees can be identified by blackened boles and the absence of needles, crowns with all brown needles, or crowns with "fading" or "dry-appearing" off-color green needles throughout the crown. However, at times it will be more difficult to

determine the survivability of fire-injured trees with partially or completely green crowns. To determine which of these trees will survive use the "Rating Guide for Tree Survival for the School Fire Recovery Project" included below.

13. To identify trees within danger tree units that have a low or moderate probability to survive damage from the School Fire, use the laminated copies of the survival guidelines (Scott et al. 2002) issued to each marker for all species and for parts A and B. Determine the score from part A of the survival guidelines that will be common to all trees in the unit. Work through the two parts consecutively (A and B) choosing the appropriate rating value given in parentheses adjacent to each factor (as described by Don Scott during training on 11/02/2005). Use grease pencils to rate out individual trees until the guides become familiar. Carry the laminated guide sheets at all times when marking for consistency of application.

    a. If the rating score falls within the **High Probability to Survive** range, the tree should be retained.
    b. If the rating score falls within the **Low Probability to Survive** range, the tree should be designated for removal.
    c. If the rating score falls within the **Moderate Probability to Survive** range, chop into the tree bark to check for dead cambium. The chopping should be done on four sides (quadrants) of the tree, and in the interstices between major lateral roots at the root crown or root-collar region where basal cambium is afforded greater protection from heat generated by smoldering duff.
        1. (a) For all Scoring Guide situations except the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" category: If dead cambium equals or exceeds 75% (either 3 or 4 of the 4 quadrants), the tree is very likely to die and it should be marked for removal if not needed for wildlife habitat, or to protect ephemeral draws.

           (b) For the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" Scoring Guide category: If dead cambium equals 100% (all 4 of the sampled quadrants have dead cambium), the tree is very likely to die and it should be marked for removal if not needed for wildlife habitat, or to protect ephemeral draws.
        2. If dead cambium is 50% (2 of the 4 quadrants), or 75% for the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" Scoring Guide category (3 of the 4 quadrants), the tree should be marked for retention.
        3. If dead cambium is less than 50% (either 0 or 1 of the 4 quadrants), or less than 75% for the "Mature and Overmature Ponderosa Pine (orange bark, ≥ 21")" Scoring Guide category (either 0, 1 or 2 of the 4 quadrants), the tree is likely to live and it should be marked for retention.

           Note: *If a numerical rating score falls in a gap between adjacent "probability to survive" categories, then assume the following:*

           - *If it falls between the low and moderate probability to survive categories, then assign the tree to the low category,*
           - *If it falls between the high and moderate probability to survive categories, then assign the tree to the high category.*

APPENDIX M
Forest Service
Response to Comments

INTRODUCTION

A 45-day comment period for the School Fire Salvage Recovery Project Draft Supplemental Environmental Impact Statement (DSEIS) was provided for interested and affected publics, including appropriate local, state, and federal government agencies, and Tribes. The comment period began with a Notice of Availability in the Federal Register on March 9, 2007, and lasted through April 23, 2007. The responsible official will be considering the comments made in the decision-making process.

The Forest Service received 11 responses both electronically and by U.S. mail during the 45-day comment period, and one response was electronically received after the comment period. We responded to all comments received. All correspondence was reviewed and our response to comments is located later in this section. The complete comment period record is kept in the analysis file and is available for review at the Pomeroy Ranger District office in Pomeroy, Washington.

The following table lists the comment letters received.

Comments Received During the DSEIS 45-Day Comment Period

Letter Identification Number and Date Received	Author(s)	Organization/ Agency
#1 – 3/8/2007	Barbara Sachau – (Jean Public)	
#2 – 3/12/2007	Ed Pearson	Dodge Logging, Inc.
#3 – 4/12/2007	Doug Heiken	Oregon Wild
#4 – 4/20/2007	Andy Stahl	Forest Service Employees for Environmental Ethics (FSEEE)
#5 – 4/20/2007	Terri Costello	State of Washington – Depart. of Ecology
#6 – 4/23/2007	Preston A. Sleeger	U. S. Department of the Interior
#7 – 4/23/2007	Charles H. Burley	American Forest Resource Council
#8 – 4/23/2007	Mike Petersen Rene Voss Larry McLaud Jeff Juel Gary Macfarlane	The Lands Council The Sierra Club Hells Canyon Preservation Council WildWest Institute Friends of the Clearwater
#9 – 4/23/2007	Ralph Bloemers	The Lands Council Oregon Wild Hells Canyon Preservation Council Sierra Club
#10 – 3/29/2007	Edward L. Johnson	
#11 – 4/23/07	Christine Reichgott, Mgr.	U. S. Environmental Protection Agency – Region 10
#12 – 4/24/07* *received after comment period.	Dan Becker	

APPENDIX M

Forest Service
Response to Comments

Letter #1 – Barbara Sachau (Jean Public)	
Letter 1 – Comment 1 *on the first page of your letter you wrote that Umatilla "needs" to log. I don't think it needs to at all. if the salary scale is too high, lay off personnel – but keep the forest. that is what the national taxpayers own and they should be able to have it kept natural.*	Your comment has been noted.
Letter 1 – Comment 2 *i don not think this new definition for "live trees" helps anything. I think the forest service is simply embarked on a campaign to destroy by burning, logging, and toxic chemicalling everything – destroying our world completely.*	Your comment has been noted.
Letter 1 – Comment 3 *I do not think this is an "emergency" at all. it is an alleged "emergency."*	Your comment has been noted.

Letter #2 – Dodge Logging, Inc. Ed Pearson	
Letter 2 – Comment 1 *Dodge Logging Inc., supports the selection of Alternative B – Proposed Action. We support this Alternative exactly as written.*	Your comment of support has been noted.
Letter 2 – Comment 2 *It has been our experience that live trees which have been moderately or severely damaged by fire usually succumb and die within one to two years. It appears to us that the Scott Guidelines currently provide the best scientific way of determining which trees are damaged severely enough that they will die and which are not damaged enough and may survive. The three timber sales were marked under these guidelines , and it appears to us, if anything, the Scott Guidelines are conservative in the number of damaged trees it allows to harvest. We support*	Your comment of support has been noted.

their continued use in the School Fire Salvage Recovery Project.	
Letter 2 – Comment 3 *We, also. whole heartedly support the effort of the Forest Service to salvage log fire damaged timber. This includes not only the dead trees but also trees that are dying and will be dead within a year or two.*	Your comment of support has been noted.

Letter #3 – Doug Heiken OREGON WILD	
Comment	**Our Response**
Letter 3 – Comment 1 ***The Forest Service must re-interpret the LRMP in light of the east side screens.***	Other than the plan amendment proposed in this FSEIS, no additional need to modify or interpret the LRMP has been identified.
Letter 3 – Comment 2 *The entire School Fire Salvage Project, including this amendment, are based on outdated science and flawed understandings of forest ecosystems. Before the School fire, the Forest Service had no specific plans to log these forests, but the fire caused the Forest Service to reorganized its priorities to conduct logging in areas that were previously not priority. The salvage logging proposal is therefore based on the idea that logging dead trees is better than doing the other things the Forest Service had planned to do. In fact, top scientists such as Dr. Jerry Franklin, now say that these large snags removed by salvage logging should be retained and it makes more sense to log live, green forests that are overstocked and arguably "need" to have small trees removed. This proposal to amend the east side screens to allow removal of dying trees takes a bad logging idea and makes it worse.*	Prior to the School Fire, the Forest Service had completed timber harvest activities on more than 18,000 acres within the School Fire area (table 3-1 in the School Fire FEIS), and plans were being formulated to complete additional timber harvest in the west end of the School Fire area (this was the Lower Tucannon Ecosystem Management Project, and it was being analyzed in an environmental impact statement. (Umatilla National Forest's Schedule of Proposed Actions –2003-2005). A Notice of Intent (NOI) for the Lower Tucannon Project appeared in the Federal Register on 7/9/2003.
Letter 3 – Comment 3 *The east side screens were adopted in response to decades of mismanagement that resulted in severely reduced habitat and water quality on National Forests in the interior Columbia Basin.*	The Eastside Screens were adopted in response to a petition from the Natural Resources Defense

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The screens prohibit the removal of live trees 21" dbh and larger in areas where large trees are under-represented.	Council and a report called the "Eastside Forest Ecosystem Health Assessment," as described in Appendix C of the School FEIS (page C-1). The proposed action (Alternative B) includes provisions for the retention of live trees ≥ 21 inches dbh.
Letter 3 – Comment 4 *Traditional salvage logging involved logging almost all of the dead and live trees with the intent to start new stands and manage them as tree farms. This results in the establishment of simplified young stands that may never attain complex old forest characteristics and will require significant future investment in stand management. This is more or less what the Umatilla NF had in mind when it was adopted. This approach was however rejected when the east side screens were adopted. Salvage logging is among the activities that need to change in order to preserve options (as intended by the screens), while new plans are developed for long-term conservation and restoration of the National Forests. The requirement to retain live trees partially modifies the ecologically harmful practice of salvage logging, because it retains more legacy features that add structural complexity to the developing stand and carry valuable ecological features forward from one stand to the next.* ***The Forest Service should not rely on the LRMP for support of its salvage proposal. All resource extraction and economic drivers in the old LRMP (including as salvage logging) must now be re-interpreted in light of the over-riding conservation objectives of the east side screens PACFISH and INFISH.***	Appendix F of the School FEIS presents a regeneration analysis for the School Fire area. It shows that about 2/3 of the fire area might require tree planting, with the remaining 1/3 is expected to regenerate naturally (table F-3, page F-8 in FEIS). For areas that would be planted, a mix of native conifer species would be used, and the species proportions in the mix would vary by ecological site potential as represented by Plant Association Groups (see Chapter 2, table 2-2 in School FEIS). This planting strategy ensures that the resulting stands will develop with a forest composition, structure, and function falling within the historical range of variability for School Fire area biophysical environments. Reinterpreting the LRMP (Forest Plan) in light of the over riding conservation objectives of the eastside screens, PACFISH, and INFISH is outside the scope of this project, and it not necessary to amend the Forest Plan. PACFISH and the Eastside Screens are amendments to the Forest Plan. Salvage activities, as proposed, are consistent with the Forest Plan, as amended, including the Eastside Screens environmental assessment and decision notices dated May 20, 1994 and June 12, 1995.

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	The Forest Service is relying on the purpose and need for action (FEIS, Chapter 1), an analysis of alternatives for accomplishing the purpose and need (FEIS, Chapter 2), and an analysis of environmental consequences associated with implementing the alternatives (FEIS, Chapter 3) for its salvage proposal.
Letter 3 – Comment 5 *The court ruled in the Lands Council case that the Forest Service had violated the screens by cutting live trees as part of the School Fire Salvage Project. Now the Forest Service proposes to amend the screens to allow them to remove trees that are live but not expected to live very long.*	On February 12, 2007 the Court issued an opinion that the Project (School Fire Salvage Recovery Project) was inconsistent with the Forest Plan (Eastside Screens) by inappropriately implementing the "prohibition on logging of any "live tree" ≥ 21 inches diameter at breast height that currently exists in the sales areas – i.e., any tree of the requisite size that is not yet dead." The Court went on to conclude that the agency could not harvest "dying" trees because they were not dead. The Court recognized that we could correct this situation by amending the Forest Plan to include a definition of the term "live tree." On February 15, 2007 the Eastern District Court of Washington issued an injunction requiring that "the Forest Service shall not harvest from the three timber sales areas any "live tree" ≥ 21 inches diameter at breast height. This includes any tree of requisite size with green needles or that is not yet dead." The proposed action addressed in this Supplemental EIS responds to the court's admonition to amend the Forest Plan by clarifying the agency's definitions of live and dead trees.

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Letter 3 – Comment 6 *Part of the flaw in the Forest Service's thinking is the assumption that the relatively short (approx. 5 year) period between now and when the trees will likely die is not an important timber period in the development of the forest. This is incorrect. The values provided by dying trees during this period are disproportionately important in the overall development of the forest because beneficial soil organisms and new plant grown are in tremendous flux. The dying trees help stem the decline of beneficial soil organisms by feeding photosynthate to the below ground ecosystem at a time when most of the usual food supplies have been killed. The dying trees also help provide beneficial microclimate for the establishment and growth of a diverse new forest. Young plants are highly vulnerable to heat, drought, and cold during the early establishment phase of succession. Shade and cover provided by the dying trees helps moderate these extremes. The dying trees are NOT just waiting to die; they are nursing the next generation of forest at a time when the new forest is most in need of assistance. Furthermore, to the extent the dying trees have green canopy, they are providing a rare and under-represented green tree habitat function in the post-fire environment.*	Response to this comment was disclosed in Chapter 3 and Appendix F, Appendix K, and Appendix M of the School FEIS. Appendix F discusses the autecological characteristics of 78 native plant species (9 trees, 18 shrubs, 15 grasses and grasslike plants, and 36 forbs) occurring within the School Fire area (table F-9), including a description of their regeneration modes and how they are expected to respond to fire effects. The capability of native tree species to handle post-fire conditions such as frost, drought, snow damage, open (unshaded) sites, and an ash or char seedbed are described in table F-2 of the School FEIS.
Letter 3 – Comment 7 ***This amendment is contrary to sound ecological forest management and therefore violates the intent of the east side screens (to preserve options and move toward the historic range of variability).***	Consistency with Eastside Screens was disclosed in Appendix C of the School FEIS. Appendix N of the DSEIS provides the Eastside Screens amendment to the Umatilla National Forest Plan; it clearly shows in a footnote to Screens table 1 (see page N-5) that the historic range of variability portion of the Screens pertains to live trees only, not to snags or other dead trees.
Letter 3 – Comment 8 *Removing large dead trees is already imposes a tax on the forest ecosystem. Going further and removing trees that are assumed to be "dying" will cause the further harm to the developing stands:* • *By reducing the future recruitment of snags, (large snags are already under-represented so further reducing large snags pushes these stands further away from the historic range of variability).* • *By eliminating refugia for beneficial soil organisms (such as mycorhhizal fungi) that are important for recovery of the new stand,* • *By retarding the recovery of beneficial soil organisms,*	Direct, indirect, and cumulative effects, to affected resources were disclosed in Chapter 3 of the School FEIS. As stated in the Draft Supplemental EIS (page 3-3) "effects to resources would be as described for all resources under Alternative B in the School Fire Salvage Recovery Project Final EIS. Timber harvest would still occur in the same areas and

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• *By reducing shade that helps buffer the microclimate that the new seedlings must contend with,* • *By further simplification of the structural complexity of the stands* *The SDEIS effects analysis fails to address these highly relevant issues.*	along the same roads as originally described in the School Fire Salvage Recovery Project Final EIS. Logging systems would remain the same and no new trees would be designated for harvest. The size and location of Riparian Habitat Conservation Areas would remain the same as would the measures to protect those areas. Seasonal restrictions on operations to minimize effects on big game winter range, soils, and snowmobile uses would remain the same. Therefore, as a result of this amendment, there would be no changes on the ground, or to environmental effects beyond those already described in School Fire Salvage Recovery Project Final EIS."
Letter 3 – Comment 9 *Even assuming the Forest Service makes correct determinations that these trees will die within a few years, the forests ecosystem is much better off with the dying trees retained because dying trees provide several important ecological values, including mycorhhizal refugia, future recruitment of snag habitat and soil nutrients, shade that helps moderate weather extremes, needle fall that provides nutrients and soil protection, fine canopy fuels held high in the air and generally unavailable for combustion, and the water filled tree bole provides hydrological and fire benefits. The Supplemental DEIS indicates that there are approximately 5 mmbf of such "dying" trees in the School Fire Salvage Project that the proposed amendment would remove. That's the equivalent of 1,000 log truck loads of mostly large trees that would provide all these wonderful ecological values if retained and provide none of these values if removed.*	See response to Comment 8 above. In addition, Appendix K of the School FEIS discussed several reports dealing with the ecological values of dead trees, including the Beschta reports, the American Lands Alliance report, the ICBEMP scientific assessment report, the Lindenmayer salvage harvest article, and the Society for Conservation Biology scientific panel report (among others).
Letter 3 – Comment 10 ***This amendment will reduce recruitment of large snags and therefore violates the intent of the east side screens (to restore habitat features associated with old forests).*** *This amendment is contrary to the intent of the east side screens. The main point of the east side screens is to protect large trees and ensure that management moves stands toward rather than away from the historic range of variability. Salvage logging is a loophole in this requirement and the Forest Service is trying to expand that loophole to allow logging not only*	Direct, indirect, and cumulative effects to snags were disclosed in the Dead Wood Habitat section of Chapter 3 of the School FEIS. In this section we recognize that the use of DecAID reflects the best available science and is a collection of recent scientific and data gathering concerning dead wood habitat (FEIS, Chapter 3, p. 3-197).

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of large dead trees but also large dying trees (and some large live trees that they accidentally misidentified as dying). Expanding this loophole undermines one of the core purposes of the east side screens. *On June 11, 2003 the Regional Forester issued Guidance for Implementing Eastside Screens to Forest Supervisors highlight new information about the large size of snags needed by certain wildlife and saying, "These findings reinforce the importance of retaining and recruiting large, old trees in the eastside landscape, particularly (but not only) in Forests historically dominated by single-story LOS. It is critical that silvicultural prescriptions provide for large snags in adequate numbers (as indicated by DecAID and other tools) <u>through time</u> to provide habitat for these species." This amendment will exacerbate the expected future deficit of large snags, know as the "snag gap." This will push the forest ecosystem further from the historic range of variability in violation of the intent of the east side screens.*	A finding of consistency with the Forest Plan was also disclosed Chapter 3 of the FEIS, it reads as follows: Dead wood levels would be retained in excess of snag and down wood levels identified in the Forest Plan, as amended with the Interim Wildlife Standard (Eastside Screens). The best available science was used to determine effects to snag and down wood dependent species (Mellen 2006). All alternatives would provide adequate habitat for cavity excavators expected to occur in the area. A low level of assurance that habitat would be available for black-backed woodpeckers indicates that the population would be maintained at the current level. Deadwood retention levels are consistent with the desired condition in the Land and Resource Management Plan for the Umatilla National Forest (Forest Plan, page 4-7, 1990) because habitat for species using dead (snags) and down trees would be provided throughout the project area. Live trees would be retained for replacement snags, wherever they occur. Dead down logs and slash would be left on the ground when they occur for species utilizing such habitat (School FEIS, Chapter 3, p. 3-221). Also see response to Comment 8.
<u>Letter 3 – Comment 11</u> 1. *The agency must recognize the asymmetric nature of snag dynamics after fires. High rates of snag fall would be expected in the decades following fire, while low rates of snag recruitment would be expected in the decades following a fire. This unavoidably results in a serious deficit of snags at some point in the future.* 2. *In order for the NEPA analysis to fully address the snag habitat issue it must look carefully*	Responses to this comment were disclosed in the School FEIS, Chapter 3, Dead Wood Habitat section, Appendix B, and Appendix M, pages M-63 to M-89.

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at the snag gap from both ends. *a. The snag gap begins when too many of the current snags are gone. So the snag gap is exacerbated on the front end by salvage logging which removes too many large snags.* *b. The snag gaps ends when the next stand grows to the point that it contains large trees and some of them die, so the snag gap is exacerbated on the back end if there is a significant delay in tree regeneration.* *3. The agency has a tendency to focus on the back end of the snag gap which is more speculative and ignore the effect of salvage logging on the front end of the snag gap (which is concrete and unavoidable).* *4. Salvage logging which retains only enough snags to meet snag requirements after harvest will not meet snag requirements in a few years after those few retained snags fall.* *5. Both the RMP and the Northwest Forest Plan (p C-13) require that snags be maintained through time, so our goal must be to manage snags to minimize the time period that there is a deficit of snags.* *6. The NEPA analysis must account for snag fall rates and figure out how to minimize the snag gap. Every day that the "snag gap" is lengthened by salvage logging is a violation of the RMP. Models that may be used to analyze snag dynamics can be found here: http://www.for.gov.bc.ca/hre/deadwood/DTmod.htm* *7. There is a strong correlation between the size of the snag and the length of time it is likely to remain standing, so salvage must be designed to retain all the large snag and only remove trees from smaller size classes.* 8. *Consider this example: Assume that the stands currently have 30 large trees/acre and 24 of those will be removed via salvage logging while 6 trees/acre will be retained for snag habitat. Further assume that in 50 years 2 percent of the large snags will remain standing as snag habitat. Two percent of 6 trees/acre is FAR LESS than 2 percent of 30 trees/acre, so there is a virtual statistical certainty that salvage logging will exacerbate the snag gap* *The agency often compares their proposed snag retention levels to the average number of snags across the landscape, without recognizing that after a significant disturbance such as fire "the rate of input [of snags] to the CWD pool is 100-1000x the rate expected for an unburned*	

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steady-state forest (Harmon et al 1986). Even afterwards, in the next 5 or 6 years, the rate of input is still 5 or 10 or even 100 times that steady-state rate." *http://www.brownandbrown.tv/warner-presentation-2002-05-14b.pdf* *The agency cannot take a hard look at the issues of snag habitat and complex young forests without considering the dynamics of snags and dead wood.*	
Letter 3 – Comment 12 ***The amendment ignores the importance of beneficial soil organisms after fire.*** *Rapid mycorrhiza formation is important to establishment and survival of vegetation after a fire. The quantity, quality and rate of revegetation is in turn important for many hydrologic, soil, and habitat qualities. See Amaranthus, M. P. and D. A. Perry. 1994. The functioning of ectomycorrhizal fungi in the field: linkages in space and time. Plant and Soil 159: 133-140. ("The authors review the importance of ectomycorrhizal fungi (ECM) to the growth and survival of trees - they take up nutrients and water, extend feeder root longevity, protect against pathogens, maintain soil structure, and can protect plants from toxic heavy metals. Furthermore, studies document that roots of different plants can be linked by commonly shared ECM fungi. Mycorrhizal hyphae supported by one plant can aid in the establishment of another plant. As a result, young seedlings can form mycorrhizae and obtain energy from an already established host tree. Extending mycelium may also help speed up regeneration in adjacent small forest openings. The authors note that ECM fungi may play a critical role during disturbance when the above-ground community dramatically changes. The existing fungi form a link between the old and new stands by aiding in the establishment of new host trees. Studies showed that tree seedling establishment was much less successful in sites without the appropriate mycorrhizae, such as on sites invaded by non-native plants, which are usually non-mycorrhizal or are associated with different mycorrhizal species.")* *The NEPA analysis must consider research suggesting that the rapidity of mycorrhizae formation in young plants following disturbance may be critical. Borchers and Perry, "Effects of Prescribed Fire on Soil Organisms, Chapter 13 in Natural and Prescribed Fire in Pacific Northwest Forests, Walstad, Radosevich, and Sandberg, editors, OSU Press. This means that any tendency of salvage logging to delay vegetation recovery or disturb or remove mycorrhizae refugia could have consequences that last longer than suggested by the mere delay. The period of natural recovery of vegetation shortly after fire may be critical. Activities that kill or damage new or residual vegetation (like salvage logging, activity fuel treatment, site prep, planting,*	Direct, indirect and cumulative effects to soil were disclosed in School FEIS, Chapter 3, and in Appendix M, pp. M-40 and M-80.

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etc.) may have serious adverse consequences for the growth and survival of the new stand.	
Letter 3 – Comment 13 ***In supplementing a NEPA analysis the Forest Service must consider and evaluate a true no action alternative.*** *The Forest Service must reconsider the no action alternative of the original School Fire FEIS, i.e. the no salvage logging alternative, because (A) the overall effect of salvage logging is overwhelmingly adverse to ecological values as described above and therefore contrary to the intent of the east side screens (it limits rather than preserves options, and moves ecosystems away from rather than toward the historic range of variability). And (B) there is significant new scientific information about salvage logging that has arisen since the ROD was approved.* *Collectively this new information (and the discussion buried in revised Appendix K) should cause the Forest Service to completely re-evaluate the no action alternative which now looks more attractive relative to all the adverse impacts of salvage logging.*	Direct, indirect and cumulative effects were disclosed for the no action alternative (Alternative A) in School FEIS, Chapter 3, and additional information was disclosed in Appendix K. In School FEIS the No-Action alternative was described to mean that all activities identified in the proposed action would not be approved or occur in the School Fire Salvage Recovery Project area. Salvage harvest of fire-killed and damaged trees and tree planting in harvested units would not be authorized. There would be no construction of temporary roads or use of previously closed, decommissioned, and unauthorized roads in support of salvage harvest (FEIS, Chapter 2, page 2-9). All published scientific literature that was relevant and known to the Forest Service was considered in the FEIS. Chapter 3 of the FSEIS discloses our review of conflicting scientific viewpoints.
Letter 3 – Comment 14 ***This is a significant plan amendment.*** *This amendments to the east side screens is not an insignificant amendment but rather a significant amendment because it is not consistent with the intent of the east side screens which is to preserve options for future management. The purpose and need for this project, to "maximize the economic benefits," is contrary to the east side screens and the multiple-use mandate of the Forest Service. As recognized by the court, the Forest Service must follow the law and the forest plan, not just the economic parts of the plan. By letting economic trump ecology, the Forest Service is significantly altering the underlying balance between competing uses of the Umatilla NF. This requires the FS to follow the full NFMA procedures for a*	This plan amendment is being proposed under the National Forest Management Act (NFMA) implementing regulations in effect prior to November 9, 2000. The 2000 NFMA implementing regulations (36 CFR 219.14 (d) (2)) as amended by the September 29, 2004 Interpretative Rule (Federal Register Vol. 69, No. 188) allow use of these procedures. Specific procedures for amending plans under the

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significant plan amendment. *A significant amendment of the forest plan will require further compliance with NEPA and NFMA and much better public notice and comment. This Supplemental EIS was only sent to a small group of people but a significant forest plan amendment must inv*olve the broader public. *Other reasons that these amendments are significant is that they are precedent setting. If this amendment is allowed the Umatilla and other National Forest will certainly do it after other fires when they want to remove large dying trees.* *This is a significant amendment because this amendment is based on economic recovery objectives and is not ecologically based. The Forest Service itself says it is adopting this amendment to conform the definition of live trees to "reflect Forest Service silvicultural practice." This is not an ecological justification. Just because the Forest Service has included dying trees in salvage sales in the past and wants to continue doing so does not make it ecologically appropriate.*	regulations in effect prior to November 9, 2000 are found in Forest Service Manual (FSM) 1926.5. Non-significant plan amendments may be made as a part of a project proposal, as is the case here. A plan amendment can be found to be non-significant if the amendment involves: 1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management. 2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management. 3. Minor changes in standards and guidelines (School DSEIS, page 1-2). A finding of significance under 36 CFR 219 will accompany the record of decision for the FSEIS. The amendment proposed in this FSEIS is short-term (the life of this project) and of limited scope (28,000 acres of the 1.5 million acre Umatilla National Forest) and it amends the Forest Plan in a way that contributes to achieving plan goals. The proposed action includes modification of one Forest Plan standard, limited to the duration and geographic scope of the Project. The amendment would not change management intent of the Eastside Screens wildlife standard nor would there be changes in how the standard would be applied to the Project compared to the effects disclosed in the July 2006 Project FEIS. Appendix B,

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	Implementation and Marking Guides, of the Project FEIS would not change. This amendment clarifies the definitions of live and dead trees to be consistent with normal agency practice and current science. This amendment would not preclude or require other amendments specific to this wildlife standard nor would this amendment preclude or require other actions across the forest (FSEIS, Chapter 3, p. 3-3).
Letter 3 – Comment 15 *The Forest Service must protect all large live trees.* *A review of past fires indicates that large pine trees are surviving after fire better than expected. The latest scientific information indicates that large pines with any green needles at all should be retained because they may survive.* *Surviving green trees are rare and valuable after a fire especially for:* • *recovery of soil biota,* • *proving current live tree habitat such as cover* • *producing seeds for natural reforestation and for animal foraging, and* • *provide critically important future snag and down wood recruitment.* *The agency's NEPA analysis must address all of these issues by explaining the extent to which surviving trees and their specific functions and values will be lost due to safety, operational constraints, and yarding corridors, road rights-of-way, etc.* *While it is true that some trees injured by fire will soon die, the agency fails to acknowledge or disclose the degree of confidence in their estimates (i.e. how many false positive predictions of imminent death will the agency make) and fails to recognize the huge importance of remaining live trees as current habitat (cover, shade, microclimate, nest/roost/foraging structures, etc.), as seed sources for natural recovery of locally adapted vegetation, as refugia for beneficial soil organisms including symbiotic fungi, as generators of fine root biomass, and as future sources of snags to fill the temporal gap between the batch of snags created by this fire and those to be produced in the distant future by the next stand of trees.*	Direct, indirect, and cumulative effects for affected resources were disclosed in the School FEIS, Chapter 3, and additional information was disclosed in Appendix E, Appendix F, Appendix K, and Appendix M. We believe the FEIS fully discloses and discusses the controversy regarding prediction of which fire-injured trees might die from their injuries in the near future (see particularly Appendix K and Appendix M). Also, the Forest Service recently reviewed post-fire survival of large ponderosa pines for two other fire areas in the Blue Mountains and, in response to this validation review, has modified the Scott Guidelines by producing Amendment 2. Amendment 2 makes several significant changes in the evaluation of survival potential for these large-diameter ponderosa pine trees, with the result that fewer of them will be marked for post-fire removal in the future. The Scott Guidelines are based on peer-reviewed science, and as with any scientific process, the results should not be viewed as a final answer for time immemorial. As new and more

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The NEPA analysis failed to adequately disclose and analyze this and an EIS is necessary to consider the effects of harvesting numerous trees that may survive. *The agency must recognize the large trees are more likely to survive fire and retain large trees with any signs of life. Large are more likely to survive due to two factors: (1) they are tall so more of their canopy is above the scorch height, and (2) their bark is thicker and better protects their cambium.*	complete information comes to light, the results are refined, and this revision process is considered a normal part of accepted scientific procedures. The Scott Guidelines are viewed as an adaptive management procedure. As new and better information becomes available, appropriate changes are made to improve the accuracy of the rating procedure. Validation of the Scott Guidelines will continue to play a key role in helping to identify future changes and improvements that will improve the rating procedure. A large, broad-scale calibration of the Scott Guidelines is currently underway, and when completed it will probably result in additional revisions of the Scott Guidelines (See Appendix M of the School FEIS, Letter #7, Comment 6; page M-14). Note that bark thickness and other survival factors are described in table E-1 of the School FEIS, but that they need to be in a contemporary context. When pre-settlement or historical fires occurred with greater frequency than they do now, and with low intensity, larger ponderosa pines were well adapted to survive these light surface fires. With implementation of fire exclusion policies about a hundred years ago came suppression of natural fire-return intervals. Under the natural fire regime, litter and duff depths may not have exceeded much more than ½ inch (Arno 2000). Arno (2000) observes that in many stands that have missed multiple fire-return cycles, the deep accumulations of duff around the base of large ponderosa pines can range from 6-24 inches. When these mounds of duff are consumed by smoldering combustion following light surface fires, high temperatures are produced

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	and sustained for a long duration over the fine-root systems and against the root crown, eventually girdling and killing the tree. If not killed outright, these trees often succumb to second-order fire effects (insects, drought, and disease) several years later.
Letter 3 –Comment 16 *The agency's use of the Scott Mortality criteria to determine "dying" trees will lead to violations of the eastside screens 21 inch diameter limit. While it's true that salvage is exempt from the ESS diameter limit. Cutting live trees is not exempt. Since the Scott criteria are probabilistic (i.e. there is a greater than 0% risk of false positive findings that trees are "dying") so some large live trees will by definition be killed in violation of the screens. The Forest Service must err on the side of protecting large trees that might survive (and any large trees that are green now and later die actually help achieve the overall objectives of the screens).*	Appendix C, Appendix K, and Appendix M of the School FEIS disclosed our compliance with the Eastside Screens and our rationale for using Scott Guidelines. Also see response to Comment 15 above.
Letter 3 – Comment 17 ***The Forest Service needs to develop new snag habitat standards that account for new information and increase the retention of snags.*** *This amendment takes the snags retention standards in the opposite direction from the need indicated by the best available science. This amendment ostensibly involves amending standards to allow more logging of snag habitat, but the Forest Service's existing snag habitat standards are based on the potential population method and are scientifically discredited. Evidence indicates that the potential population method provides too few large snags and the Forest Service needs to amend its standards to protect more snags, not fewer as this amendment would do.* *The Forest Service needs to prepare a EIS to consider a replacement methodology for maintaining species and other values associated with dead wood. This is especially critical because adequate dead wood is recognized as an essential feature of healthy forests and the Forest Service has identified lots of "management indicator species" associated with dead wood habitat.* *The bottom line is that current management at both the plan and project level does not reflect*	Direct, indirect, and cumulative effects and findings of consistency were disclosed in School FEIS, Chapter 3, Wildlife and Dead Wood Habitat sections. Information on snags and down wood is also disclosed in the FEIS, Chapter 2, Table 2-3 Design Features and Management Requirements, Appendix B, and Appendix M. Also see response to Comment 8.

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all this new information about the value of abundant snags and down wood. The agency must avoid any reduction of existing or future large snags and logs (including as part of this project) until the applicable management plans are rewritten to update the snag retention standards. *The Forest Service should stop harming dead wood habitat until they have a legal plan to conserve associated species over the long-term*	
Letter 3 – Comment 18 *Consider the following before relying on DecAID* *The agency often tries to use DecAID as a substitute for the outmoded potential population methodology. DecAID, the Decayed Wood Advisor for Managing Snags, Partially Dead Trees, and Down Wood for Biodiversity in Forests of Washington and Oregon, http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf Although DecAID helps bring together lots of useful information about snag associated species, the agency must recognize and account for the short-comings of DecAID and cannot rely on DecAID to provide the project-level snag standards because: DecAID is a tool designed for plan level evaluations, because DecAID itself has not been subjected to NEPA analysis and comparison to alternatives, and because DecAID is an inadequate tool for the purpose.* 1. *Before relying on DecAID, the agency must prepare a comprehensive NEPA analysis to consider alternative ways of ensuring viability of all species dependent upon snags and dead wood. While it is true that the "potential population" or "habitat capability" method is no longer considered scientifically valid, the agency has not yet considered a full range of alternative methods to replace the habitat capability method mandated in the forest plans.* 2. *Before using DecAID, the agency must establish a rational link between the tolerance levels in DecAID and the relevant management requirements in the applicable resource management plan. For instance, since the Northwest Forest Plan and the Eastside Screens require maintenance of 100% potential population of at least some cavity-dependent species, the agency must explain why that does not translate into maintaining 100% of the potential tolerance level. If the site is capable of supporting 80% tolerance levels, the agency should not be able to manage for 30-50% tolerance levels and still meet the 100% potential population requirement.* 3. *DecAID does not replace the discredited forest plan standards because DecAID is informational only. DecAID does not specify management objectives. The agency must*	Our response to this comment in its entirety was disclosed in Appendix M of the School FEIS on pages M-68 to M-71.

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specify the management objective based on RMP objectives for the land allocation or based on natural "range of variation." Since large snags are outside the natural range of variability across the landscape, the agency must retain all large snags to start moving the landscape toward the natural range of variability, or the agency must carefully justify in the NEPA analysis every large snag it proposes to remove. See Jerome J. Korol, Miles A. Hemstrom, Wendel J. Hann, and Rebecca A. Gravenmier. 2002. Snags and Down Wood in the Interior Columbia Basin Ecosystem Management Project. PNW-GTR-181. http://www.fs.fed.us/psw/publications/documents/gtr-181/049_Korol.pdf *This paper estimates that even if we apply enlightened forest management on federal lands for the next 100 years, we will still reach only 75% of the historic large snag abundance measured across the interior Columbia Basin, and most of the increase in large snags will occur in roadless and wilderness areas.* 4. *The agency cannot use "average" snag levels (e.g. 50% tolerance level) as a management objective within treatment areas, because treatments are essentially displacing natural disturbance events which would normally create and retain large numbers of snags, so disturbance areas should have abundant snags, not average levels of snags. It would be inconsistent with current science and current management direction to manage only for the mid-points and low points. The agency should manage for the full natural range dead wood levels, including the peaks of snag abundance that follow disturbance.* 5. *Be sure to use the DecAID tool appropriately. The agency must address the dynamics of snag habitat over time, by ensuring that recommended snag levels are maintained over time given typically high rates of snag fall and low rates of snag recruitment following fire. These dynamics are not accounted for in the DecAID advisor. The agency often misuses the DecAID decision support tool by looking at only a snap-shot in time. The agency relies on DecAID to analyze impacts on snag dependent species, but the agency fails to recognize that* *"DecAID is NOT: … a snag and down wood decay simulator or recruitment model [or] a wildlife population simulator or analysis of wildlife population viability. … Because DecAID is not a time-dynamic simulator … it does not account for potential temporal changes in vegetation and other environmental conditions, … DecAID could be consulted to review potential conditions at specific time intervals and for a specific set of conditions, but dynamic changes in forest and landscape conditions would have to be modeled or evaluated*	

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outside the confines of the DecAID Advisor.” *Marcot, B. G., K. Mellen, J. L. Ohmann, K. L. Waddell, E. A. Willhite, B. B. Hostetler, S. A. Livingston, C. Ogden, and T. Dreisbach. In prep. “DecAID -- work in progress on a decayed wood advisor for Washington and Oregon forests.” Research Note PNW-RN-XXX. USDA Forest Service, Pacific Northwest Region, Portland OR. (pre-print)* *http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf/HomePageLinks/44C813BC574BDFCC88256B3E006C63DF* *To clearly and explicitly address the issue of “snag dynamics” the can start by reading and responding to the snag dynamics white paper on the DecAID website which says “To achieve desired amounts and characteristics of snags and down wood, managers require analytical tools for projecting changes in dead wood over time, and for comparing those changes to management objectives such as providing dead wood for wildlife and ecosystem processes” and includes “key findings” and “management implications” including “The high fall rate (almost half) of recent mortality trees needs to be considered when planning for future recruitment of snags and down wood. Trees that fall soon after death provide snag habitat only for very short periods of time or not at all, but do contribute down wood habitat. In fact, these trees are a desirable source of down wood as they will often begin as mostly undecayed wood and, if left on the forest floor, will proceed through the entire wood decay cycle with its associated ecological organisms and processes that are beneficial to soil conditions and site productivity.”* *http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf/HomePageLinks/863EEA66F39752C088256C02007DF2C0?OpenDocument* 6. *The tolerance levels from DecAID may be too low to support viable populations of wildlife associated with dead wood, because anthropogenic factors that tend to reduce snags (e.g., firewood cutting, hazard tree felling, fire suppression, and salvage logging) may have biased the baseline data that DecAID relies upon to describe “natural” conditions. See Kim Mellen, Bruce G. Marcot, Janet L. Ohmann, Karen L. Waddell, Elizabeth A. Willhite, Bruce B. Hostetler, Susan A. Livingston, and Cay Ogden. DecAID: A Decaying Wood Advisory Model for Oregon and Washington in PNW-GTR-181, citing Harrod, Richy J.; Gaines, William L.; Hartl, William E.; Camp, Ann. 1998. Estimating historical snag density in dry forests east of the Cascade Range. PNW-GTR-428. http://www.fs.fed.us/pnw/pubs/gtr_428.pdf* 7. *DecAID is still an untested new tool. The agencies must conduct effectiveness monitoring to determine whether the snag and down wood retention recommendations*	

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in the DecAID advisor will meet management objectives for wildlife and other resource values. 8. *The "unharvested" inventory data used in DecAID may represent but a snapshot in time, and fail to capture the variability of dead wood over time, including the pulses of abundant dead wood that follow disturbances and may prove essential for many wildlife species.* 9. *DecAID must be used with extreme caution in post-fire landscapes because the data supporting DecAID does not include natural post-fire landscapes. ("The inventory data likely do not represent recent post-fire conditions very well … young stands originating after recent wildfire are not well represented because they are an extremely small proportion of the current landscape … The dead wood summaries cannot be assumed to apply to areas that are not represented in the inventory data." "DecAID caveats" http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf).* 10. *DecAID relies on a wide range of sources in the literature, some of which recommend much higher levels of snag retention than reflected in the advisor. The agency NEPA analysis should disclose the published literature with higher levels of snag and wood retention and discuss their potential relevance for the project. ("the agency must disclose responsible opposing scientific opinion and indicate its response in the text of the final statement itself. 40 C.F.R. § 1502.9(b)." Center for Biological Diversity v. United States Forest Service, No. 02-16481 (9th Cir., Nov. 18, 2003).)* 11. *DecAID tolerance levels need careful explanation. These tolerance levels are very difficult to put in terms that are understandable by the general public, but if the Forest Service is going to use this tool they must make it understandable. The NEPA analysis should provide cumulative species curves for each habitat type and each forest structural stage and should explain the studies and publications that support the data points on the curves. What kind of habitat were the studies located in? What was the management history of the site? Was the study investigated nesting/denning, or roosting and foraging too?* 12. *DecAID does not account for the unique habitat features associated with some types of snags. DecAID primarily just counts snags and assumes that all snags of approximately the same size have equal habitat value, but this fails to account for the fact that certain types of snags and dead wood features are unique, such as: hardwood snags, hollow trees and logs, different decay classes, etc. The NEPA analysis must account for these features and the agency should disproportionately retain dead wood likely to serve these unique habitat functions.*	

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13. *DecAID authors caution that "it is imperative, however, to not average snag and down wood densities and sizes across too broad an area, such as across entire watersheds, leaving large areas within watersheds with snags or down wood elements that are too scarce or too small" Kim Mellen, Bruce G. Marcot, Janet L. Ohmann, Karen L. Waddell, Elizabeth A. Willhite, Bruce B. Hostetler, Susan A. Livingston, and Cay Ogden. DecAID: A Decaying Wood Advisory Model for Oregon and Washington in PNW-GTR-181. http://www.fs.fed.us/psw/publications/documents/gtr-181/042_MellenDec.pdf While we agree that snags and down wood must not be averaged over wide areas, we also must emphasize that snags and down wood are far below historic levels on non-federal lands, so in order to ensure viable populations of wildlife and avoid trends toward ESA listing, federal lands must be managed to compensate for the lack of down wood on non-federal lands.* 14. *DecAID appears to be based on the idea that the habitat needs of certain key wildlife species represent the best determinant of how much dead wood to retain, and this may in fact be true, but DecAID should also include cumulative curves for other ecological functions provided by dead wood, including: site productivity, nutrient storage and release, erosion control, sediment storage, water storage, water infiltration and percolation, post-fire micro-site maintenance, biological substrate, thermal mass, etc. How much dead wood is needed for thee functions?* 15. *DecAID may be best used for program level planning rather than project level planning. See Dallas Emch and Gary Larson, 2006. Review & Analysis of Remainder of Comments on EA Supplements for Multiple Timber Sales on Mt. Hood & Willamette National Forests on Remand in ONRCA v. Forest Service CV-03-613-KI (D.Or.). 4-10-06.* 16. *Any activity that degrades snag habitat is arbitrary and capricious until the agency develops new procedures in compliance with NEPA and NFMA or LFPMA. Compliance with old standards is meaningless, and in the absence of new standards, the agency cannot draw any credible conclusions about impacts to snag associated species. There is no way to use DecAID to comply with the east side screens' requirement to maintain 100% potential populations of cavity species (until the Forest Service develops some credible way to translate DecAID tolerance levels in to potential population levels).*	
Letter 3 – Comment 19 *Snag retention standards overestimate habitat capability*	Direct, indirect, and cumulative effects regarding

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The traditional snag habitat model used by the agency is based on outdated science which vastly overestimates habitat capability for snag-dependent species because it fails to consider important factors such as: *the model does not explicitly consider snag height so some snags may be too short for some species;* *rates of snag fall rates over time;* *snag recruitment rates over time;* *use of space by each species;* *the need for roosting structures [and foraging trees, and escape cavities] as well as nesting structures;* *recent data on species needs from the Cascades and Blue Mountains has not been incorporated into the model* *Numbers and sizes (dbh) of snags used and selected by secondary cavity-nesters often exceed those of primary cavity excavators.* *the fact that snags should be retained in clumps AND dispersed to meet various species needs and ecological functions.* *federal managers attempting to maintain viable populations of native cavity-dwellers need to consider generally degraded snag habitat conditions on adjacent and nearby non-federal lands.* *The agency's analysis of snag retention and habitat for cavity dependent species is faulty at both a programmatic level and at a project level. The agency must defer any decision on this project until it reviews all the available new information and amends its management plan standards to provide adequate snags for wildlife and all other ecosystem functions.*	snag retention were disclosed in the School FEIS, Chapter 3, Wildlife and Dead Wood Habitat sections, Appendix B, and Appendix M.
Letter 3 – Comment 20 *New information on Pileated Woodpeckers indicates Standards & Guidelines are Inadequate.* *Pileated woodpeckers play a unique role in the forest ecosystem* *They excavate cavities in trees that are later used by numerous other species not just for nesting, but also for roosting and foraging. Benefited species include spotted owls and their prey.* *Their excavations accelerate wood decomposition, nutrient cycling, and fungi*	Direct, indirect, and cumulative effects were disclosed in Chapter 3, Wildlife and Dead Wood sections of the School FEIS. Additional information was also disclosed in Appendix M, pages M-66 to M-67.

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dispersal. Kerry L. Farris, Martin J. Huss And Steve Zack. The Role Of Foraging Woodpeckers In The Decomposition Of Ponderosa Pine Snags. The Condor 106:50–59. The Cooper Ornithological Society 2004. http://www.sabp.net/woodpeckers&spores.pdf *The pileated woodpecker's ability to excavate large cavities in relatively sound trees that are in the early stages of heart wood decay, means that the resulting cavity trees may provide uniquely long-lasting habitat.* *The combined foraging activities of pileated woodpeckers and all the species they assist tend to mediate insect outbreaks.* *The NEPA analysis failed to consider significant new information on pileated woodpeckers including: Pileated woodpeckers need more and larger roosting trees than nesting trees. They may use only one nesting tree in a year, they may use 7 ore more roosting trees. Determining pileated woodpeckers population potential based on nesting sites alone will not provide adequate habitat for viable populations of this species. This new information is not recognized in current management requirements at the plan or project level. The EIS must address this new scientific information. See Science Findings Issue 57 (October 2003) Coming home to roost: the pileated woodpecker as ecosystem engineer, by Keith Aubry, and Catherine Raley http://www.fs.fed.us/pnw/sciencef/scifi57.pdf*	
Letter 3 – Comment 21 *The Forest Service cannot predict with certainty which trees will live and which will die so there is a statistical certainty that false positive finds will lead to the cutting of "dying" trees that would in fact survive and continue to provide live tree habitat.*	Predicting Tree Survival adapted from the Scott Guidelines is disclosed in Appendix B of the School FEIS. Appendix K and Appendix M of the FEIS offer additional rationale for our use of Scott Guidelines. These references to the School FEIS discussion about why a survival prediction was necessary can be summarized as follows: 1. On a wildfire area covering more than 50,000 acres, the range or combination of site conditions, stand conditions, fire effects, and pre-fire stressors is almost

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	limitless. 2. The magnitude of this variability leads inevitably to a decision to adopt a prediction system that relates site and tree factors (explanatory variables) to some type of probabilistic estimate of tree mortality. 3. Regardless of whether the fire area is large and contains a wide range of site and stand conditions, we are not aware of any methodology, process, protocol, or procedure that could integrate injuries to a tree's physiological systems (foliage, stem, roots) and produce a conclusive, definitive, and absolutely accurate (never wrong) finding about whether an injured tree will survive or die. 4. Since it is not possible to account for every conceivable combination of site and stand conditions across a large wildfire area, and because an absolutely accurate (never wrong) procedure for predicting tree mortality does not exist, there will always be some amount of uncertainty associated with a probabilistic rating system such as the Scott Guidelines. 5. The amount of uncertainty associated with the Scott Guidelines is no more than would be associated with any other prediction system, such as Ryan and Reinhardt 1988 and the other systems evaluated in appendix K of the FEIS. In fact, the Scott Guidelines

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	provide more accurate estimates of tree mortality than Ryan and Reinhardt (1988) and other alternative models evaluated in appendix K because the guidelines include factors for all three of a tree's primary physiological systems, and because the guidelines account for pre-fire factors such as insects, diseases, and overstocking. 6. In conclusion: the School Fire Salvage Recovery Project could use Ryan and Reinhardt (1988) or any other similar methodology, process, protocol, or procedure to predict tree mortality, in lieu of the Scott Guidelines, and yet it would still not provide any statistical certainty that the survival prediction results are infallible. As described in the School Fire FEIS, the Forest Service has a legitimate need to predict tree mortality for fire-injured trees, and the Scott Guidelines were found to be the best option for doing so (see table K-1 in School Fire FEIS).
Letter 3 – Comment 22 *The proposed sampling of the condition of cambium will increase the risk of infection and other harm for trees that are found to be "alive." The green needle test is non-destructive and better avoids false conclusions that trees are dead, when they are actually alive.* *If the Forest Service is going to allow purchasers to enter stands to remove dead-only trees, and then re-enter stands to remove the "dying" trees, the SDEIS needs to disclose the significant adverse impacts of repeated entries and the fact that soil standards will likely be*	Cambium sampling is a requirement of the Scott Guidelines protocol for predicting post-fire tree survival, and cambium sampling is a well-established technique supported in the scientific literature (see Appendix M pages M-61 and M-62 in School FEIS).

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violated.	See responses to Comments 8 and 21.
Letter 3 – Comment 23 *The use of skyline-yarding in logging areas with green trees will violate the courts injunction and must be disallowed. Skyline yarding results in the killing of live trees, some of which will be larger than 21" dbh. The Siskiyou National Forest's Biscuit Fire Salvage FEIS (page III-177) admits that 12% of live trees >20" dbh will die in skyline yarding units. This is likely true of all cable logging types.*	Implementation of this project will be in full compliance with all applicable laws, rules, court orders, and regional policy. Skyline operations may require removal of a small number of live trees to meet safety standards (see Washington Administrative Code (WAC) Chapter 296.54, Safety Standards for Logging Operations). Meeting safety requirements is not discretionary on the part of the Forest Service.
Letter 3 – Comment 24 *We find the effects analysis in the SDEIS completely inadequate. It fails to address numerous important scientific issues addressed in these comments.*	The effects analysis in the Draft SEIS only contains discussion or information that is new or different from the School FEIS. Scientific issues were disclosed in School FEIS in Appendix K and further discussed in Appendix M. Chapter 3 in the FSEIS discloses scientific issues addressed in comments received.

Letter #4 – Forest Service Employees for Environmental Ethics Andy Stahl	
Letter 4 – Comment 1 *The stated purpose of the School Fire project is to log timber "before decay and other wood deterioration occurs to maximize potential economic benefits." The draft SEIS claims that this purpose cannot be met if large live trees are not logged. Thus, the relevant question, which the Draft SEIS does not address or evaluate, is whether large live trees proposed for logging in the School Fire project area suffer or will suffer from "decay and other wood deterioration."*	Comments and statistics about the amount and progression of wood decay and deterioration for the School Fire area are summarized in Chapter 1 of the School FEIS (page 1-4).
Letter 4 – Comment 2 *In fact, the Draft SEIS includes no evidence whatsoever that any decay or wood deterioration (associated with fire injuries or otherwise) is occurring within the project area's live trees.*	Responses to this comment were disclosed in the School FEIS, Chapter 3- Social and Economic

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Although the Draft SEIS states that "Larger diameter trees deteriorate at a slower rate and have a higher initial value," this statement appears to apply only to trees that are dead – not to live trees. The Forest Service's complete and utter failure to consider, measure, assess, inventory, or otherwise account for decay and other wood deterioration in the project area's live trees is arbitrary and capricious. There is no rational basis for concluding that the proposed decision to log live trees will meet the purpose of the School Fire project to salvage "before decay and other wood deterioration occurs."	section, Appendix E, Appendix K, and Appendix M, pages M-11 to M-14, and M-30 to M-31 and in the DSEIS, Appendix B (which was modified to be consistent with the August 30, 2006 amendment to the Scott Guidelines). Comments and statistics about the amount and progression of wood decay and deterioration for the School Fire area are summarized in Chapter 1 of the School FEIS (page 1-4).
Letter 4 – Comment 3 *Not only does the Draft SEIS fail to assess or consider the present amount and rate of decay and wood deterioration within the project area's live trees, it further fails to assess any future amount and rate of wood decay and deterioration. The Draft SEIS simply does not inform the decision-maker or public of the amount, kind, location, or any other relevant data concerning future decay or wood deterioration associated with currently live trees that the Forest Service believes will die as a result of fire injuries.* *The lack of any information regarding future decay is particularly troubling since there is no evidence that any decay or deterioration whatsoever has occurred in High Roberts project live trees marked for logging because of projected future death. The High Roberts fire burned in 2002. Like the School Fire project, the Forest Service proposed to log live (i.e., so-called "dying") trees at High Roberts "before insects and disease reduce their value." http://www.fs.fed.us/r6/malheur/high-roberts/decision-memo.pdf.* *Yet five years after the fire, virtually none of the High Roberts large live trees has died. There is no evidence of any decay or deterioration in the large live trees. These large trees remain as alive and healthy today as they were the day before the High Roberts fire.*	See response to Comment 2 above.
Letter 4 – Comment 4 *Inexplicably, however, the Draft SEIS claims that "The majority of these ≥ 21 inch dbh fire injured trees are expected to be dead within the next five years, contributing additional snags." The Draft SEIS provides no empirical basis whatsoever for this statement. Nor is it supported by actual on-the-ground experience at High Roberts, at Forest Service research sites, or*	See response to Comment 2 above. Appendix E to the School FEIS describes how local empirical knowledge (gained from monitoring other

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anywhere else. *In sum, the Draft SEIS fails to consider or disclose the lessons learned from the High Roberts project. To wit: 1) Virtually no large (> 21") trees projected by the Forest Service to die have done so; 2) No evidence of fire-induced decay or deterioration in large live trees; 3) No evidence that suggests future decay or deterioration in large, live trees. This information is relevant to the School Fire project, which proposes to log similar large trees in a similar ecosystem affected by a similar forest fire under similar conditions.*	forest fires on the Umatilla National Forest over the last 20 years), along with consultation with a professional entomologist about post-fire insect response, was used when predicting and modeling how many large-diameter trees would be expected to die within the next 5 years. Also see response to Letter 3 - Comment 15, for information about how monitoring of the High Roberts fire area was used to prepare amendment 2 of the Scott Guidelines, and how amendment 2 was used to change implementation of the School Fire Salvage Recovery Project.
Letter 4 – Comment 5 *The Draft SEIS also fails to explain or describe the sources of decay and wood deterioration, their modes of decay and deterioration, frequency within the project area, or severity. Are the decay vectors insects (and, if so, which ones?), diseases (and, if so, which ones?), physical agents (and, if so, which ones?). Insofar as the purpose of the project is to log "before decay and other wood deterioration occurs," the decision-maker and public should know the agents of decay and deterioration, the risks of their occurrence, and the expected mode and severity of damage. Some agents are more likely to cause decay than others; some cause more damage than others; and some are possibly preventable by means other than logging. In other words, some of the live trees presently or projected to fall victim to decay and deterioration may be cured and saved by some means (e.g., thinning around the large tree to reduce water stress). However, the Draft SEIS omits in its entirety all of this relevant information.*	See response to Comment 2 above.
Letter 4 – Comment 6 *Also missing from the Draft SEIS is any economic analysis of the decay and wood deterioration allegedly occurring or projected to occur within live trees. How many trees are or will be affected by each decay agent? What is the financial damage associated with each decay and deterioration agent? And, on the other hand, what are the ecological values of the allegedly damaged trees for wildlife habitat and other ecosystem services?*	The Draft SEIS only contains discussion or information that is new or different from the July 2006 FEIS. Direct, indirect, and cumulative effects for economics and other affected resources were disclosed in the School FEIS, Chapter 3, Wildlife and Social and Economic Sections.

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	The economic analysis presented in the School Fire Salvage Recovery Project's Final Environmental Impact Statement (FEIS) is in accordance with the FS manual and handbook guidance to complete a financial analysis for timber sales (FSH 2409.18). The economic analysis documented in the FEIS identifies financial monetary measures for timber and the financial costs of removing the timber. Other non-timber resources affected by the project are not measured using monetary values. The costs and benefits associated with these resources are described using other quantitative and qualitative measures in accordance with FS policy.
Letter 4 – Comment 7 *The Draft SEIS claims that the 9th Circuit School Fire Project ruling "does not reflect Forest Service silvicultural practice and interpretation." Not so. The Forest Service had implemented the Eastside Screens in a manner consistent with the 9th Circuit's School fire decision from the date of the Screens' adoption in 1995 until 2003. Beginning in 2003, a handful of Malheur National Forest employees devised a scheme to use the Monument and other Malheur forest fires to justify logging healthy old-growth ponderosa pine trees that had heretofore been protected from logging by the Eastside Screens. Most likely, these employees were motivated by a sincere desire to ensure the economic vitality of their local lumber industry neighbors. Several of their professional colleagues blew the whistle on this conspiracy to evade the Eastside Screens. Regional office staff chose to ignore the whistleblowers and, in cooperation with the Office of General Counsel, tried to build a house of cards that sought to justify this Malheur timber rip-off. The School Fire circuit court ruling rejected the Forest Service's charade. Now the School Fire project seeks to continue the Malheur's tradition of duplicity and deceit.*	On February 12, 2007 the Court issued an opinion that the Project was inconsistent with the Forest Plan (Eastside Screens) by inappropriately implementing the prohibition on logging of any "live tree" $\geq$ 21 inches diameter at breast height that currently exists in the sales areas – i.e., any tree of requisite size that is not yet dead. The Court reasoned that in the absence of an adopted technical definition of "live trees," the common understanding of the word "live" from the Merriam Webster's Collegiate Dictionary (10th ed. 1993) meant "to be alive" which meant "not dead." The Court went on to conclude that the agency could not harvest "dying" trees because they were not dead. The Court recognized that we could correct this situation by amending the Forest Plan to include a definition of the term "live trees." (DSEIS, p. S-1).

Letter #5 – State of Washington Department of Ecology Terri Costello	
Letter 5 – Comment 1 *Water Quality Program* *Proper erosion and sediment control practices must be used on the construction site and adjacent areas to prevent upland sediments from entering surface water. Local stormwater ordinances will provide specific requirements. All ground disturbed by construction must be stabilized. When appropriate, use native vegetation typical of the site.* *Routing inspections and maintenance of all erosion and sediment control Best Management Practices (BMPs) are recommended both during and after development of the site.*	Erosion and sediment control practices were disclosed in the School FEIS, Chapter 2, Design Features and Management Requirements, Table 2-3, Chapter 3, Hydrology/Water Quality section, Appendix G, and Appendix I. As stated in the Draft Supplemental EIS (page 3-3) "effects to resources would be as described for all resources under Alternative B in the School Fire Salvage Recovery Project Final EIS. Timber harvest would still occur in the same areas and along the same roads as originally described in the School Fire Salvage Recovery Project Final EIS. Logging systems would remain the same and no new trees would be designated for harvest. The size and location of Riparian Habitat Conservation Areas would remain the same as would the measures to protect those areas. Seasonal restrictions on operations to minimize effects on big game winter range, soils, and snowmobile uses would remain the same. Therefore, as a result of this amendment, there would be no changes on the ground, or to environmental effects beyond those already described in School Fire Salvage Recovery Project Final EIS."
Letter 5 – Comment 2 *Forest Practice applicants for projects that will convert forest land to another land use may be required to obtain a Construction Stormwater General Permit from theDepatement of Ecology. Specifically, if a project involves clearing, grading, and/or excavation which will result in the disturbance of one or more acres and will potentially discharge stormwater to surface waters of the State, then obtaining a Construction Stormwater General Permit prior to operation is required.*	See response to Comment 1.

Letter #6 – U. S. Department of the Interior Preston A. Sleeger	
Letter 6 – Comment 1 *The Department of the Interior has reviewed the Draft Supplemental Environmental Impact Statement for the School Fire Recovery Project, Umatilla National Forest, Columbia and Garfield Counties, Washington. The Department does not have any comments to offer.*	Thank you for your review.

Letter #7 – American Forest Resource Council Charles H. Burley	
Letter 7 – Comment 1 *AFRC, in the case of this particular project, fully supports the Proposed Action (Preferred Alternative B) to amend the Umatilla National Forest Land and Resource Management Plan (Forest Plan) to address the recent opinion of the 9th Circuit Court of Appeals. This amendment would change the Eastside Screens wildlife standard at 6d. (2)(a) to define both dead and live trees.* *There are several reasons AFRC supports this amendment. It is consistent with the Forest Plan's goal: "Provide for production of wood fiber consistent with various resource objectives, environmental constraints, and considering cost efficiency." (4-67) This amendment is short-term and only lasts as long as the project. In addition, it is limited in its geographic scope and as noted above is contributes to achieving the Forest Plan goals.*	Your comments of support have been noted.

Letter #8 – The Lands Council, Mike Petersen The Sierra Club, Rene Voss Hells Canyon Preservation Council, Larry McLaud WildWest Institute, Jeff Juel Friends of the Clearwater, Gary Macfarlane	
Letter 8 – Comment 1 *The DSEIS is an attempt to make flawed Forest Service silvicultural policy dominant over rulings of the US judicial system (see DSEIS pages 1-2 to 1-3). The DSEIS must follow science and consider a true range of alternatives to eliminating the Eastside Screens.* *It is ironic the SDEIS preferred alternative is not currently legal. Indeed, the SDEIS is a slap in the face to our legal system. The Forest Service has completely ignored that these lands are*	The proposed action addressed in the DSEIS responds to the Ninth Circuit Court's suggestion to amend the Forest Plan by clarifying the agency's definitions of live and dead trees; see response to Letter 3 - Comment 5.

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publicly owned and the Forest Service has an obligation and a duty to ensure the public interest in these public lands.	The proposed action does not eliminate the Eastside Screens.
Letter 8 – Comment 2 *The National Environmental Policy Act request federal agencies to do their jobs right. Yet, the proposed action violates this law in an attempt to justify a decision that has already been made. The Forest Service would amend the Eastside Screens to allow abusive logging of live trees because these trees may die.*	See response to Comment 1.
Letter 8 – Comment 3 *For this project alone, the SDEIS suggest that 5 MMBF would fall into this category. That is a significant amount of older trees and even if they were to die in the near future (all trees eventually die), a significant amount of snag habitat and large woody debris would be protected by following the guidance of the Eastside Scientific Society Panel.*	See response to Letter 3 - Comments 17-20 as related to snag habitat and its consideration in the School FEIS. The Eastside Screens require that some of the dead trees greater than 21 inches in diameter be maintained, with retention amounts based on 100 percent potential population levels for primary cavity excavators, and the snag retention levels for trees greater than 21 inches in diameter have been met by the School FEIS, see Chapter 3, Appendix B, and Appendix C. Also see response for Letter 3- Comment 10.
Letter 8 – Comment 4 *Furthermore, it is specious to argue that ONLY the proposed action meets the purpose and need of the project.*	Your comment has been noted.
Letter 8 – Comment 5 *While 5 MMBF of larger trees is important in term of forest structure and snags, it is less than a quarter of what remains to be logged!*	Of the approximate 9,400 acres to be harvested approximately 1,800 acres are remaining to be harvested in the Milly, Oli, and Sun sales, and approximately 5,200 acres are remaining to be

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	harvested in Round-two sales (DSEIS, Chapter 2, Table 1, p. 2-5).
Letter 8 – Comment 6 *The volume estimates in the SDEIS do not sync up with those in the FEIS.*	In the DSEIS, Chapter 2, Table 1, p. 2-5 please note the asterisk notation for volume figures that reads "*Volume figures express actual volumes realized and experienced deterioration, and therefore, differ from the FEIS.*"
Letter 8 – Comment 7 *The analysis fails to provide a reasonable range of alternatives that includes scientifically and ecologically sound management proposals. The purpose and need was designed in such a way as to constrain alternatives and, in so doing, pre-determined the decision prior to NEPA analysis.*	See Chapter 2 of the Final SEIS. This section was modified to address your comment. The Purpose and Need in the DSEIS (p. 1-3) reads as follows: As stated in the Project FEIS on page 1-4 of the Purpose and Need, "there is a need to salvage harvest [burned timber] as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits." The Appeals Court opinion and District Court injunction described in the Introduction above "prohibits salvage harvest from the three timber sales areas of any "live tree" greater than or equal to 21 inches dbh. This includes any tree of requisite size with green needles or that is not yet dead." The Appeals Court definition of a "live tree," which does not reflect Forest Service silvicultural practice and interpretation, frustrates the ability of the Forest Service to achieve the purpose and need of the Project as stated above.

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Letter 8 – Comment 8 *The DSEIS ignores this core NEPA requirement for an adequate range of alternatives by the improper use of purpose/need to limit alternatives. In this instance, by too narrowly defining the purpose and need for this project, in a manner that is at odds with the original purpose and need, constrains management direction prior to NEPA analysis and disclosure and circumvents NEPA requirements for objective evaluation of alternatives before decisions are made.* *These actions leave no room for alternatives. These are predetermined decisions which lead to foregone conclusions.*	See response to Comment 7 above.
Letter 8 – Comment 9 *Moreover, use of the overly limited statement of purpose and need to formulate alternatives omits key national, regional and local priorities in terms of restoring watersheds and fisheries habitat without further ecological degradation.*	This comment is outside the scope of the analysis for this project. See response to Comment 7 above.
Letter 8 – Comment 10 *The Forest Service holds a serious responsibility to the Columbia River Tribes, and to all citizens, to do its utmost to improve spawning habitat. The federal government, including the Forest Service, has a legal and moral obligation to do all it can to reverse this trend to meet treaty rights and environmental laws. When fish stocks are at such critical lows, it is the federal government's responsibility to minimize the habitat degradation and to maximize restoration.*	Direct, indirect, and cumulative effects and findings of consistency for Fisheries were disclosed in the School FEIS, Chapter 3. Treaty Trust Responsibilities were disclosed in Chapter 3 of the FEIS, pp. 3-274 and 3-275.
Letter 8 – Comment 11 *In coming up with the purpose and need, the agency has defined the issues to try to preclude a reasonable array of alternatives. Even that effort, does not succeed - a restoration based alternative that focuses on preserving large trees could provide jobs while ensuring long-term economic benefits to the region.*	See Chapter 2 of the FSEIS. This section was modified to address your comment.

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Letter 8 – Comment 12 *In sum, the SDEIS violates federal. The agency has refused to analyze any alternative other than the no-action and its preferred alternative. Nowhere does the agency consider new information. Rather the agency simply made this SDEIS extremely narrow. The Forest Service has proposed a policy amendment to the Eastside Screens masked as a something that the Forest Service has always done.*	See response to Comment 11 above.
Letter 8 – Comment 13 *In spite of the plethora of scientific information questioning the Scott guidelines, the agency has discarded other methods based upon a questionable list of criteria (see page 2-2) that even the Scott Guidelines do not meet.*	We believe that the School Fire FEIS fully discloses and discusses the controversy surrounding prediction of which fire-injured trees might die from their injuries in the near future. See response to Letter 3 - Comment 15.
Letter 8 – Comment 14 *The agency has not followed either the letter or spirit of NEPA in this process. Alternatives were purposely excluded or constrained*	See response to Comment 11 above.
Letter 8 – Comment 15 *The SDEIS fails to rigorously look at scientific alternatives to the Scott guidelines. It sets up criteria for excluding other research, some of which, unlike the Scott guidelines, were from independent scientists. Regardless, the lack of detailed analysis of these other methods violates NEPA.*	Appendix C and Appendix K of the School FEIS accurately describe the Forest Service's rationale for selecting the Scott Guidelines as a tree mortality prediction protocol. The information presented in these appendixes redeem our NEPA responsibility as a government agency to disclose our decision-making criteria. Appendix K and a Supplemental Information Report from Forest Supervisor Kevin Martin (dated December 21, 2006) show that six objective criteria were used to select a tree mortality prediction protocol (see Appendix K, table K-1; and page 4 of the Supplemental Information Report), and that these criteria were used to evaluate alternatives to the Scott Guidelines.

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Letter 8 – Comment 16 *The intent behind the Eastside Screens was to large live trees because they are a scarce resource that has been heavily depleted across the landscape.* *The 9th Circuit honed in on the conservative nature of the Eastside Screens. The goal was to preserve large live trees as much as possible.*	According to the Decision Notice for the Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales, as approved on May 20, 1994 by Regional Forester John E. Lowe, "the decision continues the application of the interim direction for timber sales of August 18, as modified, through amendment of each of the nine forest plans, until the Eastside EIS is completed." This means that the intent behind the Eastside Screens was to preserve future options via interim guidance until a long-term strategy was provided by the "Eastside Ecosystem Management Strategy" (Eastside EIS), which was later called the Interior Columbia Basin Environmental Impact Statement; for this reason, the screens are entitled "Interim Management Direction" (see Appendix N to the DSEIS).
Letter 8 – Comment 17 *The SDEIS also failed to look at a range of alternatives. No alternative was considered that refused to do large scale salvage logging. Indeed, no real no-action alternative was analyzed as the no-action was the adoption of the court ruling on live trees.*	See response to Comment 11 above. In the DSEIS, Alternative A (studied in detail) was described in Chapter 2, p. 2-1 as follows: *In this document the no action alternative means the August 14, 2006 record of decision (Alternative B selected as described in the FEIS) would be implemented as enjoined by the District Court of the Eastern District of Washington. Specifically, the no action alternative excludes further harvest of any "live trees" = 21 inches diameter at breast height, including any tree of requisite size with green needles or that is not yet dead.*

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	Direct, indirect, and cumulative effects of taking no action (Alternative A) to implement any proposed activities were disclosed in the School FEIS, Chapter 3.
Letter 8 – Comment 18 *The latest research from Shatford and Hibbs and many others, remains unanalyzed in this SDEIS. The Forest Service cannot ignore decades of scientific research on the negative effects of post-fire logging.* *With regard to the best science on salvage logging, the SDEIS fails to consider recent science, published since the ROD was released, about the impacts of salvage logging. NEPA requires the use of best available science. Noss and Lindenmayer., 2006 discusses the negative effects of post-fire logging. That article and other science cited in these comments and past submissions clearly show that recently burned areas are the* ***very worst areas*** *to look at for timber production.*	All published scientific literature that was relevant and known to the Forest Service was considered in the FEIS. Chapter 3 of the FSEIS discloses our review of conflicting scientific viewpoints. To our knowledge, an article or other research findings by Shatford and Hibbs has not yet been formally published, but an advance version is now available. We reviewed the advance copy of this article and our response to it is described in Chapter 3 of the FSEIS. The Lindenmayer and Noss (2006) article (published in the journal Conservation Biology, volume 20, issue 4, pages 949-958) resulted from an unpublished Society for Conservation Biology scientific panel report (cited as Noss et al. 2006 in the School FEIS), and this report was analyzed and considered in detail in Appendix K of the School FEIS (see "Society for Conservation Biology Scientific Panel Report" section in Appendix K, pages K-7 to K-9).
Letter 8 – Comment 19 *This new information was not considered in the SDEIS because the agency first defined the*	See response to Comment 18 above.

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range of alternatives too narrowly and then failed to look at an adequate range of alternatives. That is a major failing of the SDEIS.	See response to Comment 11 above.
Letter 8 – Comment 20 *The SDEIS failed to look at other relevant information. The Columbia Fire, which burned into some of the project area, was not analyzed.*	Cumulative effects of Columbia Complex Fires were considered and are disclosed in Chapter 3 of the FSEIS.
Letter 8 – Comment 21 *The SDEIS devoted little discussion to the forest plan amendment. This proposal is a significant amendment to the Umatilla Forest Plan. The 2005 NFMA planning regulations have been enjoined, and therefore this proposal is subject to the 1982 NFMA planning regulations. The current forest plan was prepared under those regulations.*	See response to Letter 3 – Comment 14.
Letter 8 – Comment 22 *The SDEIS is not clear if or even whether current marking of the units yet to be sold will be changed as a result if the preferred alternative is selected. The proposed adoption of the plan amendment and the amended Scott Guidelines (after the FEIS) are different than what is in the FEIS. As such, they will have to be remarked to meet the judge's ruling.*	The Forest Service will be in full compliance with all laws, rules, court orders, and regional policy during implementation of the project. A discussion of changes to Scott Guidelines after distribution of the School FEIS and signing of the ROD are disclosed in Appendix B of the DSEIS on page B-1.
Letter 8 – Comment 23 *The SDEIS fails to meet NEPA, NFMA, and the court order. We expect that it will be reissued for another draft because the current SDEIS is inadequate.*	The DSEIS only contains discussion or information that is new or different. Other sections of the July 2006 School FEIS are unchanged. Findings of consistency with NEPA and NFMA are disclosed in Chapters 1 and 3 of the FEIS. The Forest Service has prepared this Draft Supplemental Environmental Impact Statement (DSEIS) in response to a recent opinion of the 9th

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	Circuit Court of Appeals (Appeals Court) concerning the School Fire Salvage Recovery Project (DSEIS, Chapter 1, pp. 1-1 to 1-2).

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Letter 9 – Comment 1 *The Forest Service has had a practice of protecting these large live trees as much as possible. The Forest Service has repeatedly stated that the Eastside Screens may only be amended on a site-specific basis for cases involved ecological or biological urgency in the short-term. The Forest Service's response is to put short-term economic gain as the only purpose over and above all other considerations. However, this is not a legitimate basis for a site-specific plan amendment.*	See response to Letter 4 – Comment 1.
Letter 9 – Comment 2 *This proposed policy change is significant because it extends across this landscape and multiple watersheds.*	See response to Letter 3 – Comment 14
Letter 9 – Comment 3 *Since the Eastside Screens were designed as minimum protective measures across eastern forests, any proposed amendment was only to be applied to areas with "biological urgency and unusual circumstance." Robert W. Williams, Memo to Forest Supervisors Concerning Review of Forest Plan Amendments 1 (Dec. 23, 1997).*	According to the Decision Notice for the Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales, as approved on May 20, 1994 by Regional Forester John E. Lowe, "the decision continues the application of the interim direction for timber sales of August 18, as modified, through amendment of each of the nine forest plans, until the Eastside EIS is completed." This means

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	that the Eastside Screens were designed to preserve future options via interim guidance until a long-term strategy was provided by the "Eastside Ecosystem Management Strategy" (Eastside EIS), which was later called the Interior Columbia Basin Environmental Impact Statement. More recent direction regarding the Screens and Forest Plan amendments from the current Regional Forester (Linda Goodman) stated: "I therefore encourage you to consider site-specific Forest plan amendments where this will better meet LOS objectives by moving the landscape towards HRV, and providing LOS for the habitat needs of associated wildlife species" (June 11, 2003 memo to Eastside Forest Supervisors; subject: guidance for implementing Eastside Screens). Note that this June 11, 2003 memo states that "This letter replaces those of October 2, and December 23, 1997," and that it contains no provision about "biological urgency and unusual circumstance." This means that the "biological urgency and unusual circumstance" provision contained in the December 23, 1997 memorandum was superseded by Goodman's June 11, 2003 memo.
Letter 9 – Comment 4 *The most recent guidance plainly states that an amendment should not be solely focused on economic concerns. Linda Goodman, Guidance for Implementing Eastside Screens, June 11, 2003.*	Regional Forester Goodman states in her June 11, 2003 memo that "Economic considerations are important but are not considered adequate justification alone for conducting harvest activities in LOS stands." This statement from Goodman's memo does not apply to the DSEIS because it proposes to establish definitions of live and dead

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	trees by amending one portion of the wildlife screen. We believe that the project will be fully consistent with the intent of the Eastside Screens (as described in the Eastside Screens environmental assessment and decision notices dated May 20, 1994 and June 12, 1995) because all live trees will be retained, substantial numbers of dead trees will be retained to contribute to late and old structure, and because subsequent planting will contribute to the development of new tree stands.
Letter 9 – Comment 5 *The proposal by the Forest Service in this case is illegal, inconsistent with past practice, runs counter to the recommendations from the Eastside Scientific Society Panel and does not ensure population viability.*	See response to Letter 3 – Comment 8.
Letter 9 – Comment 6 *Instead of analyzing through the NEPA process a reasonable range of alternatives to the current rule of maintaining as many large, live trees as possible, the Forest Service has instead focused on alternative scientific methods for predicting live tree mortality in order to expedite salvage logging for the sole purpose of recovering economic value.*	See response to Letter 3 – Comment 16. See Chapter 2 of the Final SEIS. This section has been modified to respond to your comment.
Letter 9 – Comment 7 *The Forest Service has skipped the scoping period for this project, and has prepared a draft environmental impact statement (March 1, 2007).*	The Forest Service followed 40 CFR 1502.9 (3) (c) (4) which reads *Agencies shall prepare, circulate, and file a supplement to a statement in the same fashion (exclusive of scoping) as a draft and final statement …* A Notice of Intent (NOI) was published in the Federal Register 2/26/07 in Vol. 72, No. 37, page

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	8338.
Letter 9 – Comment 8 *Rather than admit that this is what it is doing, however, the Forest Service has confounded the issues by focusing on a different question from what standard for protection of large, live trees should be applied. Instead, the Forest Service focuses its analysis on how can one predict whether a given tree is dying. This ignores the actual decision being proposed by the SDEIS, namely, what level of protection should be afford to large, currently living live trees. In other words, the issue is whether currently living trees should be protected as much as possible or should the Forest Service be allowed to set put in place a standard that allows them to log them as much as possible after a fire.*	The scope of the DSEIS is to establish definitions of live and dead trees by amending one portion of the Eastside Screens amendment to the Forest Plan; the effect of doing this is to return to the same exact situation as was analyzed for the School Fire Salvage Recovery Project. Implementing the DSEIS would result in no incremental change beyond what was already considered by the School FEIS. The direct, indirect, and cumulative impacts of implementing the School Fire Salvage Recovery Project are disclosed in the project's FEIS, including its appendixes. The Decision Framework for the DSEIS, Chapter 1, p. 1-4 reads as follows: *The scope of the decision to be made is limited to the Forest Plan amendment to the Eastside Screens wildlife standard 6d. (2) (a) within the School Fire Salvage Recovery Project area. The Responsible Official for this proposal is the Forest Supervisor of Umatilla National Forest. The decision will be based on a consideration of public comments, responsiveness to the purpose and need, and a comparison of impacts disclosed by alternative.*
Letter 9 – Comment 9 *As noted above, the 9 Circuit adopted the plain meaning of the word live, consistent with the mandate of the Eastside Screens to protect all live trees as much as possible. A definition of the word "live" that is consistent with the purpose and intent of the Eastside Screens would protect*	The proposed action of the DSEIS is to define a "live tree" in accordance with Forest Service silvicultural practice and interpretation, with the

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old growth trees that currently exist on public forestlands east of the Cascade Crest as much as possible. *Essentially, the Forest Service is redefining the plain meaning of the word live without NEPA analysis and then discussing through NEPA analysis alternative ways to scientifically determine which trees meet this new definition of live.*	DSEIS definition replacing a generic definition from Merriam Webster's Collegiate Dictionary that had been adopted by an Appeals Court who was unable to locate a specific or "trade practice" definition of a live tree in the Umatilla National Forest Plan. It is common for trades or professions to establish specific definitions for terms that also have a generic or plain meaning as embodied by Webster's dictionary. This concept was discussed at length by the Appeals Court panel during their deliberations. What was missing in this situation is a trade-practice definition of a live-tree in the Umatilla National Forest Plan, and the Appeals Court recommended or suggested that we amend the Plan to rectify this shortcoming. The DSEIS is designed to be responsive to the Appeals Court recommendation.
Letter 9 – Comment 10 *the Forest Service has not provided a rationale for "treatment" of the stand to justify this site-specific amendment.*	See response to Comment 9 for the rationale of the DSEIS and its associated Forest Plan amendment.
Letter 9 – Comment 11 *that the intent of the Eastside Screens is protective and should be conservative in its application, as the standard was intended to protect large structure from being further depleted through logging.*	According to the Decision Notice for the Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales, as approved on May 20, 1994 by Regional Forester John E. Lowe, "the decision continues the application of the interim direction for timber sales of August 18, as modified, through amendment of each of the nine forest plans, until the Eastside EIS is completed." This means that the Eastside Screens were designed to preserve future options via interim guidance until a long-

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	term strategy was provided by the "Eastside Ecosystem Management Strategy" (Eastside EIS), which was later called the Interior Columbia Basin Environmental Impact Statement. We agree with this comment's interpretation with one addition: the Screens wildlife standard was intended to protect large "live" structure from being further depleted. The Eastside Screens "large structure" portion of the wildlife section (e.g., late-old structure or LOS) was not developed nor intended to maintain large blocks of 'dead and/or dying' forest condition such as that which occurs from large wildfires" (Norris 2005, as cited in the School FEIS).
Letter 9 – Comment 12 *the analysis intuitively recognizes that a site-specific amendment added to one area can be anticipated to result in widespread use as a management tool for the perceived problem, which is likely a greater risk to the forests than the perceived problem itself.*	The wildlife section of the Eastside Screens uses the short phrase "live trees", but this phrase or term is not defined within the Screens. The intent of the DSEIS is to amend the Umatilla National Forest Plan to define live trees, and the scope of this amendment applies to and only for the duration of the School Fire Salvage Recovery Project. This means that any perceived risk associated with the DSEIS and its associated Forest Plan amendment is constrained to just the School Fire area.
Letter 9 – Comment 13 *This is significant because it is covers over 20,000 acres of land across multiple watersheds. The intensity of the proposal is significant, because this involves logging on over 9,500 acres of land. This change is systematic in nature, because it affects a very large area. This change is ecologically significant.*	See response to Letter 3 – Comment 14.

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Letter 9 – Comment 14 *the FS has not looked at the size of change. The FS has not provided any data on the number of large trees that are being logged because this proposal is still based on the previous FEIS which did not disclose this impact.*	See response to Letter 3 – Comment 8.
Letter 9 – Comment 15 *The timing of this action is also impacted by present and reasonably foreseeable actions. This amendment, by itself, is not narrow in its effect in terms of the area that is being directly and indirectly affected.* *Furthermore, it is reasonably foreseeable that the Forest Service may propose a similar change throughout the Umatilla National Forest and in other forests east of the Cascade Crest.*	Speculation about similar future changes on the Umatilla National Forest, or on other National Forests located east of the Cascade Crest, is just that: speculation; and such speculation cannot be reasonably considered as a foreseeable action if projects have not been proposed (scoped) for which a similar Plan amendment is included as a proposed or connected action. As stated in the Proposed Action section of the DSEIS, Chapter 1, p. 1-3, this amendment applies to, and only for the duration of, the School Fire Salvage Recovery Project.
Letter 9 – Comment 16 *Now, the Forest Service has narrowed the stated Purpose = Maximize potential economic benefits. And, the Forest Services stated Need = Do an end-around the decision issued by the 9th Circuit Court of Appeals regarding the plain (and obvious) meaning of "live" trees to fit the agency's newly minted policy.* *Whether the new Need is real or perceived, the sole Purpose the Forest Service has put forth is to maximize economic benefits in the short-term regardless of the multiple use management direction for these federal lands. This violates federal law.*	The Purpose and Need as stated in the DSEIS reads as follows: As stated in the Project FEIS on page 1-4 of the Purpose and Need, "there is a need to salvage harvest [burned timber] as rapidly as practicable before decay and other wood deterioration occurs to maximize potential economic benefits." The Appeals Court opinion and District Court injunction described in the Introduction above "prohibits salvage harvest from the three timber sales areas of any "live tree" greater than or equal to 21 inches

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	dbh. This includes any tree of requisite size with green needles or that is not yet dead." The Appeals Court definition of a "live tree," which does not reflect Forest Service silvicultural practice and interpretation, frustrates the ability of the Forest Service to achieve the purpose and need of the Project as stated above.
Letter 9 – Comment 17 *Under this proposal, hundreds if not thousand of trees will live unless otherwise cut. That is because the trees are still live. The Scott Mortality Guidelines attempt to predict mortality using superficial characteristics. These guidelines do not ensure scientific integrity in the decision because they do not ensure that the tree will die.* *This new change allows the FS to log large numbers of old growth trees that are still alive within this 9,500 acre logging project.*	See response to Letter 3 – Comment 15.
Letter 9 – Comment 18 *The Forest Service has not told the public the probability that a tree is going to live nor has the FS disclosed the percentage trees that have a probability of living unless otherwise logged. The Forest Service has not disclosed the differences in the number of trees that would be logged under different alternatives because the FS has used the proposal in the originally illegal FEIS for comparative purposes.* *The fact is that many of the trees are live and not experiencing any rot or deterioration. The purpose for the project is non-existent. These live trees are not decaying, rotting or loosing value.*	As described in Appendix M of the School FEIS (pages M-30 and M-31), the Scott Guidelines provide a methodology for predicting the relative probability of survival for fire-injured trees growing on a wide variety of site conditions, exposed to varying levels of pre-fire factors that can predispose a tree to fire-induced mortality depending on their severity or magnitude (occurrence of dwarf mistletoe, root disease, and bark beetles), and experiencing widely varying levels of first-order fire effects to their crowns, stems and roots. The possible combinations of these factors are almost limitless, leading inevitably to a decision to adopt a prediction system that relates site and tree factors (explanatory variables) to some type of probabilistic estimate of tree mortality. This regression or

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	modeling approach is commonly used in science, particularly for complex situations (such as wildland ecosystems) where the possible list of explanatory variables can be quite long (Rubinfeld 2000). Since it is not possible to account for every conceivable combination of variables that could result in tree death, there will always be some amount of uncertainty associated with a probabilistic rating system such as the Scott Guidelines. This same statement about uncertainty also applies to the alternative modeling approaches suggested by Dr. Royce and other respondents to the School Fire Salvage Recovery Project (i.e., McHugh and Kolb 2003, Peterson and Arbaugh 1986, Ryan and Reinhardt 1988, Stephens and Finney 2002, and Thies et al. 2006) because they provide an estimate (prediction) of tree mortality, not a definitive determination. Appendix B provides implementation and marking guides for the School Fire Salvage Recovery Project. As the marking guides have been implemented, on-the-ground monitoring indicates that they have been applied in a conservative manner, which means that for trees about which there is uncertainty (primarily trees in the moderate category of the Scott Guidelines), the marking crews have generally opted to retain these trees rather than designate them for removal. Since on-the-ground monitoring of tree marking and

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	designation procedures indicate that the Scott Guidelines are being implemented conservatively in the School Fire Salvage Recovery Project, this means that more trees are being retained than would have otherwise occurred.
Letter 9 – Comment 19 *In the SDEIS, the Forest Service indicates that it considered but dismissed "other scientific methods for predicting mortality. The Forest Service dismisses these as the only other alternatives. However, these are other alternatives for predicting mortality under the "action" alternative. These are not a legitimate range of policy alternatives to fulfill the original purpose of the scientific recommendation. The Forest Service has confused the alternatives requirement with finding an accurate scientific method of achieving the chosen alternative. While it is important for the Forest Service to be accurate under the National Forest Management Act on scientific methods, these other methods are not alternatives to the policy and programmatic goal of preserving all large live trees as much as possible. Instead, they are alternative methods for just one policy – a different policy that seeks to allow the Forest Service broad discretion to log large live trees (that may have otherwise lived) as much as possible.* *In other words, the only alternative that is being considered is whether to only retain live trees with a high probability of survival.*	Alternatives to consider new policy is outside the scope of this analysis, however, the alternatives considered but eliminated from detailed study in the DSEIS do not involve whether to conduct salvage timber harvest or not because those alternatives were fully analyzed in the School FEIS; the DSEIS alternatives involve alternative methods, models, or procedures for defining a "live tree" because this strategy is responsive to the Appeals Court recommendation for rectifying a Forest Plan shortcoming (lack of a live tree definition)(DSEIS, Chapter 2, p. 2-2). See Chapter 2 of the FSEIS. This section was modified to address your comment.
Letter 9 – Comment 20 *Suggested Alternatives to Proposed Policy: In the public's estimation, the Forest Service needs to consider a reasonable range of alternatives to its action, including, but not limited to, the following:* *1. Protect 21 inches or greater Old Growth as much as possible. (Current rule).* *2. Protect 19 inches (or other dbh) or greater old growth as much as possible. (Recommendation from the local community in response to recent Forest Service proposals to change and/or get rid of the Eastside Screens).* *3. Protect all old structure, live or dead trees, 20 inches or greater*	See Chapter 2 of the FSEIS. This section was modified to address your comment.

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(Recommendation from the Eastside Panel). *4. Allow for mortality prediction for live trees to equate them with dead trees to allow trees that may live and trees that may die to be logged far more than currently possible. (Proposed Change).* *5. Protect Old Growth, except for particular circumstances where a tree has a very high likelihood of dying in the near future (1 or 2 years from fire) based on commonly accepted scientific method. (Another alternative).*	
Letter 9 – Comment 21 *The Scott Guidelines do not determine at what point the tree may die in the future, and the Scott Guidelines have yet to be field verified to be accurate. Despite prior guidance emphasizing the need to carefully assure tree death to maintain the protective standard of the Eastside Screens, the Forest Service has recently allowed the Scott Guidelines to be implemented to "implicitly define mortality" despite the fact that the guidelines merely provide a "scientific basis for determining the relative probability of post-fire survival. Linda Goodman, Memo to Forest Supervisors Concerning Defining Conifer Mortality (July 1, 2005).*	As stated in Appendix M of the School FEIS, the Scott Guidelines predict tree mortality for up to one year after fire (beyond one year for mature or overmature ponderosa pine and grand fir or white fir, although the beyond-one-year criteria for ponderosa pine were recently removed by amendment 2 to the Scott Guidelines), and the Scott Guidelines define the time period for the beyond-one-year species to be the second through fourth year after fire. This means that for all species except mature or overmature grand fir or white fir, the Scott Guidelines provide a very conservative survival prediction spanning only one year after fire. Appendix K of the School FEIS describes why the Scott Guidelines were selected as a tree survival prediction protocol, and whichever protocol had been selected would have been logically adopted when defining a live tree for the DSEIS process.
Letter 9 – Comment 22 *Additionally, the Scott Guidelines have been field verified to be highly inaccurate on at least four separate occasions. First, on High Roberts, Dan Becker field-verified the marking*	See Appendix M of the School FEIS, page M-13 specifically, for the Forest Service response to field

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and found many large diameter trees marked for harvest. Dr. Edwin B. Royce then field verified the project and determined that 85% of those trees that were marked were live and unlikely to die from fire scarring. Dr. William B. Ferrell also reviewed photos and confirmed this determination. Dr. Christine Niwa, a Forest Service researcher, field verified the guidelines on the Monument fire and determined that 97% of trees predicted to have a 50% chance of living were still alive two years after the fire. Dr. Richard Waring reviewed the marking at High Roberts three years after the fire, and determined that the trees there were live and unlikely to die. Dr. Royce also returned four years after the High Roberts fire and determined that the trees that had been marked as having either a low or moderate probability of survival were still very much alive four years after the fire. *Moreover, the Forest Service's Program Manager at its Fire Sciences Laboratory Kevin Ryan has acknowledged that "you can expect that about 95% of the trees that die will do so by the end of the second growing season after fire," and that by the third year after fire, "one would only be looking at the survivors." In sum, the Scott Mortality Guidelines continue to be highly controversial and have yet to be proven to be accurate in the field.*	examinations of Malheur NF fire areas by Royce, Waring, and others. See response to Letter 3 - Comment 15, for our response to concerns about the validity and field verification of the Scott Guidelines, and for a description of how the controversy surrounding their use for tree survival prediction was addressed by the School FEIS. Alternative methods, models or procedures to the Scott Guidelines for predicting tree survival were analyzed in the School FEIS (Appendix K), and in the DSEIS, Chapter 2.
Letter 9 – Comment 23 *For this reason, the discussion of alternatives must be undertaken in good faith; it is not to be employed to justify a decision already reached. Id.* *Suggested Alternative 1: The Forest Service should consider an alternative in its analysis which consists of treating small-diameter fuels now to reduce fire risk. The delay in treating fuel building could have significant ecological and economic benefits. Delaying logging for ten years would give soils time to recover from fire damage, provide interim habitat for a variety of wildlife, and allow watersheds and aquatic species populations to stabilize. Immediate post-fire logging has been found to have significant ecological impacts. Beschta, et al. 2004. "Postfire Management on Forested Public Lands of the Western United States," Journal of Conservation Biology 18(2). An interim period of recovery would decrease the impacts of the proposed project, and the ecosystems as a whole would be better able to sustain the impacts of the proposed project.* *Additionally, when the Forest Service is faced with a choice of providing the timber industry with*	See Chapter 2 of the FSEIS. This section was modified to address your comment.

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economic gain and protecting the forest overall for long-term habitat viability, the Forest Service has a duty under the management plan direction for the lands at issue to prioritize habitat protection. Functioning watersheds, diverse wildlife, and healthy soil that will sustain large-diameter tree growth in the future provides significant economic benefits to the community. *Suggested Alternative 2: The Forest Service must consider a restoration-based alternative that does prioritize commercial logging above all other options. The Forest Service could focus this alternative on the removal of small-diameter flash fuels, the restoration of area soils, and the removal of unneeded roads and old logging roads. A restoration-based alternative could meet the purpose and needs of the proposed project by providing local jobs and reducing fuel loads by removing the small-diameter flash fuels, the main cause of excess fuel loadings.*	
Letter 9 – Comment 24 *The Forest Service only considers the value of logs for the mill in its economic effects analysis. The Forest Service must consider the economic values of the Umatilla National Forest that are not derived from commercial logging. The economic value of the forest is not limited to timber value and, therefore, when pursuing the goal of maximization of economic value, the Forest Service must look beyond timber harvest.* *The Forest Service should incorporate information about the economic value of forests that are not logged in the EIS by including factors that it is able to quantify. These factors are just as applicable to the decision whether or not to log on public land. These include the economic benefits associated with:* *1. Recreational opportunities and tourism;* *2. Commercial and recreational fisheries within the boundaries of the Umatilla National Forest and downstream and offshore;* *3. Habitat for important game species and hunting both within and outside of the Umatilla National Forest;* *4. Water for cities, industries, businesses, and individual households downstream from the Umatilla National Forest;*	The economic analysis presented in the School FEIS is in accordance with the Forest Service manual and handbook guidance to complete a financial analysis for timber sales (FSH 2409.18). The economic analysis documented in the FEIS identifies financial monetary measures for timber and the financial costs of removing the timber. Other non-timber resources affected by the project are not measured using monetary values. The costs and benefits associated with these resources are described using other quantitative and qualitative measures in accordance with FS policy. See Chapter 3 of the FEIS. In addition, neither the National Forest Management Act (NFMA) nor the National Environmental Policy Act (NEPA) requires site-specific analyses such as the School Fire Salvage Recovery Project's FEIS to monetize non-timber resources (Forest Conservation Council v. United

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5. The regulation of water flowing through rivers and streams, including flood control; *6. Non-timber forest products such as wild mushrooms, herbs, and medicinal plants;* *7. Mitigation of global climate change through absorption and storage of vast amounts of carbon;* *8. Enhancing the quality of life of neighboring communities;* *9. Harboring biological resources that either have value now or have as yet unknown but potentially large economic and social value;* *10. Harboring biological and genetic resources that can improve the long-term productivity of all forest land;* *11. Pest-control services provided by species that prey on agriculture and forest pests, and;* *12. Pollination services provided by species that pollinate important forest and agricultural crops.* *These are important economic benefits generated by national forests in every part of the nation, including the Umatilla National Forest. The Forest Service has extensive literature and sources of data where these factors have been quantified and the Forest Service can rely upon them to quantify the magnitude of these economic benefits at the national, forest, and project level.* The Forest Service has the tools and expertise to accurately predict the economic value of recreation, scenic resources, and other resources derived from a forest without logging it. See, ECONorthwest, Seeing the Forests for their Green (2000). Another study prepared by John Talberth and Karyn Moskowitz explains that from a social and economic prospective, our national forests are far more valuable standing, growing, dying, and regenerating as standing forests rather than as converted paper and wood products. While lumber and wood products are readily available from the 80% of forested land in the United States outside of national forests, clean water, recreation, wildlife, and other public uses and values of great economic benefit generally are not. The small share of the forested land base included in the national forest system must bear nearly 100% of the burden of providing these uses and values. Talberth & Moskowitz, The Economic Case Against National Forest Logging, Executive Summary (1999).	States Forest Service, Civ. No. 05-35166 (Ninth Circuit, October 5, 2006). "Nothing in the NFMA or the regulations USFS promulgated in 1982 requires site-specific analyses to monetize non-timber resources… Nor does NEPA require monetization of non-timber resources. FS policy also does not require monetized calculations of non-timber resources in timber sale economic analyses. The costs and benefits associated with non-timber resources are described using other quantitative and qualitative measures (Chapter 3 FEIS) in accordance with FS policy.

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Letter 9 – Comment 25 *Moreover, the Forest Service must also incorporate externalized costs. Externalized costs are passed on to communities, businesses, and individuals when national forests are logged. These include the direct, indirect, and cumulative economic costs associated with:* *1. Lost recreational opportunities and decreased tourism;* *2. Degraded commercial and recreational fisheries within the boundaries of the Umatilla National Forest and downstream;* *3. Degraded habitat for important game species and loss of hunting opportunities both within and outside of the Umatilla National Forest;* *4. Increased pollution of water for cities, industries, businesses, and individual households downstream from the Umatilla National Forest and increased costs of water filtration;* *5. Increased flooding and disruption of the normal flows in rivers and streams.* *6. Loss of non-timber forest products such as wild mushrooms, herbs, and medicinal plants;* *7. Exacerbation of global warming through release of greenhouse gasses;* *8. Diminished quality of life of neighboring communities;* *9. Loss of biological resources that either have value now or have as yet unknown but potentially large economic and social value;* *10. Loss of biological and genetic resources and species that can improve the long-term productivity and aesthetic qualities of all forest land;* *11. Diminished pest-control services provided by species that prey on agriculture and forest pests;* *12. Diminished pollination services provided by species that pollinate important forest and agricultural crops.* *13. Lost jobs and income associated with timber production on private lands that is displaced by Umatilla National Forest timber sales;* *14. Lost jobs and income associated with the production of alternative and recycled products that is displaced by subsidized Umatilla National Forest timber sales;* *15. Death, injury, and property damage associated with logging on the Umatilla National Forest, and;*	See response to Comment 24 above.

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16. Increased risk of severe wildfires caused by adverse changes in microclimate, increased human access, and slash generated by timber sales. These externalized costs are generated by national forest logging in every part of the nation, including the Umatilla National Forest. The Forest Service has extensive literature and sources of data that it can rely upon to quantify the magnitude of these externalized costs at the national, forest, and project level.	
Letter 9 – Comment 26 *the National Environmental Policy Act (NEPA) requires the agency to develop some method of assessing the value of standing timber as opposed to timber processed as lumber and other more traditional consumer products.*	See response to Comment 24.
Letter 9 – Comment 27 *NFMA imposes requirements on the Forest Service for conducting economic analysis of timber sales. The regulations implementing this statute state that Land and Resource Management Plans (LRMPs) "shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long term net public benefits in an environmentally sound manner."* *Although these regulations refer to LRMPs specifically, because site-specific projects must comply with larger land management plans, the requirement that LRMPs must incorporate values such as recreation and watershed health into a cost-benefit analysis is equally applicable to site-specific project.* *NFMA regulations further explain that land management plans must be implemented through site-specific projects that are sensitive to changing economic realities. They state that national forest lands must be managed "in a manner that is sensitive to economic efficiency," and that managers must be responsive "to changing conditions in land and other resources and to changing social and economic demands of the American people."*	See response to Comment 24.
Letter 9 – Comment 28 *The RPA requires the agency to: incorporate natural resource benefits and externalized costs into decisions affecting the national forests; secure the maximum benefits of multiple use sustained yield management; conduct comprehensive economic assessments of all National Forest resources; identify all costs and all benefits associated with RPA Program outputs; insure*	See response to Comment 24.

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consideration of the economic aspects of renewable resource management; improve Forest Service accountability when it prepares annual budgets and reports to Congress on the costs and benefits of its programs; and conserve forests and promote the use of recycled products.	
Letter 9 – Comment 29 *The regulations implementing both NFMA and the RPA require the Forest Service to maximize net public benefits, evaluate the relative values of all National Forest resources, consider all market and non-market costs and all benefits of management decisions, and assign monetary values to goods and services to the extent that they can be assigned.*	See response to Comment 24.
Letter 9 – Comment 30 *Logging national forests exacerbates adverse changes in global climate by reducing the carbon absorption function of national forests and by releasing carbon stored by these forests into the atmosphere. The adverse ecological and economic effects of increases in atmospheric carbon caused by national forest timber sales must be disclosed and incorporated into decision-making by the Forest Service in its EIS for the School Fire logging project under the Global Climate Change Prevention Act.*	Addressing global climate change is beyond the scope of this or any individual project. However, it is generally recognized that reforestation following a natural disturbance will accelerate on-site carbon sequestration (Joyce and Birdsey 2000).
Letter 9 – Comment 31 *OFFICE OF MANAGEMENT AND BUDGET, CIRCULAR A-94 § 6 (1992) (emphasis in original). As applied to the management of the timber sale program, this guidance clearly indicates the need not only for analysis of the socioeconomic benefits of unlogged forests in areas where logging is contemplated, but also an analysis of the rate of return that could be achieved if timber sale monies were spent on other project such as recreation, wildlife, or watershed restoration.*	This circular designed to assist analysts in the regulatory agencies by defining good regulatory analysis and standardizing the way benefits and costs of Federal regulatory actions are measured and reported is outside the scope of this analysis.
Letter 9 – Comment 32 *The agency's Economic and Social Analysis Handbook requires the Forest Service to maximize net public benefits and fully account for all market and non-market benefits and costs*	See response to Comment 24.

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in the context of market studies, economic efficiency analysis, and economic impact assessments of its plans and programs. FSH 1909.17.11.1; 1909.17.14.1; 1909.17.14.11; 1909.17.14.6; 1909.17.23. *The Forest Service's Timber Sale Preparation Handbook requires the agency to address all marketed and non-marketed costs and benefits in analyses of the financial and economic efficiency of individual timber sales and the timber sale program as a whole. FSH 2409.18.13.1; 2409.18.32.* *Similarly, the Forest Service Manual requires the Forest Service to: manage the timber sale program so that total benefits exceed total costs; account for non-timber economic effects in its timber sale analyses; ensure that economic values used in economic efficiency and economic impact assessments adequately reflect biological, economic, and social conditions; and base its decisions on the economic and social impacts and costs and benefits. FSM 2403.4; 2403.5; 1971.5; 1970.1(1), (2), (3); 1970.2; 1970.3(1), (5).*	

Letter #9 Ralph Bloemers et al. Attachment – Letter from Dr. Jerry Franklin	
Letter 9 – Attachment-Franklin – Comment 1 *1. A live tree is a tree that still has functional phloem and cambium tissue and, certainly, any functional green foliage. Living trees may totally lack green foliage but would have live vegetative buds. Fundamentally, live mean live! No technical or scientific understanding of "live" would include trees that are predicted to die at some future point in time, since all trees are going to die at some future point in time.*	As described in Appendix M of the School FEIS, page M-61 (Letter 13, Attachment 3, Comment 14), any post-fire tree survival prediction system should consider or account for injuries to all three of a tree's primary physiological systems: crown/foliage, bole/stem, and roots. Franklin's

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	comment mentions foliage and stem, but has no mention of roots and as such, it is not considered to be a comprehensive definition of tree life (or death). As mentioned above in our response to Letter 9 - Comment 21, the Scott Guidelines are designed to predict tree survival for up to one year after fire (with one exception for grand fir and white fir, for which the prediction period is 2 to 4 years), and this means the temporal scope of the School FEIS, and the related DSEIS, is for five years. Since severely injured trees often don't die immediately, but will within a short time period defined as five years or less, it is scientifically and biologically appropriate to include a temporal criterion when establishing a definition about whether they should be considered as alive or dead.
Letter 9 – Attachment-Franklin – Comment 2 *2. A scientific definition of dead for a tree is a tree that is no longer capable of further growth, whether of the stem, branches, or leaves. A dead tree is a tree where all meristems and cambial tissue are dead* .	We agree with most aspects of this comment, although it has no specific mention of the root system (one of a tree's three primary physiological systems, although roots do have meristems) and it contains no time period for assessing when the indicators of tree growth are assumed to have no further "capability". Note that this comment supports use of a prediction system (such as the Scott Guidelines) because it implicitly assumes that an evaluator will need to interpret indicators of tree condition (such as fire-caused damage or injury), and then use results of the assessment to determine whether an affected tree is "capable" of further growth. Note that the use of "further" in Franklin's comment certainly provides a temporal or time-

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	based perspective for his definition, even though his first comment seemed to express no support for any time-based criteria.
Letter 9 – Attachment-Franklin – Comment 3 *3. The recommendations of the Eastside Scientific Society Panel are even more appropriate today than they were in 1994 based on our current understanding of the ecological role of old-growth trees in eastside forests and the current reduced population levels of such trees in the eastside landscapes. From an ecological perspective there should be no removal of live old-growth trees, dead old-growth trees (snags), or downed old-growth boles. The elimination of protection for old-growth trees would be a major change in policy that would impact many aspects of the ecosystem including forest resiliency and biological diversity, such as the population levels of old-growth tree-dependent species.*	This comment about the relevance of recommendations from the Eastside Scientific Society Panel report is opinion. Any analysis or consideration of old growth in the School FEIS is still pertinent to that decision and its associated FEIS. Old growth is not directly applicable to the DSEIS for these reasons: the DSEIS proposed action is to define live and dead trees by amending the Forest Plan for the School Fire Salvage Recovery Project only, and since dead trees are the only tree class proposed for salvage harvest by the School Fire FEIS, and because old growth (LOS) is defined using live trees only by the Eastside Screens amendment to the Umatilla National Forest Plan, this means that removing some of the dead trees created by the School Fire has no effect on LOS in the project area (see Appendix C, page C-5, in School FEIS for more of this rationale).
Letter 9 – Attachment-Franklin – Comment 4 *4. From the perspective of biological diversity and ecosystem function, a reasonable alternative to the Forest Service proposal would be to protect all old-growth trees, regardless of size, and to allow no salvage of dead old-growth trees.*	The School FEIS allows for protection of all live "old growth" trees (however old growth trees are defined) because no live trees of any type or classification (other than danger trees along roads and public-use sites) are proposed for harvest. The option of not harvesting any of the dead trees, whether they are considered to be old growth or not, was analyzed in the School FEIS as the No Action alternative.

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Letter 9 – Attachment-Franklin – Comment 5 *5. Based on the information that you provided, the actions proposed within the School Fire Perimeter would be significant.*	See response to Letter 3 – Comment 14.
Letter 9 – Attachment-Franklin – Comment 6 *6. Application of the School Fire proposals throughout the eastside would have significant negative impacts on current and future ecological conditions.*	See response to Letter 9 – Comment 15.
Letter 9 – Attachment-Franklin – Comment 7 *I find it surprising that the Forest Service is proposing to remove living trees of any size—and most certainly old-growth trees—based upon a set of guidelines (Scott et. Al.) that have no basis in a sound, peer-reviewed scientific study and have, in fact, been shown to be grossly inaccurate in their prediction of death in at least 4 case studies. The Forest Service's use of the Scott guidelines is not justified on scientific grounds. If for economic reasons the Forest Service wishes to cut living trees that it thinks will die soon, it should require the high standards of proof of imminent death and the Scott guidelines do not meet this standard. Absent credible scientific criteria with high predictive capability, there is no basis for assuming imminent death of any old-growth tree with live meristems or cambial tissue.*	The Scott Guidelines provide three possible outcomes or ratings for each tree being evaluated (and each tree would be assigned to one, and only one, of the three possible ratings): High Probability of Tree Surviving; Moderate Probability of Tree Surviving; or Low Probability of Tree Surviving. The high probability of survival trees are deemed to be alive, and they are not subject to the School FEIS proposed action of salvage timber harvest. The low probability of survival trees are deemed to be dead, and they are available for salvage harvest. The moderate probability of survival trees are evaluated further using cambium testing and some of them are deemed to be alive, and some of them are deemed to be dead. Any tree predicted to be alive by the Scott Guidelines is not subject to salvage harvest, and the Forest Service is not proposing to remove any living tree as based on the Scott Guidelines! As described above for Letter 3 - Comment 15, the Scott Guidelines are a scientifically credible protocol for evaluating whether a tree will live or die after its fire-caused injuries.

Letter #9 **Ralph Bloemers et al.** **Attachment – Letter from Richard H. Waring**	
Letter 9 – Attachment-Waring – Comment 1 *1. What is a live tree?* *Answer: A live tree is one able to maintain activity in both its primary and secondary meristems, the parts of a plant where cell divisions occur, leading to plant growth. Meristematic tissue is much more sensitive to injury than is older, more mature tissue. They include the following parts of a plant: Cambium in all stems and roots – cell division in this layer leads to radial stem growth. Buds at the end of each branch – cell division there leads to branch elongation and the initiation of new leaves/needles. Root tips, by which roots elongate. Meristems within each growing leaf/needle, by which the tissues grow following its initiation. Reproductive buds, supporting the formation of reproductive structures such as flowers or cones (on conifers). Brown leaves do not conclusively indicate that a tree is dead. One must dissect a good sample of buds and find 100% brown inside. Similarly, a tree is alive if any of its cambium remains functional. Another indicator of life is an increase in the respiration of CO_2 as the temperature increases, independent of whether cell divisions occur.*	Much of this comment is in accord with the assumptions used by the Scott Guidelines and other tree survival prediction systems analyzed in Appendix K of the School FEIS. However, Waring's contention that "a tree is alive if any of its cambium remains functional" is not supported by the scientific literature used for the School Fire FEIS and the Scott Guidelines. Ryan (1990) states that "most trees survive up to 25% basal girdling, but few trees survive more than 75%". Ryan's conclusion indicates that a tree could have 80% basal girdling (i.e., nonfunctional cambium at the stem base in the area referred to as the root collar) and 20% of the basal cambium non-girdled (and presumably alive) and it would still be expected to die. This finding is obviously counter to Waring's definition.
Letter 9 – Attachment Waring – Comment 2 *2. What is a dying tree?* *Answer: A progressive decrease in the ratio of live to dead buds (or branches) indicates a dying tree. It is possible that a dying tree may recover if growing conditions improve, as evidenced by growth spurts following the cessation of insect defoliation, and recovery following a long period of drought.*	Waring's comment indicates that a dying tree cannot be evaluated using definitive or conclusive (black/white or yes/no) criteria because death results from "a progressive decrease" in his indicators. We agree. Since tree death generally cannot be determined using conclusive, "yes/no" indicators, this logically leads to adoption of a system where a wide range of indicators must be considered and evaluated, synergistically, and an overall assessment or rating result be used as a probabilistic estimate of tree mortality.

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	Also see response to Letter 9 - Comment 18.
Letter 9 – Attachment Waring – Comment 3 3. *What is a dead tree?* *Answer: a dead tree has no functioning meristems. All buds and cambium above and below-ground no longer respire.*	We agree with many of the concepts embodied in this definition, although it provides no timeframe for when these conditions must be present (or assessed) to consider a tree dead, and it provides no operational details about how these indicators would be assessed in a project implementation context. It also includes the criterion that none of the tissues mentioned must be functioning and, as mentioned above in our response to Letter 9 - Waring Attachment - Comment 1, there is much scientific literature indicating that a tree can be considered to be physiologically dead before 100% of a certain tissue type has become functionally nonresponsive.
Letter 9 – Attachment Waring – Comment 4 4. *Can we predict which trees will die?* *Answer: Not accurately, although the probability of mortality in a stand can be estimated within certain bounds. To predict the impending death of an individual tree is difficult, even with detailed measurements of its current physiological state The status of neighboring trees affects competition for resources and threats from insects and pathogens must be assessed, as a dose-response relationship. The modified Scott's guidelines, like other empirical logistic regression models, are based on superficial classification of injury with different, often questionable, weighing factors. If the goal is scientific integrity, this classification system does not fit the bill. The removal of large diameter material east of the Cascade Crest, particularly live trees but also dead trees, has significant negative effects because this large structure is a rare commodity. In the fact of climate change, there is an even greater need to ensure resiliency across the landscape. For a variety of reasons, the removal of large old structure (large live or dead trees) will have significant impacts in the forested watersheds where it is allowed to occur.*	We agree with the first part of this comment because it is not possible to predict whether a fire-injured tree will survive or die with absolute certainty (see our response above to Letter 9 - Comment 18). And as stated in the DSEIS, "tree mortality is a complex biologic al process", and the School FEIS discusses this complexity issue at great length (see Appendix K and Appendix M in the FEIS). With respect to the second portion of this comment: any potential impact of using salvage harvest to remove a portion of the dead trees in the School Fire area were analyzed and discussed in the School FEIS, Chapter 3.

Letter #9 **Ralph Bloemers et al.** **Attachment – Letter from James R. Karr**	
Letter 9 – Attachment-Karr – Comment 1 *First, the debate about the meaning of "live" stimulated by recent Forest Service actions is yet another effort to parse words until clarity, logic, and common sense are lost. Sadly, a bogus scientific justification is formulated to justify this loss of common sense. Given the significant depletion of old-growth resources across the landscape east the of Cascades, a conservative approach like the one plainly evident in the Eastside Screens is appropriate. Judge King wisely reached the same conclusion when he noted that "the plain meaning of "live" is still living, in other words, not dead."*	Your comment has been noted.
Letter 9 – Attachment-Karr – Comment 2 *Second, I am concerned about the lack of scientific foundation in the defined procedure for marking trees expected to die in the next 5 (or some other arbitrary number) years. The only certainty is that all trees alive today will die in the future; it is virtually impossible to know with any level of accuracy which individual in a population of live (and thus destined to die) trees will die 1 day, 1 year, 10 years, or 100 years from today. Expressing these as probabilities at a population level does provide an aura of quantitative respectability. But that respectability soon fades when one attempts to define which trees will die, a step that is necessary to mark specific trees for harvest. The unsophisticated and not comprehensively validated marking approach of the Forest Service does not meet even a minimum scientific standard.* *(1) The Scott Guidelines have not been empirically validated by long-term peer reviewed studies.* *(2) They continue to be revised in substantial ways suggesting it is at best a work in progress. It is not appropriate or defensible on either scientific or policy grounds to use unvalidated works in progress to guide management decisions that will influence the health of public lands for decades.*	As mentioned above in our response to Letter 9 - Comment 21, the Scott Guidelines are designed to predict tree survival for up to one year after fire (with one exception for grand fir and white fir, for which the prediction period is 2 to 4 years), and this means the temporal scope of the School FEIS, and the related DSEIS, is for five years. Since severely injured trees often don't die immediately, but will within a short time period defined as five years or less, it is scientifically and biologically appropriate to include a temporal criterion when establishing a definition about whether they should be considered as live or dead. With respect to the second portion of this comment: see our response Letter 3 - Comment 15, regarding validation and scientific defensibility of the Scott Guidelines protocol for evaluating tree survival.
Letter 9 – Attachment-Karr – Comment 3 *Any effort to eliminate the important protections conveyed through our recommendations would be counterproductive. These changes will, stated simply, lead to further local and regional natural resource degradation that will have significant ramifications in the short- and long-term. This can and should be avoided.*	Your comment has been noted.

Letter #9 **Ralph Bloemers et al.** **Attachment – Letter from James R. Karr**	
Letter 9 – Attachment-Karr – Comment 4 *In short, cutting those trees as the Forest Service now proposes quite simply sacrifices the ecological and evolutionary future of these landscapes. Instead of being a scientifically grounded policy, the current Forest Service approach is a policy decision being masked as scientific.*	Your comment has been noted.

Letter #9 **Ralph Bloemers et al.** **Attachment – Emergency Situation Determination**	
Letter 9 – Attachment-ESD – Comment 1 *2. National Forest Management Act (NFMA) section 1604(g)(3)(E)(iv) which provides that the USFS is required to "ensure that timber will be harvested from NF lands only where…the harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest output of timber." The purpose and need in the proposed ESD is equated solely with economic loss unless immediate timber recovery is undertaken. See also School Fire FEIS. This approach conflicts with this and other NFMA requirements. There are well- known metrics for calculating these costs and benefits of this kind of project.* *4. The reality of deterioration. How accurate are the calculations? How relevant are the calculations. The FS does not address the scientific reality in the ESD. The deterioration in the first two to three years in fire killed trees is primarily a marketing issue, it is not an issue that is related to the function of the timber cut, milled and sold. The Forest Service can find more on how the issue of marketing is not functional at:* *4. What is the true value of an appeal given the potential conflict of interest? This conflict of interest also undermines the initial decision as well. The Ninth Circuit has stated that the Forest Service has a conflict of interest and has cautioned against any assumption of regularity in the Forest Service's conduct with respect to post-fire (salvage) logging sales.*	As stated in School FEIS, Appendix M, Letter 5 – Comment 2, page M-10, several factors were considered in selection of harvest systems. Harvest systems were considered that took into consideration terrain, transportation system, resource protection and other factors. Emergency situation in 36 CFR 215.2 is defined as *"A situation on National Forest System (NFS) lands for which immediate implementation of all or part of a decision is necessary for relief from hazards threatening human health and safety or natural resources on NFS or adjacent lands; or that would result in substantial loss of economic value to the federal government if implementation of the decision were delayed." The determination that an emergency situation does not exempt an activity from appeal. The determination only eliminates the automatic stays built into the appeal review process.* The determination that an emergency situation

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	exists does not conflict with NFMA. Rates of deterioration were disclosed in the Economics section of Chapter 3 of the FEIS. As stated above the determination of an emergency situation does not exempt a project from appeal, it only allows project implementation to begin during the appeal period.

Letter #9 Ralph Bloemers et al. Attachment – Dr. Edwin Royce	
Letter 9 – Attachment-Royce – Comment 1 *1) In terms of live trees what does live mean?* *"Live" is a cellular issue and refers to cells that are carrying out normal metabolic functions. Plant tissues that are alive are then those tissues that are made up of living cells carrying out their normal metabolic functions. The question of whether a tree is alive then comes down to whether the tissue that is normally alive in a healthy tree is, in fact, alive in that tree. This tissue that is normally alive includes the cambial layer under the bark of the trunk, branches, twigs, and larger roots (the phloem, cambium, and newly forming sapwood/xylem), leaves/needles, fine roots, and reproductive structures (flowers/cones). In a healthy mature tree, all of the heartwood, the bark, and the mature functioning sap wood are actually dead tissue. Therefore, a large fraction of the tissue that makes up a healthy live tree is dead.* *To maintain their metabolic processes, cells require supplies of water, minerals that they normally receive in that water, and the products of photosynthesis (carbohydrates/sugars commonly referred to as photosynthate). When fire kills cells by heat, the question then becomes whether the remaining parts of the tree can replace those cells or their function.* *2) What is the scientific definition of dead?*	We agree with much of the basic concepts embodied in this definition of a live tree because it refers to all three of a tree's primary physiological systems (crown/foliage, bole/stem, and roots), but it provides no temporal context in which these physiological indicators (functioning meristems, etc.) are to be evaluated. The definition also lacks specificity about how much of these various tissues must be properly functioning to consider the tree as being alive; as noted above in our response to Letter 9 - Waring Attachment - Comment 1, there is much scientific literature (such as Ryan 1990) indicating that a tree can be considered to be physiologically dead before 100% of a certain tissue type has become functionally nonresponsive. The same concerns apply to Royce's definition of

Letter #9 **Ralph Bloemers et al.** **Attachment – Dr. Edwin Royce**	
In one sense, every living organism will die eventually, though in another sense, successful organisms live forever through reproduction -- in the case of most plants through the production of seeds or spores. But this is not the issue. The issue in post-fire forest management is whether trees are dead or will die prematurely. *A dead tree is one in which all of the tissue is dead -- where all of the cells making up that tissue are no longer carrying out their normal metabolic functions. These cells may have been killed directly by heat from the passage of a fire or have exhausted their stores of photosynthate. The latter occurs either when there are insufficient needles to produce adequate new photosynthate or when the transport of photosynthate through the phloem layer is interrupted.* *Unless a tree is massively charred, it is not obvious by visual inspection that a tree is dead following the passage of a fire. In principal one would have to perform some kind of cellular sampling throughout the tree. (The orthotolidine test for live cambium is one such cellular test.) Even if there are no live (green) needles immediately post fire, both ponderosa pines and some firs are known sometimes to grow new needles. Typically this "flushing" occurs the next growing season. Sometimes through flushing the tree is able to produce sufficient needles to restore adequate photosynthesis to sustain tissues throughout the tree, and the tree survives. But sometimes the tree looses this race and dies. The newly flushed needles then turn brown. If a conifer is massively charred, one can assume that all above-ground tissues were killed by heat, and the tree is clearly dead. As a practical matter, if charring is less obvious but a tree has no green needles by the end of the next growing season after it is damaged by fire, the tree is also dead. This determination cannot be made immediately post fire because of the possibility of flushing.* *Thin bark trees like lodgepole pine may be fire girdled even if the fire was so benign that the tree retains green needles. These trees will die within the next year or so because they cannot normally replace cambial layer tissue killed by fire girdling, and the roots will die from lack of photosynthate. On the other hand, mature thick bark trees such as ponderosa pine, western larch, and some firs are not usually subject fire girdling from a fire that does not also kill all of the needles. While one cannot determine if there has been fire girdling other than by sampling the cambial tissue, the question really does not matter if one waits a year before declaring the tree dead. If there has been fire girdling the tree will probably die within that year -- as evidenced by the needles turning brown.*	tree death: it lacks specificity by primary physiological system because the definition requires that "all of the tissue is dead" and there are no criteria provided for how this would be evaluated, particularly in a project implementation context. And as noted for the "live tree" definition, there is much scientific literature indicating that a tree can be considered to be dead before all of a certain tissue type has become functionally nonresponsive. The Scott Guidelines require supplemental cambium testing for trees in the moderate probability to survive category, and this type of "cellular testing" is deemed to be standard practice for this purpose. Since orthotolidine is a known carcinogen, its use would be restricted for federal lands management. Royce's description of the myriad combinations of tree injuries and their alternative outcomes with respect to survival or mortality provide a good example of the concept that it is not possible to predict whether a fire-injured tree will survive or die with absolute certainty (see our response above to Letter 9 - Comment 18). And as stated in the DSEIS, "tree mortality is a complex biological process," and the School FEIS discusses this complexity issue at great length (see Appendix K and Appendix M in School FEIS).

Letter #9 **Ralph Bloemers et al.** **Attachment – Dr. Edwin Royce**	
Letter 9 – Attachment-Royce – Comment 2 *The recommendation is to leave the old structure alone. Dead means the tree is either massively charred and no green needles right after the fire or the tree is charred (either lightly to quite extensively) but has no green needles a year after the fire. If the tree has green needles a year after the fire, it will probably live and should not be harvested.*	The School FEIS allows for protection of all live "old structure" trees because no live trees of any type or classification (other than danger trees along roads and public-use sites) are proposed for harvest. The option of not harvesting any of the dead trees, whether they are considered to be old growth or not, was analyzed in the School FEIS as the No Action alternative. The option of retaining all fire-injured trees with a diameter of 21 inches or greater, and having any "green needles a year after the fire," was analyzed in the DSEIS as the No Action alternative because it reflects the existing situation as enjoined by the District Court and based on the Ninth Circuit Appeals Court ruling.
Letter 9 – Attachment-Royce – Comment 3 *4) The effects of the proposed change to the Eastside Screens are proposed for the School Fire perimeter. Do you think the potential direct, indirect and cumulative effects of the change are significant?* *Given the depletion of these key resources across the landscape below the historic range of variation, any action that permits the harvest of large live trees will have a significant impact on the ecosystem, at least locally and possibly regionally.*	Your comment has been noted.

Letter #10– Edward L. Johnson	
Letter 10 – Comment 1 *I don't agree with the broad interpretation by the 9th circuit of appeals regarding what constitutes a "live tree." I feel management of National Forests should be left to people trained in forest management – not by the courts.*	Your comment has been noted.

Letter 10 – Comment 2 I agree with the Regional Forester's amendment #2 to the Forest Plan defining what constitutes live trees. It along with the Scott guidelines explains what factors are used to determine the question of survival of a tree or group of trees.	Your comment has been noted.
Letter 10 – Comment 3 I agree with the proposed ESD regarding salvage of the School Fire timber. The economic value of this timber will be lost if it is not removed. Revenue produced could be used to help finance post fire recovery. If these dead trees are not removed they pose a threat to live trees should a future fire occur. A public safety factor is also involved. I would hope an emergency determination is made so sale and removal of this timber can proceed.	Your comment has been noted.

Letter #11 – Christine Reichgott, U.S. EPA – Region 10	
Letter 11 – Comment 1 *We have assigned a rating of LO (Lack of Objections) to the DSEIS. The rating and our summary of comments will be published in the Federal Register.*	Thank you for your review.
Letter 11 – Comment 2 *Although EPA continues to have concerns related to the potential for increased sediment loading to stream associated with the proposed salvage harvest, particularly in the Tucannon River Subbasin, we acknowledge that the current analysis is focused on an operational definition of the words "live" and "dead" and not on harvest per se. We also acknowledge the importance of these sales to the local timber economy, and the importance of the trees currently under injunction in terms of making the proposed sales economically viable.*	Your comment has been noted.
Letter 11 – Comment 3 *We appreciate that the Forest Service is proposing that this amendment should apply to, and only for the duration of, the School Fire Salvage Recovery Project.*	Your comment has been noted.
Letter 11 – Comment 4 *We appreciate that the Forest Service is proposing that this amendment should apply to, and only for duration of, the School Fire Salvage Recover Project. As noted by Filip et. Al (2007), "the effects of fire on trees depend on several factors. Tree species, size, and age: stand structure; season of burn; weather; fuel loading; topography; and fire severity are among the important variables that determine the degree of injury to trees and probability of immediate or delayed mortality or attack by bark beetles or other opportunistic pests in subsequent years."*	Your comment has been noted.

Accordingly, the definition of what constitutes a "dead" tree may vary as these factors change. Likewise, the model best suited to making a prediction about tree mortality may change.	
Letter 11 – Comment 5 *We feel that the document has adequate job of considering a range of alternative models and methods for assessing the probability of tree mortality. Based o the information presented, it appears that the Scott Guidelines are the best suited to the assessment of tree mortality within the School Fire Project area. As noted in Appendix K, the Scott Guidelines are geographically specific to the School Fire Project area, and they provide a methodology for geographically specific to the School fire Project area, and they provide a methodology for predicting the relative probability of survival for fire-injured trees growing on a wide variety of site conditions, exposed to varying levels of pre-fire factors, and experiencing widely varying levels of first-order fire effects to their crowns, stems and roots.*	Your comment has been noted.
Letter 11 – Comment 6 *Nevertheless, as noted in the document (K-16), it is not possible to account for every combination of variables that could potentially result in tree death. There will always therefore be uncertainty associated with any probabilistic rating system (such as Scott Guidelines). This uncertainty could be addressed in part by monitoring survival of fire-damaged trees across the School Fire burn (both inside and outside of sale units). Results from these monitoring efforts could be used to help validate and calibrate the Scott Guidelines. Additionally we note there have been relatively few studies that discuss empirical data on the effect of post-fire salvage logging. The School Fire Salvage project provides a unique opportunity to examine effects of salvage logging and restoration planting in a fire prone ecosystem (Blue and Wallowa Mts).*	Your comment has been noted.

Letter #12 – Dan Becker	
Letter 12 – Comment 1 *…there are better ways to comply with the Eastside Screens and, even, to legitimately predict tree mortality in far more statistically accurate ways than those used by the Forest Service outside of Region 6. These models are easier to implement in the field and do not increase the likelihood of further damage to the trees as the Scott guidelines. The question remains: Why do the papers and guidelines published by Scott, Schmidt, and Filip not have peer review and specifically peer review by the many Forest Service scientists who have made a career of fire and fire effects? Their work is cited to lend authority to these papers and guides, yet peer review is not elicited from these same scientists.*	Your comment has been noted. See response to Letter 3 – Comment 16.

Appendix N

Eastside Screens

APPENDIX B

REVISED

INTERIM MANAGEMENT DIRECTION
ESTABLISHING RIPARIAN, ECOSYSTEM AND WILDLIFE STANDARDS
FOR TIMBER SALES

REGIONAL FORESTER'S FOREST PLAN AMENDMENT #2

6/12/95

REGIONAL FORESTER'S EASTSIDE FOREST PLAN AMENDMENT NO. 2
ALTERNATIVE 2, as adopted

1. All timber sales, except as identified below, will be designed to incorporate the interim riparian, ecosystem and wildlife standards.
2. The following types of sales will not be subject to the interim standards: personal use firewood sales; post and pole sales; sales to protect health and safety; and sales to modify vegetation within recreation special use areas. NEPA and required consultation under Section 7 of the Endangered Species Act must be completed.
3. Five other types of sales will not be subject to the interim ecosystem standard, but must apply the interim riparian and wildlife standards: precommercial thinning sales; sales of material sold as fiber; sales of dead material less than 7-inch dbh, with incidental green volume (ref. RO 2430 ltr, 8/16/93); salvage sales, with incidental green volume, located outside currently mapped old growth (ref. RO 2430 ltr. 8/16/93); and commercial thinning and understory removal sales located outside currently mapped old growth.
4. Interim riparian standard: Timber sales (green and salvage) will not be planned or located within riparian areas as described below:
    a. Perennial and intermittent fish-bearing streams: consists of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet including both sides of the stream channel), whichever is greatest.
    b. Perennial nonfish-bearing streams: consists of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.
    c. Intermittent non-fish bearing streams: consists of the stream channel from the edges of the stream channel to the top of the inner gorge, or to the outer edges of the riparian vegetation, or to the extent of landslides or landslide-prone area, or to a distance of 100 feet slope distance (200 feet, including both sides of the channel), whichever is greatest.

    See FSM 2526 9/80 R-6 Supp 42 for definitions of Perennial and Intermittent stream.
    d. Ponds, lakes, reservoirs, seeps and springs, bogs and wetlands consist of the body of water or wetland and/or seeps/spring source and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.
5. Interim ecosystem standard:
    a. Characterize the proposed timber sale and its associated watershed for patterns of stand structure by biophysical environment and compare to the Historic Range of Variability

(HRV). The HRV should be based on conditions in the pre-settlement era; however 1900s photography may be acceptable. HRV should be developed for large landscapes across which forest types, environmental settings, and disturbance regimes (fire and insects/disease) are relatively uniform. Each component watershed should not be expected to reflect the average conditions for the larger landscape, but the sum of conditions across watersheds within the area for which HRV is developed should reflect ranges of conditions determined in the HRV evaluation. Note: LOS, a term used in the interim wildlife standard, refers to the structural stages where large trees are common, i.e. Multi-stratum with Large Trees, and Single-stratum with Large Trees. See Table 1.

b. Ecosystem characterization steps to determine HRV:

   1) Describe the dominant historical disturbance regime, i.e. the disturbance types and their magnitudes and frequencies.

   2) Characterize the landscape pattern and abundance of structural stages (Table 1) maintained by the disturbance regime. Consider biophysical environmental setting (Table 2) across the large landscape to make this determination.

   3) Describe spatial pattern and distribution of structural stages under the HRV disturbance regime, and

   4) Map the current pattern of structural stages and calculate their abundance by biophysical environmental setting.

c. Characterize the difference in percent composition of structural stages between HRV and current conditions (Table 3). Identify structural conditions and biophysical environment combinations that are outside HRV conditions to determine potential treatment areas.

Table 1. Structural stages for use with HRV analysis. Structural stage is not necessarily associated with stand age or to seral (species composition) development.

Structural Stage	Definition	Description
Stand Initiation	Growing space is reoccupied following a stand replacing disturbance, typically by seral species.	One canopy stratum (may be broken or continuous), one dominant cohort[2] of seedlings or saplings. Grass, forbs, or shrubs may also be present with early seral trees.[3]
Stem Exclusion: Open Canopy	Occurrence of new tree stems is excluded (moisture limited). Crowns are open grown. Canopy is discontinuous. This structure can be maintained by frequent underburning or management.	One discontinuous canopy stratum. One cohort of trees. New tree stems excluded by competition. Trees may be poles or of small or medium diameter. Understory shrubs, grasses, or forbs may be present.
Stem Exclusion: Closed Canopy	Occurrence of new tree stems is excluded (light or moisture limited). Crowns are closed and abrading.	Canopy layer is closed and continuous. One or more canopy strata may be present. Lower canopy strata, if present, is the same age class as the upper stratum. Trees may be poles or of small or medium diameter. Understory shrubs, grasses, or forbs may be present.
Understory Reinitiation	A second cohort of trees is established under an older, typically seral, overstory. Mortality in the overstory creates growing space for new trees in the understory. Large trees are uncommon.	The overstory canopy is discontinuous. Two or more canopy layers are present. Two or more cohorts of trees are present. Overstory trees may be poles or of small or medium diameter. Understory trees are seedlings, saplings or poles.
Multi-stratum, without large trees	Several cohorts of trees are established. Large overstory trees are uncommon. Pole, small, and medium sized trees dominate.	The overstory canopy is discontinuous. Two or more canopy layers are present. Large trees are uncommon in the overstory. Horizontal and vertical stand structure and tree sizes are diverse. The stand may be a mix of seedlings, saplings, poles, or small or medium diameter trees.
Multi-stratum, with large trees	Several to many cohorts and strata of trees are present. Large trees are common.	The overstory canopy is broken or discontinuous. Two or more canopy layers are present. Two or more cohorts of trees are present. Medium and large sized trees dominate the overstory. Trees of all sizes may be present. Horizontal and vertical stand structure and tree sizes are diverse.
Single stratum, with large trees	A single stratum of large trees is present. Large trees are common. Young trees are absent or few in the understory. Park-like conditions may exist.	The single dominant canopy stratum consists of medium sized or large trees. One or more cohorts of trees may be present. An understory may be absent or consist of sparse or clumpy seedlings or saplings. Grasses, forbs, or shrubs may be present in the understory.

[1] Adapted from an unpublished report by K. O'Hara, Assistant Professor of Silviculture, University of Montana, under contract to the Interior Columbia Basin Ecosystem Project for the Eastside EIS.

Modifications developed by Miles Hemstrom, USFS Regional Office, Portland, Oregon, with input from Paul Hessburg, USFS/PNW Research Station, Wenatchee Lab, Wenatchee, Washington.

[2] A cohort is a class of trees arising after a common natural or artificial disturbance.

[3] "Trees" refers to live trees, not snags or other dead trees.

Table 2. Example biophysical environments matrix. Analysis areas may have more or fewer kinds of biophysical environments and characteristics of each environment may differ from those shown. This table is only provided as an example. The biophysical environments listed are not comprehensive. Each landscape area may have these or different environments.

Biophysical Environment[4]	Dominant Disturbance Factors	Disturbance Regime[5]	Average Disturbance Patch	Typical Landform Setting	Typical Elevation Range	Typical Aspects
Hot, Dry: PIPO, ABGR	Fire, insects, and disease	Low	<l acre	Ridge tops and steep side slopes	2500-4000 feet	S, SW
Warm, Dry: PSME, ABGR	Fire, insects, and disease	Moderate	<5 acres	Side slopes	3000-5000 feet	S, SW
Cool, Mesic: PSME, ABGR, ABLA2, PIEN	Fire, insects, and disease	High	80-120 acres	Various	3000-5000 feet	Various
Cool, Wet: ABGR, ABLA2, TSME	Insects and disease, fire	High	>250 acres	Bottom lands	3000-5000 feet	NE, N, NW, Flat

[4] Temperature and moisture regime, characteristic late seral species, first two letters of genus and species.

[5] Agee (1990). "The historical role of fire in Pacific Northwest forests", Natural and Prescribed Fire in Pacific Northwest Forests, Oregon State University Press.

Low severity regime: 1-25 year return interval, 0% to 20% mortality of large trees.
Moderate severity regime: 26-100 year return interval, 26% to 70% mortality of large trees.
High severity regime: >100 year return interval, >70% mortality of large trees.

Table 3. Example biophysical environment by structural stage matrix. This is only an example. The number and kind of biophysical environments and the historic and current distribution of structural conditions vary by landscape. H% is the estimated range of the percent extent of each condition from HRV assessment. C% is the estimated percent extent of each condition at present in the watershed under examination. D% is a range indicating the difference between H% and C%; D% = C%-H%. Negative values indicate a reduction from historical conditions. *This table is only provided as an example. The biophysical environments listed are not comprehensive. Each landscape area may have these or different environments.*

	Stand Initiation			Stem Exclusion: Open Canopy			Stem Exclusion: Closed Canopy			Understory Reinitiation			Multi-stratum, without large trees			Multi-stratum, with large trees			Single-stratum, with large trees		
Envt	H%	C%	D%	H%	C%	D%	H%	C%	D%	H%	C%	D%	H%	C%	D%	H%	C%	D%	H%	C%	D%
Hot, Dry	5 to 15	15	0 to 10	5 to 20	20	0 to 15	NA	NA	NA	NA	NA	NA	5 to 10	30	20 to 25	2 to 15	20	5 to 18	20 to 70	15	-5 to -55
Warm, Dry	1 to 15	5	4 to -10	5 to 20	20	0 to 15	1 to 10	10	0 to 9	1 to 10	10	0 to 9	5 to 25	25	0 to 20	5 to 20	35	15 to 30	15 to 55	5	-10 to -50
Cool, Mesic	1 to 5	2	1 to -3	NA	NA	NA	5 to 25	5	0 to -20	5 to 25	5	0 to -20	50 to 70	65	15 to -5	5-25	24	19 to -1	NA	NA	NA
Cool, Wet	1 to 10	1	0 to -10	NA	NA	NA	1 to 10	3	2 to -7	5 to 25	10	5 to -15	20 to 50	40	20 to -10	30 to 60	46	16 to -14	NA	NA	NA

6. Interim wildlife standard:

   a. The interim wildlife standard has two possible scenarios to follow based on the Historical Range of Variability (HRV) for each biophysical environment within a given watershed. For the purposes of this standard, late and old structural stages (LOS) can be either "Multi-strata with Large Trees," or "Single Strata with Large Trees," as described in Table l of the Ecosystem Standard. These LOS stages can occur separately or in some cases, both may occur within a given biophysical environment.

   b. LOS stages are calculated separately in the interim ecosystem standard. Use Scenario A whenever any one type of LOS is below HRV. If both types occur within a single biophysical environment and one is above HRV and one below, use Scenario A. Only use Scenario B when both LOS stages within a particular biophysical environment are at or above HRV.

   c. The following sale types were exempted from consideration of HRV through the interim ecosystem standard, but must still meet the intent of the wildlife standards by following the direction provided in Scenario A, 1) through 4), as applicable to the type of sale being proposed, and regardless of whether the stand is LOS or not:

      1. precommercial thinning sales,
      2. sales of material sold as fiber,
      3. sales of dead material less than sawlog size (7-inch dbh) with incidental green volume,
      4. salvage sales with incidental green volume located outside currently mapped old growth,
      5. commercial thinning and/or understory removal sales located outside currently mapped old growth.

The interim wildlife standard only altered portions of current Forest Plans. All additional Forest Plan wildlife standards and guidelines not altered in this direction still apply.

   d. Scenario A

   If either one or both of the late and old structural (LOS) stages falls BELOW HRV in a particular biophysical environment within a watershed, then there should be NO NET LOSS OF LOS from that biophysical environment. DO NOT allow timber sale harvest activities to occur within LOS stages that are BELOW HRV.

      1) Some timber sale activities can occur within LOS stages that are within or above HRV in a manner to maintain or enhance LOS within that biophysical environment. It is allowable to manipulate one type of LOS to move stands into the LOS stage that is deficit if this meets historical conditions.

      2) Outside of LOS, many types of timber sale activities are allowed. The intent is still to maintain and/or enhance LOS components in stands subject to timber harvest as much as possible, by adhering to the following standards:

         a) Maintain all remnant late and old seral and/or structural live trees ≥ 21" dbh that currently exist within stands proposed for harvest activities.

b) Manipulate vegetative structure that does not meet late and old structural (LOS) conditions (as described in Table 1 of the Ecosystem Standard), in a manner that moves it towards these conditions as appropriate to meet HRV.

c) Maintain open, park-like stand conditions where this condition occurred historically. Manipulate vegetation in a manner to encourage the development and maintenance of large diameter, open canopy structure. (While understory removal is allowed, some amount of seedlings, saplings, and poles need to be maintained for the development of future stands).

3) Maintain connectivity and reduce fragmentation of LOS stands by adhering to the following standards:

INTENT STATEMENT: While data is still being collected, it is the best understanding of wildlife science, today, that wildlife species associated with late and old structural conditions, especially those sensitive to "edge," rely on the connectivity of these habitats to allow free movement and interaction of adults and dispersal of young. Connectivity corridors do not necessarily meet the same description of "suitable" habitat for breeding, but allow free movement between suitable breeding habitats. Until a full conservation assessment is completed that describes in more detail the movement patterns and needs of various species and communities of species in eastside ecosystems, it is important to insure that blocks of habitat maintain a high degree of connectivity between them, and that blocks of habitat do not become fragmented in the short-term.

a) Maintain or enhance the current level of connectivity between LOS stands and between all Forest Plan designated "old growth/MR" habitats by maintaining stands between them that serve the purpose of connection as described below:

(1) Network pattern – LOS stands and MR/Old Growth habitats need to be connected with each other inside the watershed as well as to like stands in adjacent watersheds in a contiguous network pattern by at least 2 different directions.

(2) Connectivity Corridor Stand Description – Stands in which medium diameter or larger trees are common, and canopy closures are within the top one-third of site potential. Stand widths should be at least 400 ft. wide at their narrowest point. The only exception to stand width is when it is impossible to meet 400 ft with current vegetative structure, AND these "narrower stands" are the only connections available (use them as last resorts). In the case of lodgepole pine, consider medium to large trees as appropriate diameters for this stand type.

If stands meeting this description are not available in order to provide at least 2 different connections for a particular LOS stand or MR/Old Growth habitat, leave the next best stands for connections. Again, each LOS and MR/Old Growth habitat must be connected at least 2 different ways.

(3) Length of Connection Corridors – The length of corridors between LOS stands and MR habitats depends on the distance between such stands. Length of corridors should be as short as possible.

(4) Harvesting within connectivity corridors is permitted if all the criteria in (2) above can be met, and if some amount of understory (if any occurs) is left in patches or scattered to assist in supporting stand density and cover. Some understory removal, stocking control, or salvage may be possible activities, depending on the site.

b) To reduce fragmentation of LOS stands, or at least not increase it from current levels, stands that do not currently meet LOS that are located within, or surrounded by, blocks of LOS stands should not be considered for even-aged regeneration, or group selection at this time. Non-regeneration or single tree selection (UEAM) activities in these areas should only proceed if the prescription moves the stand towards LOS conditions as soon as possible.

4) Adhere to the following specific wildlife prescriptions. These standards are set at MINIMUM levels of consideration. Follow Forest Plan standards and guidelines when they EXCEED the following prescriptive levels:

a) Snags, Green Tree Replacements and Down Logs:

INTENT STATEMENT – Most (if not all) wildlife species rely on moderate to high levels of snags and down logs for nesting, roosting, denning and feeding. Large down logs are a common and important component of most old and late structural forests. Past management practices have greatly reduced the number of large snags and down logs in managed stands.

(1) All sale activities (including intermediate and regeneration harvest in both even-age and uneven-age systems, and salvage) will maintain snags and green replacement trees of ≥ 21 inches dbh (or whatever is the representative dbh of the overstory layer if it is less than 21 inches), at 100% potential population levels of primary cavity excavators. This should be determined using the best available science on species requirements as applied through current snag models or other documented procedures. NOTE: for Scenario A, the live remnant trees (≥ 21" dbh) left can be considered for part of the green replacement tree requirement.

(2) Pre-activity (currently existing) down logs may be removed only when they exceed the quantities listed below. When pre-activity levels of down logs are below the quantities listed, do not remove downed logging debris that fits within the listed categories. It is not the intention of this direction to leave standing trees for future logs in addition to the required snag numbers, nor to fall merchantable material to meet the down log requirements. The snag numbers are designed to meet future down log needs in combination with natural mortality. Exceptions to meeting the down log requirement can be made where fire protection needs for life and property cannot be accomplished with this quantity of debris left on site.

The down log criteria are not intended to preclude the use of prescribed burning as an activity fuels modification treatment. Fire prescription parameters will ensure that consumption will not exceed 3 inches total (1½ inch per side) of diameter reduction in the featured large logs (sizes below).

Tools such as the CONSUME and FOFEM computer models, fire behavior nomograms, and local fire effects documentation can aid in diameter reduction estimates.

Leave logs in current lengths; do not cut them into pieces. Longer logs may count for multiple "pieces" without cutting them. Cutting them may destroy some habitat uses and also cause them to decay more rapidly. It is also not expected that the "pieces" left will be scattered equally across all acres.

SPECIES	PIECES PER ACRE	DIAMETER SMALL END	PIECE LENGTH AND TOTAL LINEAL LENGTH	
Ponderosa Pine	3-6	12"	>6 ft.	20-40 ft.
Mixed Conifer	15-20	12"	>6 ft.	100-140 ft.
Lodgepole Pine	15-20	8"	>8 ft.	120-160 ft.

b) GOSHAWKS:

INTENT STATEMENT: Goshawks are known to use interior forest habitats of mature/old growth structure. Habitat uses, nesting stand characteristics, and key habitat structural components in eastern Oregon/Washington are currently being studied. Until further information is known and management plans approved to insure species viability, the following standards are to be met as a minimum. Forest Plan standards and guidelines that EXCEED the levels described below should be used instead of, or in addition to, the following:

(1) Protect every known active and historically used goshawk nest-site from disturbance. "Historical" refers to known nesting activity occurring at the site in the last 5 years. Seasonal restrictions on activities near nest sites will be required for activity types that may disturb or harass pair while bonding and nesting.

(2) 30 acres of the most suitable nesting habitat surrounding all active and historical nest tree(s) will be deferred from harvest.

(3) A 400-acre "Post Fledging Area" (PFA) will be established around every known active nest site. While harvest activities can occur within this area, retain the LOS stands and enhance younger stands towards LOS condition, as possible.

e. Scenario B

Within a particular biophysical environment within a watershed, if the single, existing late and old structural (LOS) stage is WITHIN OR ABOVE HRV, OR if both types of LOS stages occur and BOTH are WITHIN OR ABOVE HRV, then timber harvest can occur within these stages as long as LOS conditions do not fall below HRV. Enhance LOS structural conditions and attributes as possible, consistent with other multiple use objectives.

The intent of the following direction is to maintain options by impacting large and/or contiguous stands of LOS as little as possible, while meeting other multiple use objectives.

1) Harvest activities, (any and all types being considered), can occur in the following stand types in order of priority:
   a) Activities should occur within stands other than LOS as a first priority.
   b) Second priority for harvest activities is within smaller, isolated LOS stands <100 acres in size, and/or at the edges (first 300 ft) of large blocks of LOS stands (≥ 100 acres).
   c) Some harvesting can occur, but only as a last priority, within the interior of large LOS stands (≥ 100 acres); REGENERATION AND GROUP SELECTION ACTIVITIES ARE NOT ALLOWED. REFER TO NON-FRAGMENTATION STANDARDS, 3), BELOW.
2) Maintain connectivity as directed in Scenario A, 3)
3) Non-fragmentation standards – Within the interior of large LOS stands ≥ 100 acres, (beyond 300 ft from edge), harvest activities are limited to non-fragmenting prescriptions such as thinning, single-tree selection (UEAM), salvage, understory removal, and other non-regeneration activities. Group selection (UEAM) is only allowed when openings created either mimic the natural forest pattern, and do not exceed ½ acre in size.
4) Adhere to wildlife prescriptions provided in SCENARIO A, 4) a) for snags, green tree replacements, and down logs; and 5) for goshawks with the following exception for goshawk post fledging areas in 5) c):

   A 400-acre "Post Fledging Area" (PFA) will be established around every active nest site. While harvesting activities can occur within this area, up to 60% of the area should be retained in an LOS condition, (i.e., if 35% of the area is now in LOS stands then it all needs to be retained; if 75% of the area is now in LOS stands then some can be harvested, as long as this late and old stand structure does not drop below 60% of the area).