

**CATASTROPHIC STAND CONDITIONS IN THE BLUE MOUNTAINS :
Discussion, Guidelines, and Rating System**

Craig L. Schmitt and Donald W. Scott
Blue Mountains Pest Management Zone
Wallowa-Whitman National Forest
La Grande, OR 97850
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Introduction

There are differing perceptions, and/or a lack of clear understanding between District, Forest and Regional personnel, regarding what constitutes a "*catastrophic stand condition*" determination as referenced in the Forest Land and Resource Management Plans.

Endemic levels of insect and disease activity provide diversity to forest stands and the landscape. Most forest-dwelling species of mammals, birds, and invertebrates benefit from vegetative edges, openings, snags, and down woody material; all which can result from an endemic level of mortality and decay that should be accepted and even encouraged. Only when the level of this activity exceeds normal natural levels and/or prevents attainment of management goals, should Forest managers consider this activity "damage".

A large number of mixed conifer stands in the Blue Mountains have been severely damaged by a variety of insects and diseases, compounded by protracted drought, overstocking, and inappropriate past management, often on hundreds to thousands of contiguous acres. Many thousands of acres have fuel loads higher than occurred under the natural conditions of frequent periodic fire. Additionally, large areas in the ponderosa pine type are drastically overstocked and in imminent danger of a bark beetle population buildup and resultant epidemic. To properly respond to the current forest health restoration efforts in the Blue Mountains, and to develop and then maintain a healthy ecosystem, certain stands, frequently more than 40 acres in size, may require silvicultural treatments involving regeneration cuts, thinning, etc., to attain the desired future condition, rather than merely salvaging of the mortality.

To assure that a consistent definition of "*catastrophic damage*" is used, the purpose of this document is to provide guidelines and a standardized rating system for making that determination. Moreover, the discussion and application extend well beyond the Blue Mountains physiographic division. The intent of this document is to develop the application principles that can be extended by adoption or adaptation to other areas of the Pacific Northwest Region and Intermountain West.

Definition of Catastrophic Damage

Ref.: Blue Mountains Forest Health Report, 1991. Gast et al¹ (Catastrophic Pest-Caused Damage [losses])

"A level of insect- or disease-caused tree mortality and/or damage, such that resource management goals and objectives are significantly hindered, and desired future condition described in Forest Plans cannot be achieved in either the short term or the long term."

Federal Laws

The fundamental direction regarding catastrophic damage or losses in relation to National Forest Management comes from Acts passed by Congress, carried out through Department and Agency policy and regulations. The following are sections from The National Forest Management Act of 1976 germane to the issue of catastrophic tree damage.

Ref.: National Forest Management Act of 1976 (Reforestation)

Act states in part:

"Sec. 4 (d)(1) It is the policy of the Congress that all forested lands in the National Forest System shall be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of Multiple Use Sustained Yield management in accordance with Land Management Plans." [Act goes on to establish reporting requirement to Congress of the amount and location of all lands where reforestation of cut-over, denuded or deforested, etc., lands are required, or where stands of trees are not growing at their best potential rate of growth, and other requirements for scheduling first and third growing season's stocking and growth rate surveys, etc., and the requirement for retreatment, if necessary].

Ref.: National Forest Management Act of 1976 (National Forest System Resource Planning)

(Amends Section 6 of the Forest and Rangeland Renewable Planning Act of 1974, to add the following section).

Act states in part:

¹ Gast, William R., Jr.; Scott, Donald W., Schmitt, Craig; Clements, David; Howes, Steven; Johnson, Charles G. Jr.; Mason, Robert; Mohr, Francis; Clapp, Robert A. Jr.; 1991. Blue Mountains Forest Health Report: New Perspectives in Forest Health. [unnumbered report]: USDA Forest Service, Malheur, Umatilla, and Wallowa-Whitman National Forests. [Unconventional pagination].

"(g)(3)(F) Insure that clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate an even-aged stand of timber will be used as a cutting method on National Forest System lands only where..." "(g)(3)(F)(iv) there are established according to geographical areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation, including provisions to exceed the established limits after appropriate public notice and review by the responsible Forest Service Officer one level above the Forest Service Officer who normally would approve the harvest proposal: provided, that such limits shall not apply to the size of areas harvested as a result of natural **catastrophic** conditions such as fire, insect and disease attack, or windstorm; and..." (g)(3)(F)(v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource."

Act further states in part:

"(m)(1) The Secretary [Secretary of Agriculture] shall establish..." "(l) standards to insure that, prior to harvest, stands of trees throughout the National Forest System shall generally have reached the culmination of mean annual increment of growth (calculated on the basis of cubic measurement or other methods of calculation at the discretion of the Secretary): provided, that these standards shall not preclude the use of sound silvicultural practices, such as thinning or other stand improvement measures: provided further, that these standards shall not preclude the Secretary from salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow or other **catastrophe**, or which are in imminent danger from insect or disease attack..."

Ref.: National Forest Management Act of 1976 (Limitations on Timber Removal; Public Participation and Advisory Boards; Regulations; Severability)

Act states in part:

"Sec. 13. (b) Nothing in subsection (a) of this section shall prohibit the Secretary from salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow, or other **catastrophe**, or which are in imminent danger from insect or disease attack. The Secretary may either substitute such timber for timber that would otherwise be sold under the Plan or, if not feasible, sell such timber over and above the Plan volume. (16 U.S.C. 1611)"

(Note: Sec. 13 (a) addresses limitations on annual timber removal on National Forest lands established by the Secretary of Agriculture).

Ref.: National Environmental Policy Act of 1969
(Amended May 27, 1986 by Council on Environmental Quality)

Amendment states in part:

"Section 1502.22. Incomplete or unavailable information. In preparing an

environmental impact statement, the agency shall make reasonable efforts, in light of overall costs and state of the art, to obtain missing information which, in its judgment, is important to evaluating significant adverse impacts on the human environment that are reasonably foreseeable..... "Reasonably foreseeable" includes impacts which have **catastrophic consequences**, even if their probability of occurrence is low, provided that they have credible scientific support, are not based on pure conjecture, and are within the rule of reason." 50 FR 32238 (1985).

FS Manual Direction

2435.03 - Policy

1. Aggressively and expeditiously pursue the salvage of wood material resulting from natural disasters prior to insect and disease build ups to reduce the risk of fire, insect and disease attacks, to protect investments on private and public land and to protect the soil, water, fish and wildlife resources. Such use and utilization of salvage material is to be compatible with multiple-use objectives, including protection of wildlife habitat, and shall reflect local conditions and species characteristics.

Blue Mountains Forest Plan Examples of Catastrophic Events and Directed Actions:

The Forest Plans of the three National Forests in northeastern Oregon and southeastern Washington all contain discussions which make general reference to catastrophic conditions:

Malheur NF

The Malheur Forest Plan addresses "catastrophic events" and "catastrophes" in Forest-wide Standards (Chapter IV). The Plan limits forest openings created by application of even-aged harvest cutting systems to a maximum size of 40 acres. "Exceptions are permitted for natural catastrophic events, such as fires, windstorms, or insect and disease attacks....".

Stands scheduled for harvest using even-aged management will be managed on rotations which are equal to or greater than 95% of culmination of mean annual increment of growth based on cubic measure. Harvest of trees or stands before this is permitted for: ".... salvage or sanitation harvesting of stands substantially damaged by fire, windthrow, or other catastrophes, or stand(s) that are in imminent danger from insect or disease attack;.....".

Management action for catastrophic events are not discussed separately for individual

Management Allocations.

Umatilla NF

The Umatilla Forest Plan addresses "catastrophic situations" and "catastrophic occurrences" in Forest Plan sections pertaining to Forest Management Objectives for Timber. Exceptions to 40 acre maximum size even-aged silviculture treatments are allowed "when natural catastrophic situations such as fires, windstorms, or insect or disease attacks occur;....".

Standards for many of the individual management allocations have exceptions with wording similar to, "Exceptions to created opening size and maximum percentage in created openings at one time are permitted under conditions of catastrophic occurrence such as blow down, insect and disease attacks, wildfire, and others....".

Wallowa-Whitman NF

The Wallowa-Whitman Forest Plan also discusses exceeding the 40 acre limitation in even-aged harvest methods "for natural catastrophic events (such as fires, windstorms, or insect and disease attacks)....". Also, where catastrophic timber mortality has occurred, "Efforts will be made to salvage the affected timber as quickly as possible within the objectives of the affected management areas."

Under Miscellaneous Standards and Guidelines-

"Catastrophes, such as those caused by insect epidemics, fire, floods or weather disturbances will not change the land allocation. The intent is still to achieve the conditions described for the management area. A catastrophe may result in the need for different methods or alter the time frame for achieving the objectives, but the objectives remain the same".

Individual management allocations are covered under Forest-wide standards. There is mention of timber harvest following catastrophic events in Backcountry allocations, if primary resource objectives are to be met, and Oldgrowth Preservation allocations if replacement stands are available.

Guidelines and Criteria for Determining Catastrophic Conditions

In many stands in the Blue Mountains, the current level of damage caused by western spruce budworm and bark beetles is clearly recognized by most resource managers as "*catastrophic*" damage. Designating other conditions of stand damage as catastrophic may not be as readily accepted because of either unrecognized damage or unrealized risk. Such designation should hinge on current or imminent hazard to dominant stand components that do not allow the stand to meet short- or long-term management goals

or Desired Future Condition.

Management emphasis or direction for a particular resource area can influence to a large extent whether the effect of insect and disease damage should be considered catastrophic. In some situations, a catastrophic designation will require prompt action to recover merchantable wood fiber and prevent additional damage, or to reduce wildfire potential. Whereas, in another non-catastrophic scenario, resource managers might be able to tolerate current conditions of elevated insect- or disease-caused damage, as long as they are still able to provide benefits to the primary resource(s) under management, at least for the short-term. The following situations, criteria, and examples illustrate most of the critical concerns currently being faced in the Blue Mountains:

A. Stand will not meet short- or long-term Forest Plan Goals or Desired Future Condition because of excessive tree mortality or decay caused by insects, diseases, fire, or wind.

Criteria:

1. The affected tree species collectively comprise most stocking in the stand, such that the stand would be considered understocked, in cases where full stocking is required to meet desired future condition, and the stand could not readily achieve full stocking by maturity without disturbance or reforestation.
2. Affected tree species are being damaged at rates of mortality or defect that will cause a significant portion of those stand component species to be dead or defective within the time frame until the next planned management entry, based on current trends.
3. Forest Plan "*Desired Future Condition*" does not exist, or is not expected to exist in 10 years, due to current trends in pest activity, or is not attainable in the long-term (50 years) with the current stand structure.

Examples:

1. Bark beetles have killed, or are currently killing, at least 35 percent of their host component in the stand. Affected tree species are a major stand component because their removal would result in an understocked condition. Predisposing factors may include overstocking, root diseases, drought, or insect defoliation.
2. Resource management goals including sawlog production, wildlife cover, water quality, visual quality, and others, will not be met by managing the current stand. Indian paint fungus decay, or latent infection that will develop into decay, will result in excessive defect in grand fir understory in timber emphasis areas. Dead defoliated understory grand fir does not provide adequate cover to deer and elk. Dead beetle-killed fallen spruce may not provide effective security areas to big game

since it greatly hinders animal movement. Visual quality of viewsheds are deteriorating due to dwarf mistletoe mortality of overstory larch and budworm-caused mortality of understory fir, along with the absence of larch regeneration.

3. Windstorms can result in extensive windthrown timber. A large number of available spruce, pine, or Douglas-fir can result in rapid development of epidemic populations of bark beetles which can then move into healthy timber.

4. Because of a lack of periodic ground fire and selective harvesting of pine, Douglas-fir stocking has increased dramatically on xeric south- and west-facing aspects. Douglas-fir dwarf mistletoe has often increased in severity along with the increase in host stocking and development of the susceptible understory. Few of these infected understory trees will develop into sawlog-quality merchantable trees. In some management allocations this may be acceptable but in timber emphasis areas it is a catastrophic event.

B. Conditions are such that the stand, while meeting short-term Forest Plan Goals and Desired Future Condition, is in imminent danger of fire, insect, or disease attack, which would forego meeting long-term goals.

Criteria:

1. Site or stand conditions are outside of accepted norms for a healthy functioning ecosystem. The potential of an event that would prevent the current stand from meeting desired future conditions for the short- or long-term is considered unacceptably high by a fuels or pest specialist.

2. The entire stand or a dominant component are in imminent danger of mortality or decay prior to the next planned compartment entry; accepted risk rating systems, if available, or pest specialist input, predict at least a 50 percent probability that resultant damage will forego attainment of resource objectives.

3. Probability for stand replacement fire, given current fuel loads and the potential for unplanned ignition is at least 50 percent over the next ten years or until the next planned management entry. Estimate is based on model or fire specialist judgement.

4. According to risk-rating models or entomologists, insect damage hazard is, or will be, "high" and there is at least a 50 percent chance of an epidemic insect event occurring over the period of time until the next planned management or ten years, and would result in a stand condition that jeopardizes being able to meet the desired future condition/goals/objectives for the area.

5. Disease damage hazard, as assessed by available risk-rating models or pathologist input, is judged to present at least 50 percent probability of cumulative

disease damage at levels which would not allow attainment of Forest Plan objectives.

Examples:

1. Young-maturing ponderosa pine stocking is excessive (exceeding by 50 percent the basal area recommended for site quality) in many areas in the Blue Mountains. Stocking levels are high based on site quality, stocking guides, and known bark beetle hazard rating systems. Damaging bark beetle activity is increasing. Other localities will also have losses as susceptibility increases over time and competition causes moisture stress to increase and vigor to decrease.

2. Mixed conifer stands with near-pure understory stocking of shade tolerant grand fir have had heavy spruce budworm defoliation during the last 8 to 10 years. Many of these stands have had considerable mortality in the understory component over large areas. Dead understory grand fir serve as excellent fuel ladders to crowns of remnant seral pines, larch and associated species. These stands are clearly at extreme risk during a fire event. These stands also are a considerable fire ignition risk, as natural or human-caused fires are more readily ignited and more apt to build and spread with the abundance of fuels.

C. Preventable spread of insects and diseases from mature/overmature stand components to developing regeneration will contribute to not meeting long-term goals.

Criteria:

Silvicultural priority is very high based on urgency of treatment to minimize spread of insects or diseases from mature to immature stand components.

Example:

1. Developing regeneration may be at considerable risk in stands where dwarf mistletoe in larch, ponderosa pine, lodgepole pine, or Douglas-fir overstory trees is starting to spread to healthy, viable, developing hosts in stands. Such stands are those where maintaining a low incidence of pest-caused damage is a management objective.

D. Loss of silvicultural options by deferring treatment will contribute to not meeting long-term goals.

Criteria:

Silvicultural options are currently limited because of pest effects, stand structure, and composition. Deferring treatment will reduce the number of viable silvicultural options in the future, leaving alternatives that have undesirable attributes

or are otherwise unlikely to be adopted. This would contribute to stand degradation and the developing imminent catastrophic condition for the long-term.

Example:

1. Viability of seed producing seral larch is quickly being lost due to dwarf mistletoe infections. Typically understories are entirely composed of grand fir due to lack of periodic fire. These understory fir are not viable due to suppression, budworm defoliation or other condition(s). Larch regeneration is also not possible until the shade-tolerant understory is removed and the seedbed prepared.

These examples are specifically discussed with regard to insects and diseases currently of immense concern to land managers in the Blue Mountains. The **Stand Rating System for the Blue Mountains - Stand Classification to Determine Imminence of Catastrophic Damage** is designed to quantify stand parameters related to catastrophic conditions and systematically rate stand conditions. The intent of the rating system is to standardize application for the purpose of determining potential catastrophic effects that can be consistently applied anywhere within the Blue Mountains. While it is not possible to state all criteria in a manner that are completely objective, we believe the criteria will allow for a range of subjectivity without seriously compromising the validity of the Stand Composite Score, and subsequent stand classification designation decision. We also point out that while numerous scenarios were used to "test" the rating system, as the rating system is more extensively used, and field validation data become available, the table Composite Score Ranges may need to be adjusted slightly. Other parts of the Region may have similar or different conditions and problems; the rating methodology would be similar.

**STAND RATING SYSTEM FOR THE BLUE MOUNTAINS:
STAND CLASSIFICATION TO DETERMINE IMMINENCE OF CATASTROPHIC
DAMAGE**

(NORTHEAST OREGON AND SOUTHEAST WASHINGTON)

Donald W. Scott and Craig L. Schmitt
Blue Mountains Pest Management Zone
Wallowa-Whitman National Forest
La Grande, Oregon 97850
July, 1993

	<u>Score</u>
(1) Relative status of Forest Plan "Desired Future Condition" for management area or resource:	_____
Currently meets long-term (50 years) Desired Future Condition (value = 0)	
Currently meets short-term (10 years) Desired Future Condition, but will probably not meet long-term Desired Future Condition (value = 1)	
Currently meets neither short-term nor long-term Desired Future Condition, nor is expected to due to current pest trends and stand conditions (value = 2)	
(2) Proportion of major stand species basal area currently defective or dead, or will be within the next 10 years:	_____
< 25% affected (value = 0)	
25-50% affected (value = 1)	
51-75% affected (value = 2)	
76-100% affected (value = 3)	
(3) Current stocking conditions (include all live tree species):	_____
Normal stocking (75-100%) (value = 0)	
Minimum or understocked (value = 1)	
Overstocked (value = 2)	

**** Stocking may be best assessed using SDI-based density recommendations by Cochran and others (1994).²**

² Cochran, P. H., J. M. Geist, D.L. Clemens, R. R. Clausnitzer, and D.C. Powell. 1994. Suggested stocking levels for forest stands in Northeastern Oregon and Southeastern Washington. Research Note PNW-RN-513. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 21 p.

(4) Relative fuels condition (size, accumulation, and structure) and potential for catastrophic stand replacement fire before the next planned management entry:

Currently meets "normal" range of fuels condition expected for this plant association at normal stocking (value = 0)

Current range of fuels "moderate" for this plant association; potential for increase in fuels from current or expected insect, disease, or other catastrophic event also moderate (value = 1)

Current range of fuels "high" for this plant association, or expected to be high due to insect, disease, or other catastrophic events affecting stand now, or within next ten years resulting in at least a 50% probability of a major fire event (value = 2)

(5) Relative risk of spread of insects or diseases from infested or infected overstory stand components to susceptible developing or advanced regeneration:

Overstory infestation/infection non-existent or very "low;" risk of spread to understory components also "low" (value = 0)

Overstory infestation/infection and risk of spread to understory "moderate" (value = 1)

Overstory infestation/infection and risk of spread to understory "high" (value = 2)

(6) Relative risk of losing present silvicultural options in stands, based on insect and disease effects, stand structure, and composition:

Risk non-existent or low (value = 0)

Risk moderate (value = 1)

Risk high (value = 2)

STAND COMPOSITE SCORE

Stand Classification Table:

Composite Score Range	Degree of Imminence	Comments
0-1	Low	Stands relatively healthy and expected to remain healthy for the next decade; expected to meet Desired Future Condition over this period.
2-5	Borderline Condition	Not catastrophic, but will approach catastrophic condition within five to ten years.
≥ 6	Catastrophic	Presently catastrophic, or will become catastrophic within three to five years.

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