MOUNTAIN PINE BEETLE POPULATION MANIPULATION STRATEGIES--PAST SUPPRESSION PRACTICES

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ABSTRACT: Suppression of mountain pine beetle is a viable strategy when implemented at the stand level in conjunction with ongoing vegetation management and is designed to protect a high value resource for a short period of time. There is a need to evaluate all management strategies for mountain pine beetle using an orderly process. Decision analysis is one such process that has demonstrated its utility in pest management.

Before I get into suppression, I would like to define a few terms. A mountain pine beetle EPIDEMIC occurs over an extensive area and consists of a matrix of INFESTATIONS at the stand level. At any one time in an epidemic, an infestation in a stand may be in the epidemic, increasing, outbreak or declining phase. Stands themselves have varying levels of susceptibility which contribute both to the probability of an infestation occurring and to the expected level of infestation. Not all stands become infested and participate in an epidemic. In fact, not all highly susceptible stands participate in a given epidemic.

The history of mountain pine beetle suppression is marked by strategies that were directed at an epidemic and were applied too late in the epidemic cycle at great expense in both dollars and man power. How often have we sent out the cry for action when massive amounts of tree mortality dotted the landscape? How often have we treated thousands of infested trees for three to five consecutive years only to see a general deline in populations in treated and untreated areas alike? How often have we viewed this decline and said "see, control works?" The reality of mountain pine beetle suppression is that we are very effective at what I call the "Visine treatment". We CAN get the red out. Other than "getting the red out" what have we accomplished with mountain pine beetle suppression programs? I'm afraid that most of our accomplishments have a negative connotation. We've convinced a large portion of the public, ourselves included, that suppression is a viable strategy over large expanses of forested acres. We've disrupted management plans and effectively delayed ongoing vegetation management that could have reduced stand susceptibility to infestation. We've neglected the resource management objectives of the land manager by implying that all infestations are "bad" and must be suppressed. A line in a song by Burt Reynolds best sums up our accomplishments. He sings "let's do something cheap and superficial". Superficial? No doubt! Cheap? Not in dollars and cents or manpower! Suppression costs have escalated from $1.50 per tree in the mid 1970's to $20.00 a tree in 1985. However, cheap in that we have effectively mitigated the land manager's and the public's concern - we got the red out! - without addressing the real and often controversial problem - and epidemic of mature trees.

Our accomplishments in insect suppression are akin to our accomplishments in fire suppression. We've had some real success in suppressing defoliator populations nationwide. The result has been an overall increase in the age of the forest, increase in offsite tree encroachment, increase in the progression of forest succession and, an increase in the overall susceptibility of the forest to insects and diseases. We've also had real success in suppressing fires in the past. By doing so we've increased the average age of the forest, increased offsite encroachment, increased the progression of succession and increased the overall susceptibility of the forest to all insects and diseases. Indirectly mountain pine beetle suppression has produced the same results by negatively impacting ongoing vegetation management. As a consequence, our ability to suppress insect epidemics and put fires out is declining rapidly even as our technology continues to advance.

There is a need to evaluate management strategies in an orderly process. By what process do you value the various alternative strategies? Using decision analysis, a procedure was developed to match management strategy to a land classification system (Freeling and Seaver 1980). The procedure first developed a land classification system based on the following criteria:

1. Stand risk to mountain pine beetle infestation
   a. moderate to high
   b. low
2. Land accessibility or operability
   a. accessible
   b. inaccessible

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3. Tree value

   a. high
   b. low

From this eight land classifications were constructed, eg. moderate to high risk, accessible and, high value. The second part of this procedure involved the development of the following management strategies:

1. Thinning of stands

2. Preventive spraying

3. Favoring tree species other than the host species

4. Direct control actions taken to reduce the beetle population

5. No action

Using a range of current costs and values, each strategy was evaluated economically for each individual land classification. The viability of each strategy was then examined in the context of the land classification system and a preferred strategy developed. In addition, five major premises were developed during this process:

1. All host type, regardless of ownership can be stratified into land classification units.

2. Mountain pine beetle cannot be controlled by any method over extensive areas of land.

3. Management and control of mountain pine beetle is viable in restricted areas of type having relatively high value.

4. The ideal strategy for managing mountain pine beetle is to intensively manage the host type, thereby preventing outbreaks from occurring.

5. Prevention is a viable strategy only in moderate to high susceptible stands or in low susceptible condition in the near future. This thumb nail sketch of decision analysis is used here to demonstrate one strategy for managing mountain pine beetle in an orderly process. Not all strategies make sense under all conditions. The process can be made dynamic so that, as conditions change strategies can be reexamined and new preferred strategies developed. Gene Amman, Intermountain Research Station, is in the process of developing a decision model for mountain pine beetle. Once the framework of the model is developed, other bark beetle scenarios could be developed.

Is suppression ever a viable strategy for dealing with mountain pine beetle? The answer is clearly YES! Suppression makes sense when implemented at the stand level and designed to protect a valuable resource for a short period of time - 1 or 2 years. An example of a viable suppression strategy would be the use of preventive sprays with salvage logging in an infested campground to protect high value trees from immediate attack while preparing to implement a vegetation management plan to reduce overall stand susceptibility. Another example might be the use of pheromone baited trap stands or trees to reduce beetle pressure on high value sawlogs in an ongoing timber sale. The scenario seems clear. If we're going to attempt suppression it must be done at the stand level and in conjunction with ongoing vegetation management.

Knowing that suppression is ineffective over large forested areas, most entomologists realize the need to prevent infestations or, more realistically, to reduce the impact on the forest resource given an infestation will occur in the future. Forest Plans are delineating areas on the ground and addressing the management objectives for those areas. Management prescriptions are placing emphasis on particular resource needs for an area and outlying silvicultural practices to attain the stated objectives. Entomologists are providing input into the second round of the Forest decisions of the land manager.

Nationwide we have 56.6 million acres of host type susceptible to mountain pine beetle infestation. Annually, 4.3 million acres is at epidemic levels. At this rate all susceptible acres will be impacted over the next 13 years. However, not all of these acres will be negatively impacted. Forest plans must identify those acres that will be negatively impacted; strategies for reducing the impact; and, most important of all, the probable scenario if strategies are not implemented. Forest plans must also address the consequences of the "no action" alternative. This alternative too often implies that the vegetation will remain static over time.

The future is both positive and exciting. In the past few years entomologists and pathologists have taken the lead in developing the tools of silviculture as a means of attacking the cause and not the symptom of insect infestation. We have established long term studies to demonstrate the use of silviculture in pest management. Many of these demonstrations are just now yielding valuable information which should be documented in the forest planning process and implemented on the ground. We have entomologists and pathologists being trained and certified as silviculturists and accepted as knowledgeable specialists. We have a National Forest Health Initiative which has the stated objective of developing "a strategic plan to enhance and maintain the health of the Nation's forests which will be implemented through Forest Service programs and authorities." We have the opportunity to make a quantum leap in forest pest management. Let's not miss our chance.

REFERENCE

Freeling, Anthony N.S.; Seaver, David A., 1980. Decision analysis in Forest Service planning: Treatment of mountain pine beetle. Decision Science Consortium, Inc., Tech. Report 80-8. 93 p.