

Review

Management for Mountain Pine Beetle Outbreak Suppression: Does Relevant Science Support Current Policy?

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Abstract: While the use of timber harvests is generally accepted as an effective approach to controlling bark beetles during outbreaks, in reality there has been a dearth of monitoring to assess outcomes, and failures are often not reported. Additionally, few studies have focused on how these treatments affect forest structure and function over the long term, or our forests' ability to adapt to climate change. Despite this, there is a widespread belief in the policy arena that timber harvesting is an effective and necessary tool to address beetle infestations. That belief has led to numerous proposals for, and enactment of, significant changes in federal environmental laws to encourage more timber harvests for beetle control. In this review, we use mountain pine beetle as an exemplar to critically evaluate the state of science behind the use of timber harvest treatments for bark beetle suppression during outbreaks. It is our hope that this review will stimulate research to fill important gaps and to help guide the development of policy and management firmly based in science, and thus, more likely to aid in forest conservation, reduce financial waste, and bolster public trust in public agency decision-making and practice.

Keywords: bark beetle; clearcut; climate change; climate change adaptation; daylighting; *Dendroctonus ponderosae*; forest pest management; monitoring; sanitation; thinning

treatments. Funding cuts to research personnel, particularly in agencies like the US Forest Service, have exacerbated this problem exactly at the time when the need for rigorous research is increasing at a rapid pace. The US Forest Service has recognized that long-term planning must include explicit goals to increase forest resilience and adaptation to disturbance, including outbreaks of the mountain pine beetle. However, with extreme cuts to budgets and personnel, they are highly constrained to meet these needs at this time. Likewise, cuts in federal funding to agencies such as United States Department of Agriculture and the National Science Foundation concurrently reduce the ability of academic researchers to address these problems.

7. Aligning Policy to Science

Our survey of the relevant literature finds that there is significant uncertainty about whether the most commonly used beetle timber harvest treatments are, indeed, effective. Yet there has been little discussion of this uncertainty in the relevant policy debates. Politicians have instead latched on to beetle timber treatments as a cure-all for beetle infestations and have pushed to weaken or eliminate environmental laws that are perceived to be obstructing these treatments. Agencies such as the US Forest Service, to their credit, have been more nuanced in their support for bills that package beetle timber harvest treatments with weakened environmental laws; they have opposed several proposals to alter environmental laws to allow more treatments, but on the other hand, the agencies have at times also aggressively pushed for the implementation of treatments.

It seems clear that the policy debates—both in the agencies and in Congress—need to be better informed by science. Researchers should be more proactive in communicating their understandings of the current science to policymakers. This does not mean that researchers need to take a position pro or con vis-à-vis beetle treatments, or even vis-à-vis specific legal proposals. In the face of uncertainty, aggressive beetle timber harvest treatments may be warranted in some instances. However, policymakers should be aware of uncertainty when they are making the relevant decisions and should also be more willing to include the voices of scientists in the development of policy.

Given the uncertainty about the effectiveness of many beetle timber harvest treatments, the high financial costs of those treatments, the impacts on other environmental resources and values, and the possibility that in the long-run those treatments may interfere with the ability of North American forests to adapt to climate change, our position is that weakening or eliminating environmental laws to allow more beetle timber harvest treatments is the wrong choice for advancing forest health in the United States. Indeed, given the uncertainty, the costs, and the possibilities of both short-term harm to other resources and long-term ineffectiveness, we believe that the current structure of thoughtful, detailed environmental review for these projects is, in general, appropriate. If agencies believe that they need to be able to react quickly to specific infestations with treatments, and that this quick reaction is incompatible with existing legal procedures, we encourage the agencies to adopt overall programmatic environmental reviews based on the principles of adaptive management. Agencies should be able to build (or tier) on these programmatic reviews to respond quickly to individual events as needed. However, the programmatic reviews should allow the agency to build in the monitoring, replication, and variance of treatments that are essential for successful adaptive management [142].

8. Conclusions

The manner in which policy makers have accepted beetle timber harvest treatments as a panacea for responding to bark beetle outbreaks in North American forests raises a number of red flags. As ecosystems and places that have economic, social, and cultural value to human communities are altered by climate change, there is a risk that people will overreact because of a need to “do something” to respond to change, and to give themselves some sense of control over broader forces that appear to be out of control. That pressure, to “do something”, might also interact with the uncertainty about which choices are effective and appropriate (as with beetle timber harvest treatments) to create an opportunity for political pressures to force the adoption of particular choices that benefit specific interest groups [143]. It is perhaps no accident that the beetle treatments that have been most aggressively pushed for in the political landscape allow for logging activities that might provide revenue and jobs for the commercial timber industry. The result is that the push to “do something,” uncertainty, and political pressures might lead us to act to respond to climate change before we understand the consequences of what we are doing, in the end producing more harm than good.

Our argument here is not to forgo management, but rather that management should be led by science and informed by monitoring. Both direct and indirect management for bark beetles have their place. However, to manage our forests in a way that best ensures their long-term function while wisely using limited financial resources, policy makers and the public need a clearer understanding of current science and gaps.

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Conflicts of Interest

The authors declare no conflict of interest.

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