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Forest Policy and Economics 8 (2006) 312–322

Forest Policy and Economics

www.elsevier.com/locate/forpol

Wildfire, timber salvage, and the economics of expediency

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Received 5 December 2003; received in revised form 4 June 2004; accepted 26 July 2004

Abstract

Administrative planning rules and legal challenges can have significant economic impacts on timber salvage programs on public lands. This paper examines the costs of the delay in salvage caused by planning rules and the costs associated with the volume reductions forced by legal challenges in one case study. The fires on the Bitterroot National Forest in the northern Rocky Mountains in the United States burned 124,250 ha in the summer of 2000, killing valuable timber. A proposal to salvage about 15% of the burned area, containing 0.8 million m^3 (176 million board feet) of the damaged timber, was challenged in court, resulting in a mediation plan salvage amount of 0.27 million m^3 (60 million board feet). Administrative planning requirements also delayed the initiation of salvage to 2003. Because timber decays following death and damage, the costs of delay can be quantified. We evaluate the costs of both reducing the salvage volume due to the litigation and the losses due to decay from the administrative delay. Simulations show that the court settlement plan created through legal challenge resulted in an $8.5 million loss to the U.S. treasury and an $8.8 million (65%) loss in net welfare under the base case market assumptions. The delay in salvaging the agreed upon salvage amount from 2001 to 2002 reduced revenues from salvage to the U.S. treasury by $1.5 million (25%) and potential welfare benefits by the same amount, under base case assumptions of market sensitivities to prices.

Keywords: Timber salvage; Welfare; Legal challenge; Lawsuit; Stumpage; Wildfire; Catastrophe; Timber market

1. Introduction

Wildfire provides a dramatic expression of the interaction between man and nature in a forested landscape, raising a number of basic questions regarding forest management, policy, protection, and restoration. In the summer of 2000, these questions were again brought to national prominence after fires in the northern Rocky mountains in the United States burned more forest area there than at any time since the catastrophic fires of 1910. The largest and most damaging of these fires occurred on the Bitterroot National Forest in western Montana where 124,240 ha burned and damage to adjacent private property, including houses, and private land (over 20,230 ha burned) was widespread. Proposals by the Forest Service to restore and reduce the flammability of forests drew considerable public debate and litigation.

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doi:10.1016/j.forpol.2004.07.003

The most controversial element of the Bitterroot proposal was a plan to salvage 0.8 million m^3 (176 million board feet) of damaged timber. Challenges to salvage harvesting raised important questions regarding the role of salvage in the reduction of fuels and the optimal design of salvage activities following a large fire.

This paper uses the Bitterroot National Forest case to examine salvage harvest strategies available to the government and the economic effects they may generate. When a salvage harvest is large in the context of the local market it can influence market-clearing prices, thereby affecting the decisions and welfare of other timber producers and of timber consumers. We estimate these market effects for the Bitterroot case study considering the effects of short-run increases in harvesting along with potential long-run harvest reductions linked to substantial losses of standing forest inventories on both public and private lands. Our findings suggest a structure for evaluating future salvage operations.

We also examine how the time interval between burning and salvage harvesting influences the economic effects and viability of the salvage efforts and how procedural requirements may affect this interval and therefore the flow of benefits. For public land, the length of this interval is largely determined by the administrative rules governing planning and environmental assessment as well as by administrative appeal procedures and litigation that may follow a decision. The consequences of delay are largely determined by the process of decay in the dead trees—i.e., salvage options are foreclosed as harvesting is delayed. Nearly 2 years transpired between the fire and the date at which salvage harvesting commenced on the Bitterroot National Forest, with the planning process alone requiring 15 months for completion. Agency efforts to expedite implementation of the resulting fire recovery plan were controversial and led to litigation.[1] A mediated settlement eventually reduced salvage harvests by about two-thirds (to 0.27 million m^3) and resulted in further delay.

In this paper, we first examine the effects of government salvage operations from a theoretical economic perspective and then estimate the economic effects that would have resulted from both the original Bitterroot National Forest fire recovery plan and the mediated settlement plan. The analysis considers the interaction of government and private timber producers in the marketplace, costs imposed on private producers, and benefits accruing both to the treasury through revenues and to consumers from the increased availability of timber products. We also address the intertemporal effects of harvest strategies and estimate the costs of delay related to administrative procedures and public challenges to the recovery plan. Salvage harvests provide a case where the length of the decision process may be mapped to real irretrievable costs. By computing these costs, we provide some insights into the general debate regarding the effects of what has been described as "process gridlock" in public land management in the United States. We close with some general observations on the implications of these findings for the design of future salvage operations.

2. Economic effects of timber salvage

Natural catastrophes that generate large quantities of dead or damaged timber yield a complex of economic effects (Holmes, 1991; Prestemon and Holmes, 2000). If damages are large enough, then the resulting sale of damaged timber can yield market-scale effects that affect all market participants. For example, salvage sales may shift supply outward so prices fall and producers of undamaged timber suffer losses compared to the no-salvage case. Depressed timber prices yield benefits to consumers of timber products—i.e., consumer surplus increases over the no-salvage case. In the long run, countervailing effects may arise: an initial decrease in timber prices may be followed by a period of higher prices due to losses of standing inventory and contracted supply. This has positive effects on producers of undamaged timber and

[1] In an attempt to expedite timber salvage, the Chief of the Forest Service requested that the USDA Undersecretary for Natural Resources approve the project rather than decision officers lower in the line (e.g., Forest Supervisor, Regional Forester, or the Chief himself). The undersecretary's approval of the project precluded administrative appeals that would have been coupled with automatic stays of action. The plan and the approval by the Undersecretary were challenged by lawsuits filed by seven environmental groups in U.S. District Court.