CHAPTER 11

FOREST DISTURBANCE IMPACTS ON RESIDENTIAL PROPERTY VALUES

Robert J. Huggett, Jr., Elizabeth A. Murphy, and Thomas P. Holmes

1. INTRODUCTION

Natural environments and the amenities they offer have fueled much of the population growth in the rural United States (Deller et al. 2001, English et al. 2000). In fact, the fastest growing counties in the United States during the early 1990s were non-metropolitan counties that were destinations for retirees or that offered outdoor recreation opportunities (Johnson and Beale 1994). Migration to these rural and exurban areas from urban and suburban locations, along with growth in the United States population, has resulted in an increased mixing of humans, their artifacts, and natural environments. These expanding interface and intermix areas expose more lives and property not only to desirable natural amenities, but also to natural disturbances and disamenities.

Households choose the type and amount of natural amenities, along with other structural, neighborhood, and environmental characteristics, in their location decisions. These amenities, such as access to recreation, viewshed, and air and water quality, are capitalized by housing markets into prices. Wildfires, pest outbreaks and other natural disturbances can alter the quantity and quality of amenities available to the household. Damage or destruction of the property itself or any of the surrounding amenities by natural disturbances affects that property’s value and if the impacts are widespread, the broader property market is impacted as well. Even in the absence of a disturbance event, property markets respond to the presence of disturbance risk alone since this risk represents the potential for future damages to property and natural amenities. In the context of this chapter, risk will refer to both the probability of a disturbance event and the probability of the loss associated with an event.

The primary theoretical framework for studying the relationship between a property’s portfolio of characteristics and its price is based on the hedonic model of Rosen (1974). The application of this theory to property markets is known as the hedonic property model (HPM). The empirical use of the HPM in the literature is extensive as it is a popular method to explain the effect of trees, forests, and
woodland on residential property markets. Morales (1980), Anderson and Cordell (1985), and Dombrow et al. (2000) examine how residential prices respond to the presence of trees. The relationship between urban forests and housing prices in Finland is treated by Tryväinen (1997) and Tryväinen and Miettinen (2000). Price response to woodland in Great Britain is the subject of work by Garrod and Willis (1992a). The effects of open space, a more general classification, on property prices are considered by Geoghegan et al. (1997), Acharya and Bennett (2001), Shultz and King (2001), and Geoghegan (2002).

Despite the depth of literature using the HPM to look at how forest and woodland amenities impact property prices, there are far fewer examples which examine the impacts of forest disturbances and the risks they represent. Price-waterhouseCoopers (2001) performed an analysis of how the Los Alamos, New Mexico real estate market responded to the 2000 Cerro Grande fire. The results report a temporary dip in prices of 3 percent to 11 percent following the fires. No insight is offered on the possible cause for this drop—a shock to the overall housing market, the loss of forest amenity, or an increased awareness of wildfire risk. Loomis (2004) estimates that house prices in Pine, Colorado decreased by approximately 15 percent following the Buffalo Creek fire due to updated risk perceptions and the loss of forest amenity. In a study of the Flagstaff, AZ property market, Wells (2001) reports that households place a higher value on medium canopy density vs. high canopy density. Lower risk of fire and increased viewshed afforded by medium canopy closure are offered as possible explanations. Donovan et al. (2007) find that the publication of a website that rated wildfire risk in the wildland-urban interface of Colorado Springs had an impact on housing price.

Payne et al. (1973) provide an accounting procedure for calculating property value losses from gypsy moth damage, which was based on a hedonic study of the contribution of trees to property value in Massachusetts (Payne and Strom 1975). Derived from the later published hedonic study, an equation was presented which describes the relationship between the number of trees on a lot and the dollar amount those trees contribute to property values. Using data on tree mortality from insect infestations, lost property value is calculated as the difference between pre-attack and post-attack valuations. However the model does not account for lost value from trees that are unsightly or unhealthy, nor does it consider the nuisance impact of gypsy moths.

Garrod and Willis (1992b) suggest that replacing mature conifers, which reduce price in their study when located within 1 km of a house, with other species would result in lower disamenities. However they offer no insight into the nature of the disamenities. Geoghegan et al. (1997), Tryväinen (1997), and Schultz and King (2001) report negative relationships between some natural amenity variables and housing prices but do not suggest the risk or realization of disturbances as a reason. The response of property prices to other natural hazards, such as earthquakes, volcanoes, and hurricanes, has received treatment by Brookshire et al. (1985), Bernknopf et al. (1990), Beron et al. (1997), and Bin and Polasky (2004).