MOUNTAIN PINE BEETLES AND COLORADO FORESTS

Silverthorne Community Re-Survey Report

Introduction

This report describes changes in community reactions to the mountain pine beetle (*Dendroctonus ponderosae*) outbreak and resulting changes in north central Colorado forests. In 2006, a project was initiated to assess community responses to forest disturbance by mountain pine beetles. The full study included nine communities: Breckenridge, Frisco, Dillon, Granby, Kremmling, Silverthorne, Steamboat Springs, Vail, and Walden. This report focuses on responses from the community of Silverthorne.

In 2007, 4,027 survey questionnaires were mailed to randomly selected households with addresses in the study communities. 1,346 completed surveys were returned (181 surveys received from Silverthorne), yielding an aggregate response rate of 38.9%, accounting for undeliverable surveys. Findings from the 2007 survey provided baseline information regarding community residents' risk perceptions, public relationships with land managers, environmental attitudes about forest management, and local action capacities in the context of forest disturbances caused by bark beetles.

A re-study mail survey was sent in 2018 to those original respondents from the 2007 survey and an additional sample of 3,000 households randomly selected from a database from USADATA. In 2018, 177 of the 1,130 completed surveys were received from Silverthorne. Findings from the 2018 survey were compared to 2007 survey results to assess how attitudes and actions within Silverthorne have changed over time.

Perceptions of Beetle Impacts

Respondents were asked to indicate perceptions of forest mortality, natural regeneration, and beetle impacts. As in 2007, survey respondents rated the level of tree mortality they observed in and around Silverthorne on a scale from 1 (no pines are dead) to 5 (all pines are dead). Similarly, respondents were asked to indicate the extent of regeneration they perceived in and around Silverthorne on a scale from 1 (no natural re-growth) to 5 (much natural re-growth). Perceptions of tree mortality and natural regeneration are depicted in Figures 1 and 2. In 2018, survey respondents in the Silverthorne area indicated perceiving an increased degree of tree mortality (mean of 3.5 compared to 3.1 in 2007), but also perceived more natural regeneration (mean response 3.1 compared to 2.2 in 2007).

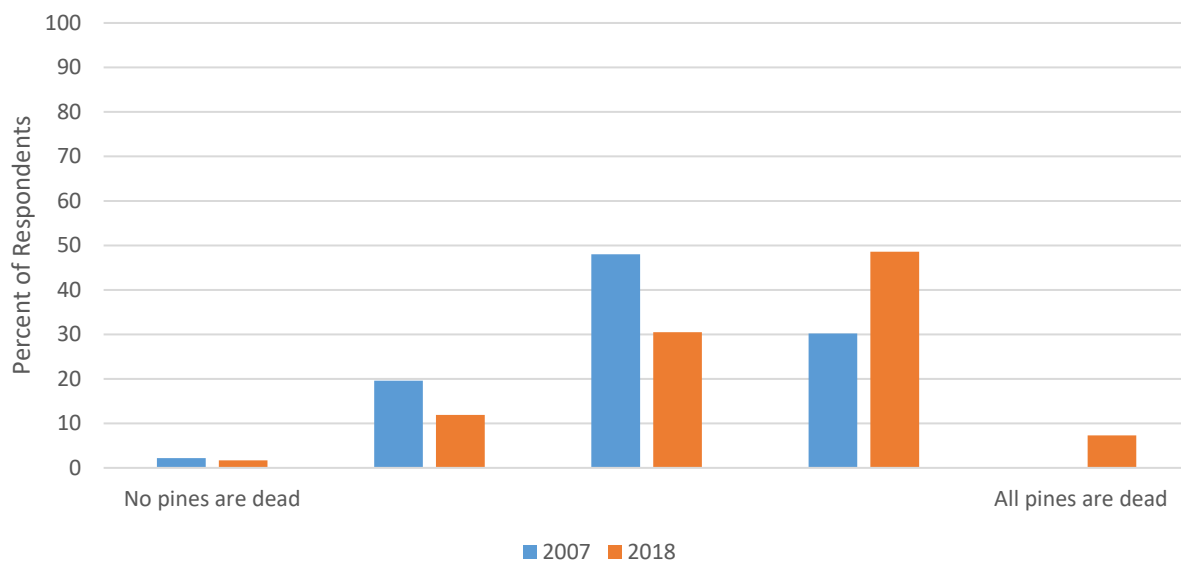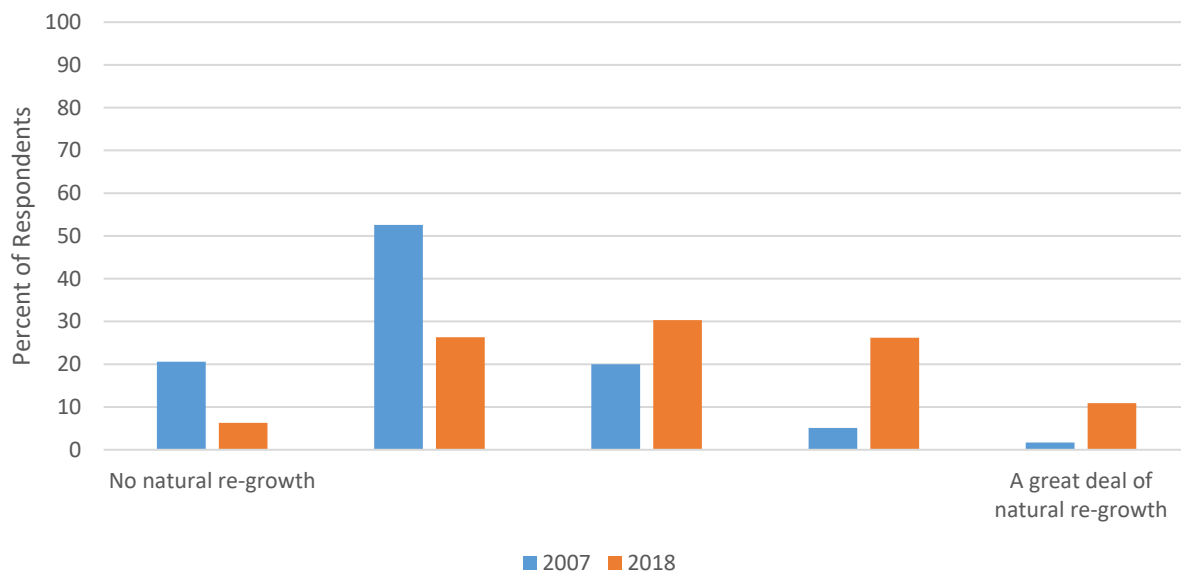Hua James Qin • Christine Sanders • Elizabeth Prentice • Jamie Vickery | UNIVERSITY OF MISSOURI-COLUMBIA & UNIVERSITY OF COLORADO BOULDER

Figure 1: Perceptions of Tree Mortality

Percent of Respondents

No pines are dead — All pines are dead

■ 2007 ■ 2018

Figure 2: Perceptions of Natural Regeneration

Percent of Respondents

No natural re-growth — A great deal of natural re-growth

■ 2007 ■ 2018

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In both years, Silverthorne respondents were asked to identify and rate the impacts from the mountain pine beetles on a graduated scale from 1 (very negative) to 5 (very positive). The bars in Figure 3 indicate the percent of respondents who indicated observing each mountain pine beetle impact in and around their community. Respondents indicated lower level of impact regarding most issues compared to 2007. The most frequently selected observations for 2018 respondents were "fire hazard", "falling trees", and "visual/aesthetic loss". The least frequently indicated impacts in 2018 were "impact on tourism", "affected property values", and "expanded timber industry".

The bars in Figure 4 indicate the mean values for each impact according to the answers of respondents, arranged left to right from most positively perceived impacts to most negatively perceived impacts. "Increased ecological awareness", "availability of firewood", and "rejuvenation of forest" were indicated as positive impacts of mountain pine beetles (having a mean greater than 3.5). Survey respondents had relatively more positive views in 2018 regarding many impacts such as "logging and land clearing", "emerging view on property", "affected property values", "tree clearing cost", and "visual/aesthetic loss", as compared to the 2007 survey. They also had slightly more negative views regarding "job creation", "trail and forest accessibility", and "falling trees".

Figure 3: Mountain Pine Beetle Impacts

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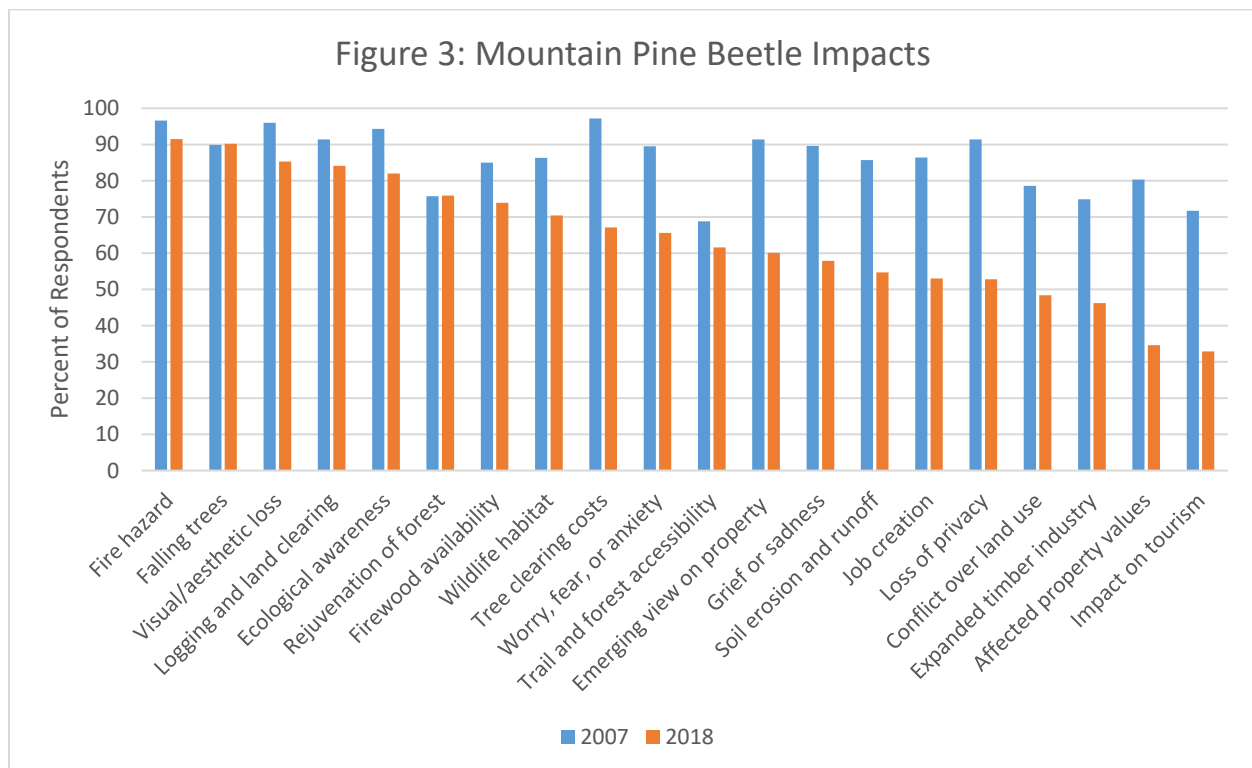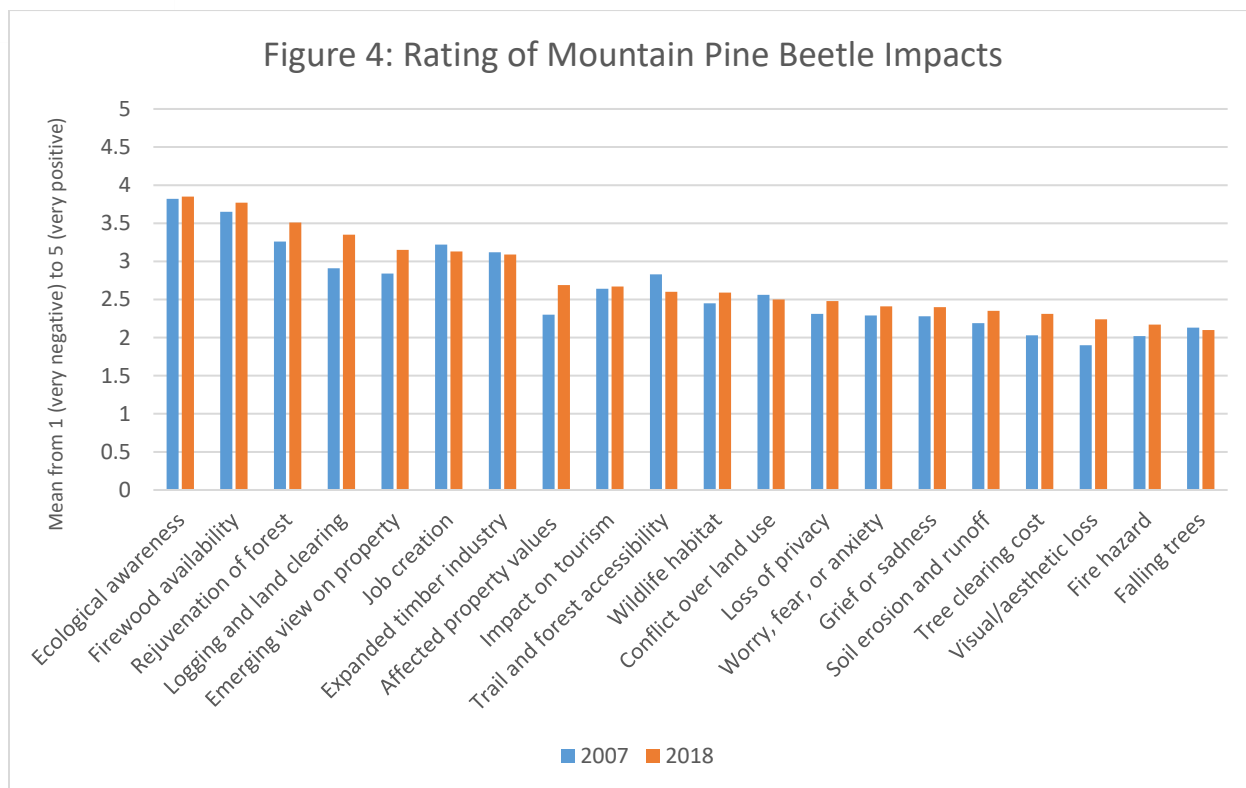
Figure 4: Rating of Mountain Pine Beetle Impacts

Forest Risk Perceptions

Forest risk perceptions were measured with a scale from 1 (not concerned) to 5 (extremely concerned). The bars in Figure 5 indicate the mean values for each concern according to the answers of respondents, arranged left to right from highest levels of concern to lowest levels of concern. While levels of concern remained generally elevated, respondents expressed less concern about most issues compared to 2007, with the exceptions of "forest fire" and "falling trees", which were shown to be of greater concern to 2018 respondents. In 2018, the highest rated concerns were "forest fire", "falling trees", and "loss of scenic/aesthetic quality". The lowest rated concerns for the area were "impact on livestock grazing", "loss of tourism and recreation opportunities", and "loss of community identity".

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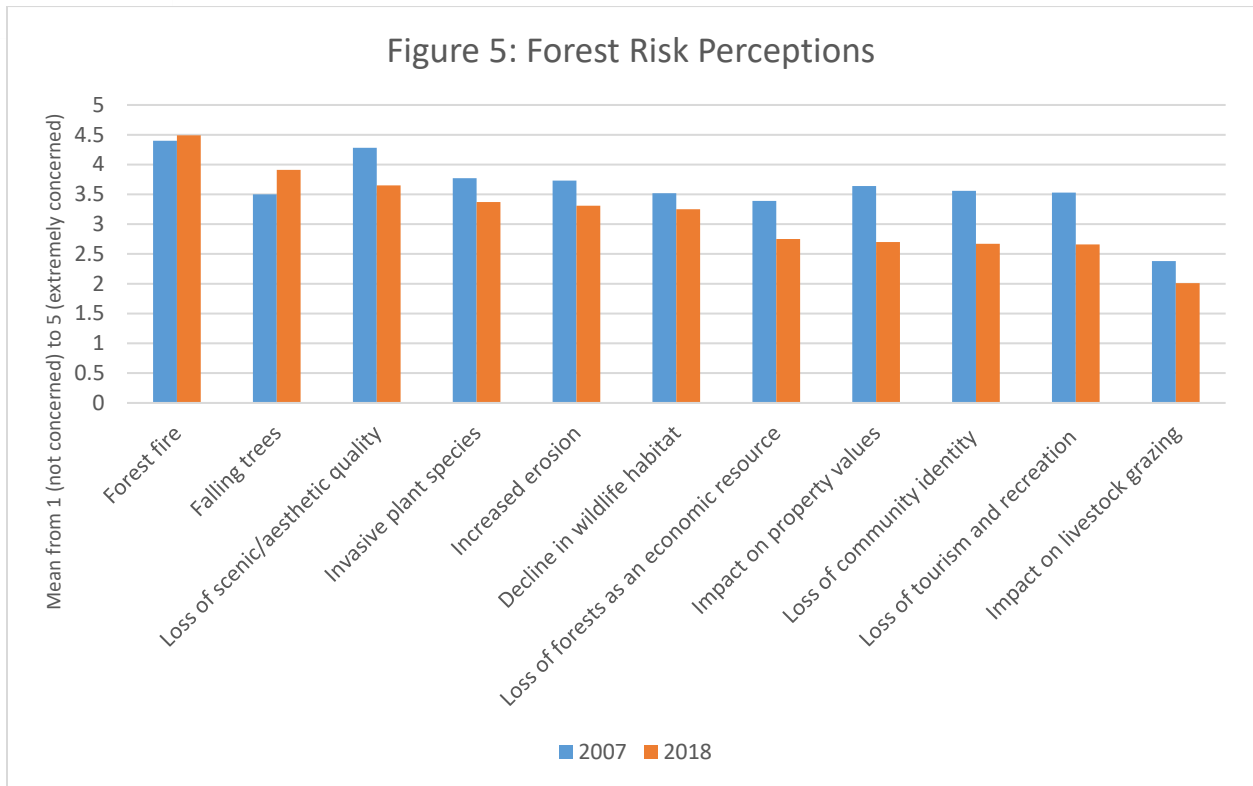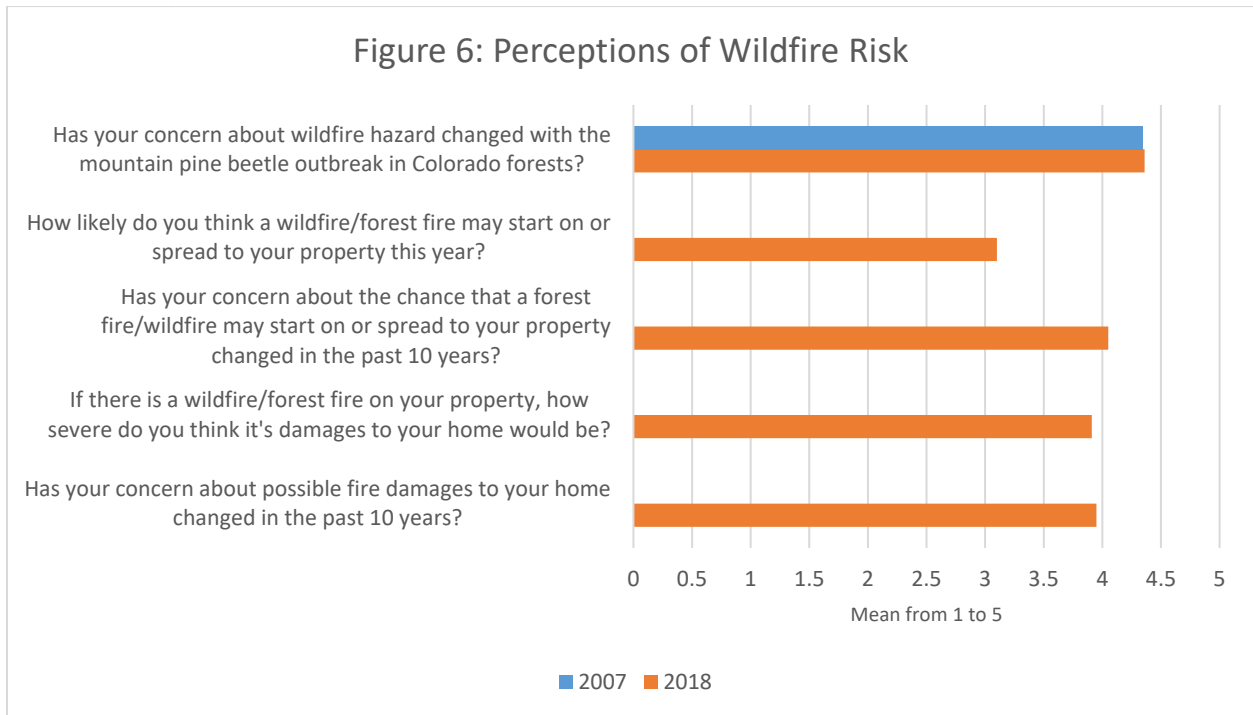
Figure 5: Forest Risk Perceptions

Figure 6 shows perceptions of wildfire risk. For the questions "has your concern about wildfire hazard changed with the mountain pine beetle outbreak in Colorado forests," "has your concern about the chance that a wildfire/forest fire may start on or spread to your property changed during the past 10 years," and "has your concern about possible fire damages to your home changed during the past 10 years," perceptions were measured on a scale from 1 (strongly decreased) to 5 (strongly increased). For the question "how likely do you think a wildfire/forest fire may start on or spread to your property this year," perceptions were measured on a scale from 1 (not likely) to 5 (very likely). For the question "if there is a wildfire/forest fire on your property, how severe do you think its damages to your home would be," perceptions were measured on a scale from 1 (not at all severe) to 5 (very severe).

The only question to appear in both survey years was "has your concern about wildfire hazard changed with the mountain pine beetle outbreak in Colorado forests?" Similar to 2007, 2018 respondents indicated an increased level of concern regarding wildfire risks with the mountain pine beetle outbreak (with means of 4.4 in both years). In the 2018 survey, the respondents also indicated elevated levels of concern (mean larger than 3.5) over the past 10 years regarding the chance a forest fire/wildfire may start or spread to their property and the severity of possible fire damages to their home.
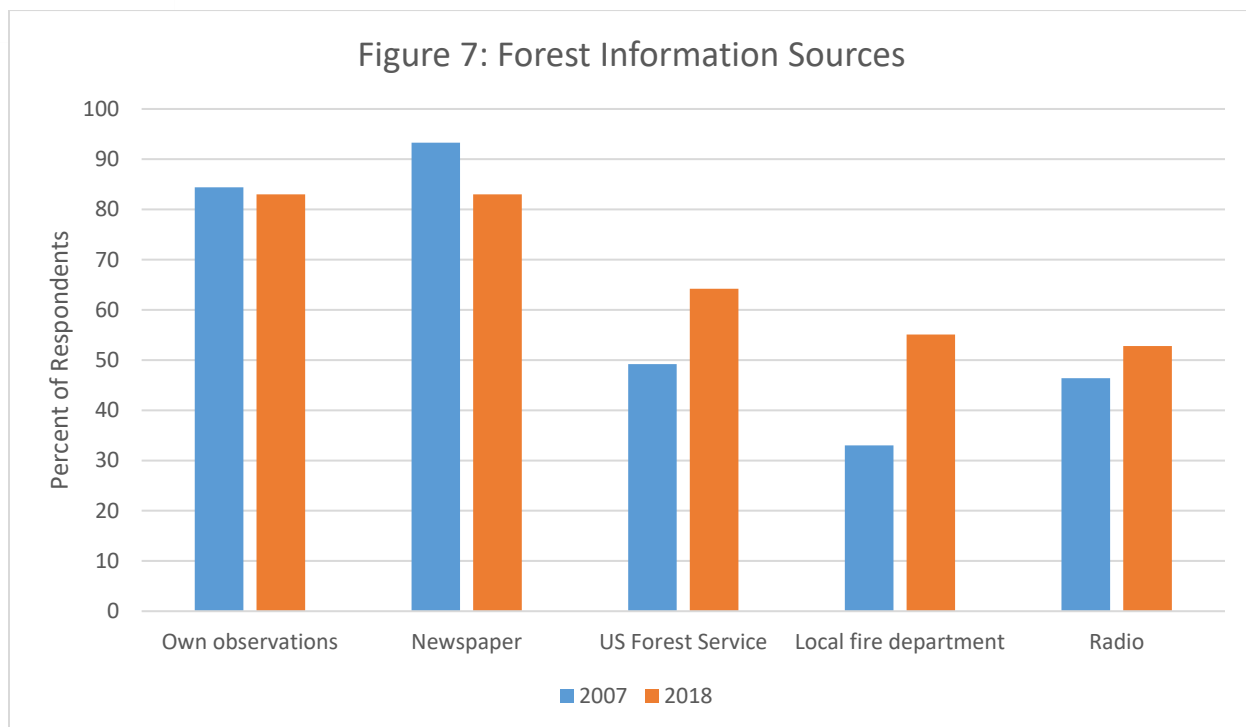
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Figure 6: Perceptions of Wildfire Risk

Has your concern about wildfire hazard changed with the mountain pine beetle outbreak in Colorado forests?

How likely do you think a wildfire/forest fire may start on or spread to your property this year?

Has your concern about the chance that a forest fire/wildfire may start on or spread to your property changed in the past 10 years?

If there is a wildfire/forest fire on your property, how severe do you think it's damages to your home would be?

Has your concern about possible fire damages to your home changed in the past 10 years?

Mean from 1 to 5

■ 2007 ■ 2018

Sources of Forest Information

Respondents were asked to indicate which sources of information they relied on regarding forest issues. The percentages of respondents indicating reliance on the top five sources are displayed in Figure 7. The most popular sources of forest information for respondents in the area included "own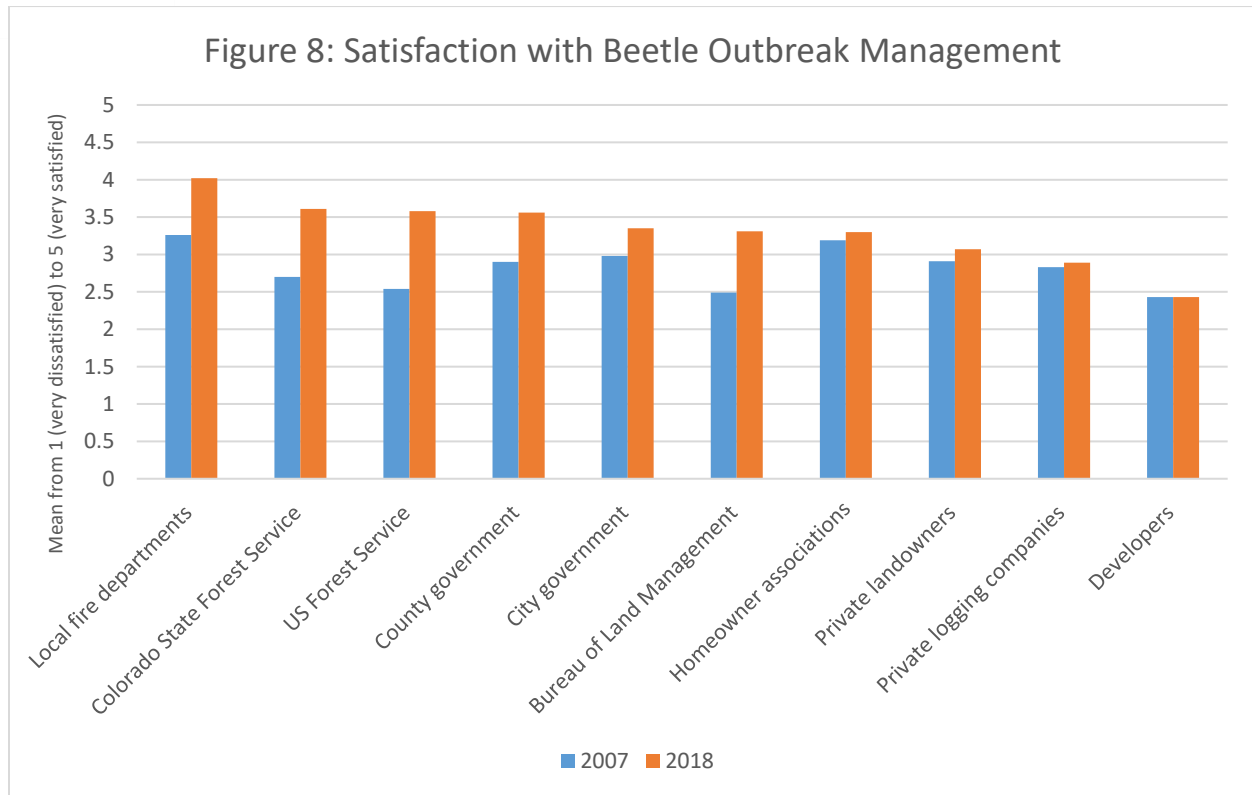 observations", "newspapers", and "US Forest Service". In the 2018 survey, respondents in the Silverthorne area reported increased reliance on "US Forest Service", "local fire department", and "radio" but decreased use of "newspapers" as sources of forest information compared to 2007.

Figure 7: Forest Information Sources

Figure 7: Forest Information Sources

Satisfaction with Management

In both 2007 and 2018, respondents were asked to indicate their level of satisfaction with entities involved with the management of the pine beetle issue on a scale from 1 (very dissatisfied) to 5 (very satisfied). The mean ratings for each entity are displayed in Figure 8. In 2018, respondents indicated satisfaction (mean at or above 3.5) with "local fire departments", "county government", "Colorado State Forest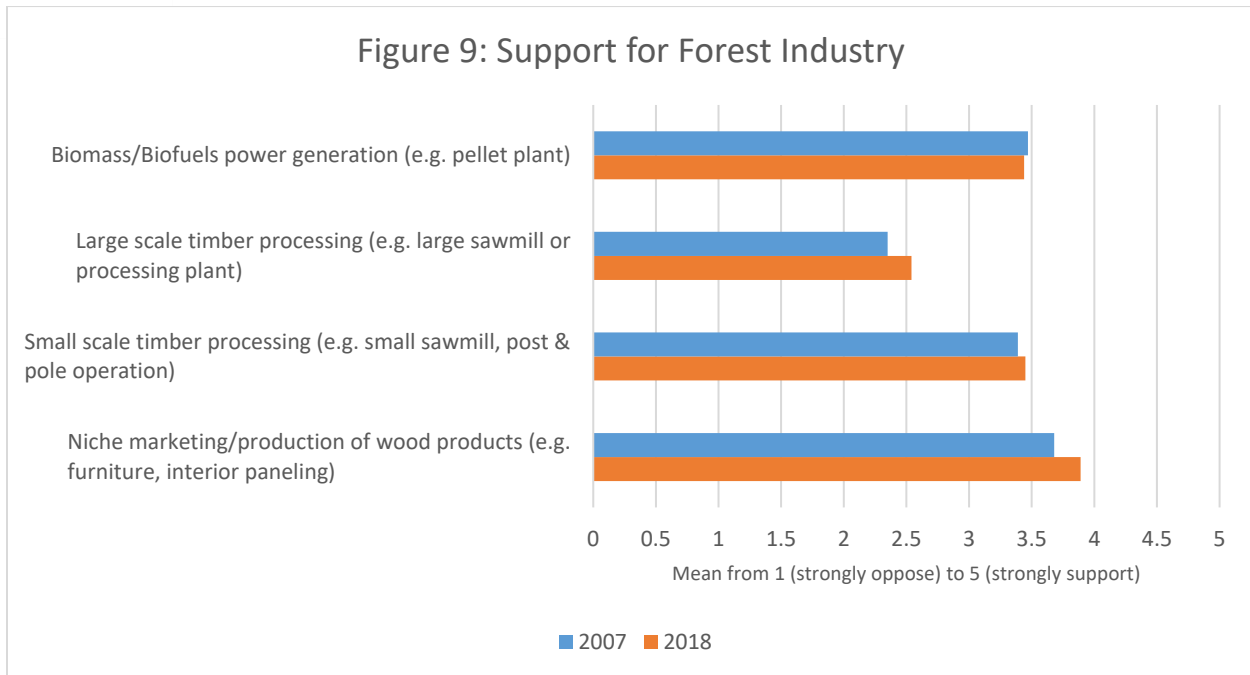 Service", and "US Forest Service". Increased levels of satisfaction with all land management entities were indicated, with the exception of "developers", as compared to the 2007 survey. Notably, Silverthorne area respondents in 2018 indicated relatively higher levels of satisfaction with "local fire departments", "county government", "Colorado State Forest Service", "Colorado State Forest Service", "US Forest Service", and "Bureau of Land Management".

Figure 8: Satisfaction with Beetle Outbreak Management

Mean from 1 (very dissatisfied) to 5 (very satisfied)

Categories: Local fire departments, Colorado State Forest Service, US Forest Service, County government, City government, Bureau of Land Management, Homeowner associations, Private landowners, Private logging companies, Developers

■ 2007 ■ 2018

Respondents were also asked to indicate their level of support for several industry options in or near Silverthorne, including "biomass/biofuels power generation (e.g., pellet plant)," "large scale timber processing (e.g. large sawmill or processing plant)," "small scale timber processing (e.g. small sawmill, post & pole operation)," and "niche marketing/production of wood products (e.g. furniture, wood paneling)".

Respondents indicated their support on a scale from 1 (strongly oppose) to 5 (strongly support). Mean values for each option are displayed in Figure 9. Similar to 2007, the 2018 respondents were moderately supportive of all industry options (mean above 3.0), with the exception of "large scale timber processing". In general, support for industry options slightly increased from 2007 to 2018 surveys.

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Figure 9: Support for Forest Industry

Mean from 1 (strongly oppose) to 5 (strongly support)
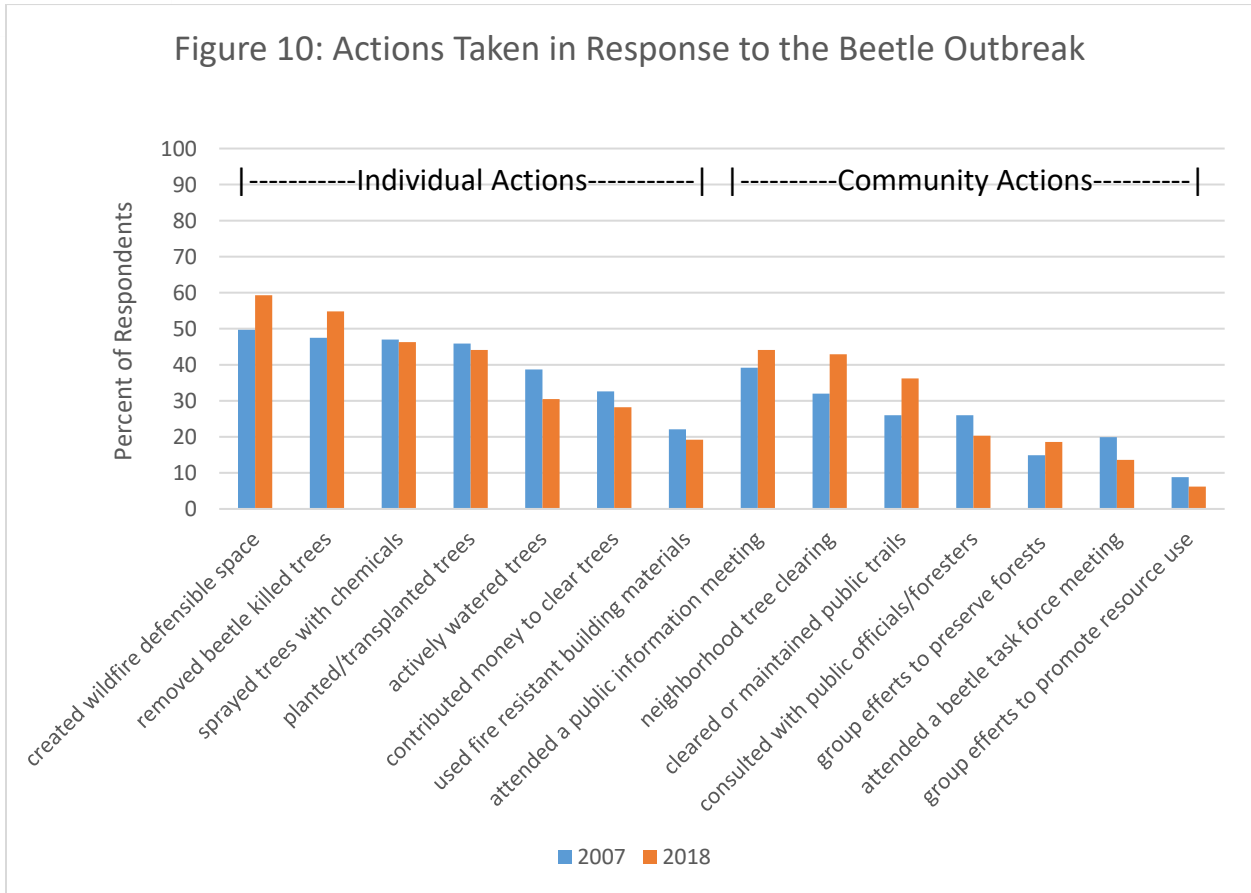
■ 2007 ■ 2018

Response to the Beetle Outbreak

Respondents were asked to indicate if they had participated in a series of actions in response to the mountain pine beetle. Figure 10 shows the percent of all respondents who undertook various activities, both as individuals and as part of community efforts. Overall, for both years, the proportion of respondents indicating participation in individual/household activities (on the left side) were higher than the proportion of those indicating participation in community related activities (on the right side). For individual actions, creating wildfire defensible space near structures, removing beetle killed trees, and spraying trees with chemicals were the most actively reported activities for respondents in both 2007 and 2018. Creating wildfire defensible space remained

the most frequent individual activity in the 2018 survey responses. The resurvey respondents reported increased activity in creating wildfire defensible space and removing dead trees and decreased activity in other individual actions, particularly tree watering activity and contributions of money to Homeowner Association efforts to clear trees. Regarding community responses, respondents reported mixed frequencies of participation in surveyed community actions, with notable increases in public information meeting attendance, neighborhood tree clearing, and public trail clearing or maintenance, and decreases in consultations with public officials/foresters and beetle task force meeting attendance in 2018, as compared to the 2007 survey.

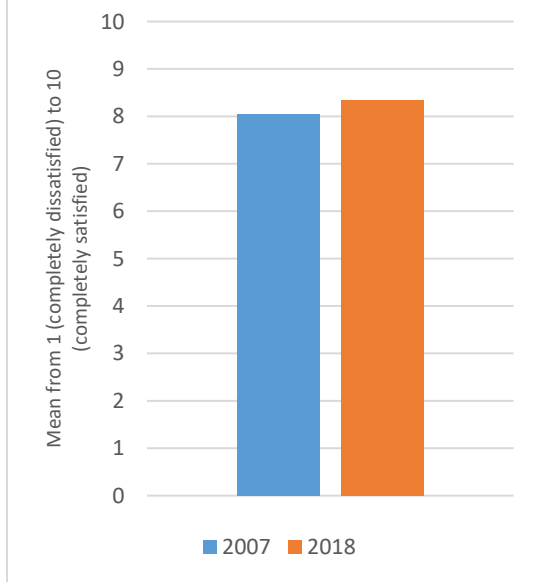Figure 10: Actions Taken in Response to the Beetle Outbreak

Community Experience and Participation

Both surveys also contained questions related to respondents' community experience and participation in Silverthorne. Respondents were asked to indicate their level of satisfaction with 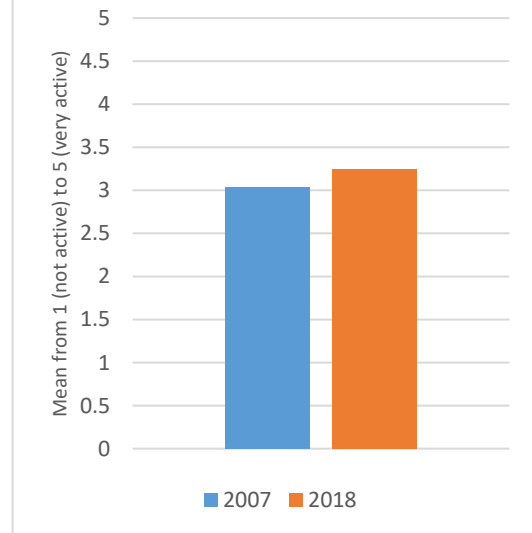Silverthorne as a place to live on a scale from 1 (completely dissatisfied) to 10 (completely satisfied). Mean responses for both years are indicated in Figure 11. In both 2007 and 2018, survey respondents indicated a high level of satisfaction with Silverthorne as a place to live.

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Figure 11: Satisfaction with Silverthorne Community

Mean from 1 (completely dissatisfied) to 10 (completely satisfied)

2007   2018

Figure 12: Community Involvement in Silverthorne

Mean from 1 (not active) to 5 (very active)

2007   2018

In addition to their satisfaction with Silverthorne as a place to live, respondents were asked to describe their personal level of involvement in Silverthorne or local area activities or events on a scale from 1 (not active) to 5 (very active). Mean responses for community participation are indicated in Figure 12. In 2018, respondents indicated a slightly increased level of personal participation in Silverthorne community or local area activities compared to 2007.

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Respondents were asked to rate certain aspects of community life on a scale from 1 (very poor) to 5 (excellent). Mean responses are indicated in Figure 13. In 2018, Silverthorne respondents indicated all surveyed community attributes as positive (mean greater than 3.5), with the exception of "availability of affordable housing". Generally, respondents indicated slightly more positive views of the various aspects of community life in 2018, as compared to the 2007 responses, with the exception of a slightly poorer rating for "availability of affordable housing".

Figure 13: Silverthorne Community Attributes

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