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FINDINGS

"There are woods that are plain to look at, but not look into..." ALDO LEOPOLD (1887-1948)

PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES-FORESTRY ARCHIVE

Firewood Use in Wisconsin State Parks and Forests: 2006 and 2008

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INTRODUCTION

This report addresses the transport and use of firewood in Wisconsin's state parks and forests. It is based on surveys conducted for the Wisconsin Department of Natural Resources (Wisconsin DNR) in 2006 and 2008 (Nelson and Peterson 2007, Peterson and Nelson 2009). The looming invasion of the emerald ash borer (*Agrilus planipennis* Fairmaire), an invasive wood-boring beetle that attacks ash (*Fraxinus*) trees, provides the motivation for documenting our findings.

Since its discovery in southeastern Michigan in 2002 (Haack et al. 2002), the emerald ash borer has destroyed millions of ash trees in Illinois, Indiana, Maryland, Michigan, Missouri, Ohio, Ontario, Pennsylvania, Quebec, Virginia, West Virginia, and now Wisconsin (Poland 2007, Wisconsin DATCP and Wisconsin DNR 2008, Wisconsin DATCP 2009). The beetle has few known natural enemies and attacks both healthy and stressed trees alike. It typically disperses less than a mile or so per year, so its rapid spread across Wisconsin's neighboring states stems mainly from the movement of infested ash nursery stock, logs, and firewood into uninfected areas (Cappaert et al. 2005, Muirhead et al. 2006, Poland and McCullough 2006).

Authorities have attempted to curtail the transport of firewood, but with modest success. Despite the imposition of quarantines, campers have continued to bring campfire wood on summer trips. For example, the Michigan Department of Natural Resources reported that "of the 8,096 campers whose firewood state park rangers inspected, 1,654 had brought it from a quarantined area, and 114 of them arrived with loads of firewood already showing signs of the bug...a big problem is fighting the family ritual of bringing campfire wood on summer trips" (Egan 2007). Given this evidence, we sought to investigate the extent to which Wisconsin state parks and forests may be at risk, and how firewood transport could be discouraged.

METHODS

We administered three-wave mail surveys in December 2006 and December 2008. Reserve America, the Wisconsin DNR's campground reservation agent, drew random samples from which we selected 800 names for each survey. These were campers who had reserved one or more sites at a Wisconsin state park or forest during the respective years. We measured camper attitudes, behaviors related to camping and firewood transport, and features of firewood supplies at and near specific state forests and parks. We also asked why campers brought firewood from home. In addition, in our 2008 survey we asked questions to help determine if various education efforts, regulations, and notices had influenced camper transport of firewood, and which of these efforts campers thought were most informative and/or persuasive. We also asked how firewood quality could be improved inside the parks, and whether campers transported firewood when they visited private or county campgrounds. Campers returned 479 usable questionnaires in 2006 and 495 in 2008 (62% and 64% response rates, respectively).

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RESULTS AND DISCUSSION

The discussion that follows contrasts results from our two surveys. Most percentages shown have been rounded.

Highlights

In 2008, camper awareness of the emerald ash borer had increased:

- *Only about 35% of campers had either "never heard of" this insect, or had "heard of it but not very much". This compares with 71% who responded similarly in 2006.*
- *Approximately 92% of campers were aware of the firewood transport/emerald ash borer link. This corresponds with roughly 68% in 2006.*
- *Slightly more than 94% of campers were aware of the 50-mile firewood transport limit in Wisconsin. Only 67% were aware of this regulation in 2006.*

Camper attitudes related to the emerald ash borer and firewood transport improved:

- *In 2008, only 5% of survey respondents thought that the emerald ash borer was less than a moderate size threat. This figure was 12% in 2006.*
- *Approximately 5% felt that stopping long distance firewood transport was not important in 2008. In 2006, 22% felt this way.*

Most importantly, firewood movement behavior improved:

- *When asked if the 50-mile transport limit had changed the way they got or moved firewood, slightly more than 58% of campers responded "yes" in 2008. This question was not asked in 2006.*
- *Approximately 21% of respondents moved firewood in bulk to and/or from their homes (e.g., a trailer or truckload) in 2008. This represents a decrease from 2006, when 27% answered "yes".*
- *On average, campers moved firewood in bulk slightly less than five times in the last two years, and over distances that averaged 33 miles. Figures for 2006 were eight times and 55 miles, respectively.*
- *On their most recent camping trip, roughly 27% of campers in 2008 brought at least some of their firewood from home or a distant location. This represents a sizable reduction from 2006, when roughly 44% reported doing so.*

The Wisconsin DNR can do more to reduce firewood transport:

- *From 2006 to 2008, the percentage of campers who were satisfied with firewood supplied inside state parks or forests decreased.*
- *At the same time, the percentage of campers who were "quite dissatisfied" or worse increased.*

Camping and Campers at a Glance

Summary statements for each 2008 survey question follow. Corresponding data from 2006 are either discussed briefly or provided in brackets.

- *Campers at 42 of 45 state parks and forests responded to the survey in 2008. They camped from May through November, and the most popular month was October. Data for all 45 parks and forests were obtained for 2006, and the most popular month that year was August.*
- *On average, campers spent slightly more than four days on their most recent trip, drove 150 miles one-way, and included four in their immediate camping party. [Four days, 150 miles, and five in-party campers in 2006.]*
- *Approximately 65% took more than one camping trip to Wisconsin state forests and parks. [55% in 2006.]*
- *Campers think that campfires are important. In fact, 87% said that campfires are extremely important. [89% in 2006.]*
- *Almost 92% of survey respondents had a campfire on their most recent trip. [93% in 2006].*
- *Generally, campers used plenty of firewood. In fact, more than 78% used at least 4-6 armload size bundles or more. [75% in 2006.]*
- *Approximately 51% of campers used all of their firewood on their trip, but many moved what they didn't use either to the next campground they visited (1%) or back home (15%). This represents a marked improvement from figures of 40%, 3%, and 19%, respectively, in 2006.*

Where Campers Got Their Firewood

Campers cited their primary source of camping firewood as follows. Results show improvement since 2006:

- *Bought inside the park or forest where they camp – 47%. [39% in 2006.]*
- *Bought near the park or forest – 17%. [13% in 2006.]*
- *Cut on own property – 13%. This option was frequently written in as "Other" in 2006 (percentage not calculated).*
- *Gathered inside park or forest – 9%. [6% in 2006.]*

For their most recent trip to a state park or forest, campers reported getting their firewood from multiple sources. These figures also show improvement from 2006:

- *Inside the campground (bought or gathered) – 66%. [57% in 2006.]*
- *Near the campground (typically, bought) – 29%. [24% in 2006.]*
- *Brought from home or a distant (from the campground) location – 27%. [44% in 2006.]*

When asked to rate this firewood in terms of quality, price, and convenience, the least favorably rated feature was price – for sources both inside and near their campground. The same results were obtained in 2006.

Campers seemed to be less satisfied with the firewood they got inside the park or forest than near it. Compared to 2006, they were also less satisfied with supplies provided inside the park and more satisfied with those provided nearby (Percentages at least "quite satisfied" are shown.):

- *Inside the campground – 63%. [67% in 2006.]*
- *Near the campground – 67%. [62% in 2006.]*

Many campers were "quite dissatisfied" or worse, a situation that seems to be increasing for supplies provided inside:

- *Inside the campground – 13%. [9% in 2006.]*
- *Near the campground – 6%. [6% in 2006.]*

The reasons campers cited for bringing firewood were roughly the same as in 2006, and included:

- *We had firewood at home that we wanted to use – 36% of total responses.*
- *The price of firewood inside or near this state park or forest is too high – 19%.*
- *We had firewood left over from a previous camping experience – 14%.*

When asked if they had camped at any private, county, or other non-State of Wisconsin campgrounds this season, roughly 39% answered yes. Of these, 36% said that they had brought along firewood from home. These questions were not asked in 2006.

Roughly 21% of all respondents also moved firewood in bulk to or from their homes, often to supply their camping needs. The average number of such moves during the last two years was 4.7; the average distance traveled was 33 miles. These are improvements over 2006, when figures were 27%, 7.6 times, and 55 miles, respectively.

When asked to rate the relative importance of firewood quality, price, convenience, and reliability of supply, respondents said that price was most important and ranked quality next. This was also true in 2006.

Awareness of the Emerald Ash Borer and Firewood Transport Limits

Campers have become more aware of the emerald ash borer and firewood transport limits:

- *In 2008, only 35% had heard "nothing" or "not very much", in contrast with 71% who answered this way in 2006.*
- *Most who had heard were informed at the park or forest. Other important sources were newspapers, television, and the Internet; park or forest, newspapers, and television were cited most frequently in 2006.*
- *Of these sources, the ones cited as most persuasive in 2008 were state parks and forests (rated #1), newspapers (#2), and Wisconsin DNR's Internet site (#3). This question was not asked in 2006.*
- *Roughly 92% knew (before seeing this survey) that the transport of firewood is how forest pests are dispersed. [68% in 2006.]*
- *Approximately 94% were aware that firewood movement to state parks and forests from distances greater than 50 miles is not allowed. [67% in 2006.]*
- *Campers learned about this transport limit from a variety of sources, including state parks and forests, during campsite registration, a Wisconsin DNR postcard, and Wisconsin DNR's Internet site. Sources were similar in 2006, except for "during campsite registration," which was not an option then.*
- *The sources cited as most informative by campers in 2008 were state park or forest (rated #1), DNR's Internet site (#2), and posters seen in convenience stores (#3). This question was not asked in 2006.*
- *When asked if they had changed the way they get or move firewood as a result of the 50-mile transport limit, slightly more than 58% said "yes". This question was not asked in 2006.*
- *Slightly more than 64% said that they were asked if they had brought firewood along when they checked in at the campground on their most recent trip. This question was not asked in 2006.*

Camper Attitudes Related to the Emerald Ash Borer

Camper attitudes have changed with respect to the size of the emerald ash borer threat.

- *In 2008, only 5% thought that emerald ash borer was less than a moderate size threat. This percentage was 12% in 2006.*
- *Similarly, approximately 5% felt that stopping long distance transport of firewood was not important in 2008, whereas 22% felt this way in 2006.*

Firewood Improvements

We asked several questions regarding firewood improvements in our 2008 questionnaire. Comparable questions were not asked in 2006.

- *When asked to rate the importance of improvements to firewood supplies, campers said that keeping firewood supplies dry and protected should come first.*
- *When asked about the earliest and latest times that in-campground firewood should be available, campers responded with times that averaged roughly 8:30 am and 9:00 pm.*

RECOMMENDATIONS

One of the primary conclusions to be drawn from this study is that efforts to educate the public ***have*** worked. It is also clear that more remains to be done. Many campers are dissatisfied with the firewood that is available to them, and cite this as an important reason for their bringing it along. Given their dissatisfaction, these campers are likely to resist further efforts to curtail their transporting habits.

Although many out-of-state campers bring firewood on their camping trips, even larger numbers, and percentages, of in-state residents transport – especially those who cut firewood on their own woodlots or at home. Given the cost advantages and often shorter travel distances enjoyed by these residents, these campers may be especially reluctant to change their firewood habits.

Many additional analyses are possible using the data gathered in these surveys. Useful insights could follow from analysis of the variables that may influence compliance with firewood transport rules. For example, out-of-state campers seem less likely to bring along firewood due to transport costs and limited cargo space, but do firewood availability, quality, price, and convenience at campgrounds also act to influence this? Another approach would develop predictive models of compliance using these and other variables. A third general approach relates to camper satisfaction. Given that compliance with firewood transport rules seems to have grown since 2006, but that satisfaction with firewood supplies provided inside state parks and forests has declined, it follows that campers are conscientious. But if they're growing less satisfied with the firewood supplied, achieving higher levels of compliance may be difficult.

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