# Family Forest Owners Appraise the Effectiveness and Value of Wildland Weeds Control Methods

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## Introduction

Family forest owners control nearly two-thirds of the private forest land in the United States and, thus, have a large impact on the nation's environmental quality. Their holdings tend to be in small tracts; nearly half are less than 100 acres in size (Butler 2008). The opinions, perceptions, and motivations of these family forest owners lead to forest management decisions that have great impact on the health of the nation's forests, especially the ever-growing problem of invasive species. Clearly, their perceptions on the effectiveness of various control methods, along with benefit/cost issues, will determine how active a role they play in invasive species control.

Focus groups are commonly used to gain understanding about public views on natural resource issues. We used them to evaluate forest owner perceptions concerning chemical and mechanical control methods for Chinese privet (*Ligustrum sinense*), an invasive woody shrub imported from China in the mid-nineteenth century (Miller 2003). It dominates mesic forest understory throughout the southeastern United States and is an aggressive, shade-tolerant invasive, particularly in bottomland hardwood forests, where it produces abundant seeds that are widely spread by birds and water drainages (Langeland and Burks 1998). Many different treatment methods have been tested in attempts to control Chinese privet: foliar, basal, and stump herbicide applications; biological control, mechanical treatment, and prescribed burning (Harrington and Miller 2005, Williams and Minogue 2008). Our field examples attempted to mimic established treatments.

The focus groups provided an opportunity to both analyze what made family forest owners perceive various control methods to be effective and how they evaluated the benefit/cost relationship of each method. The focus groups facilitated the communication, understanding, and integration required to effectively connect on-the-ground invasive plant management with scientific research (Renz et al. 2009). Rather than quantitative data, focus groups provide shared perspectives from a combined local demographic and elicit often surprising information through conversational clues and repeated words or ideas (Grudens-Schuck et al. 2004).

Our objective was to get feedback on a specific invasive plant species, Chinese privet, in South Carolina's bottomland forests, but at the same time to identify the factors that forest owners use in evaluating forest management techniques like chemical and mechanical control. We also stressed perceptions on economic feasibility from the forest owners. Unlike the conventional indoor setting used for most focus groups, we took participants to see varying herbicide treatment areas in the field, walking through various levels of infestation, and stopping at strategic evaluation points. They experienced all the natural factors that affect owners' perceptions of treatment effectiveness, i.e. insects, heat, and humidity. Participants were able to give very specific on-site perceptions of treatment efficacy.

## Methods

Field focus groups require site selection and planning, participant selection, on-site focus group interviews, and data analysis. To provide examples of effective treatments, glyphosate and metsulfuron were applied during hardwood dormancy at levels suggested in scientific literature. This resulted in four treatment areas and one control block. Relatively small blocks on each tract were appropriately treated utilizing different methods, in demonstration fashion (Table 1).

| Treatments | Location 1 | Location 2 | Location 3 |
|---|---|---|---|
| 4% glyphosate foliar mist blower application | ✓ | | ✓ |
| 4% glyphosate foliar mist blower application plus cut and spray (50% glyphosate) on all stems over 2m (6ft.) | ✓ | | ✓ |
| 73.1 ml/ha (1 ounce/ac) metsulfuron foliar mist blower application | ✓ | | ✓ |
| 18.7 L/ha (8 quarts/ac) glyphosate aerial helicopter application | | ✓ | |
| Untreated control (check) | ✓ | ✓ | ✓ |

**Table 1.** Treatments applied by location

| Specific themes and subthemes | Timber Group Frequency | Non-timber Group Frequency | Total Frequency |
|---|---|---|---|
| **Biological efficacy concerns** | **34** | **46** | **80** |
| regrowth | 10 | 11 | 21 |
| not effective control | 7 | 12 | 19 |
| effective control | 4 | 14 | 18 |
| herbicide selectivity | 4 | 3 | 7 |
| **Economic concerns** | **34** | **39** | **73** |
| timber quality and return dollars | 10 | 17 | 27 |
| cost-share assistance | 5 | 8 | 13 |
| retreatment and guarantee | 7 | 5 | 12 |
| **Field focus group critique** | **10** | **13** | **23** |
| demonstration value | 9 | 8 | 17 |
| **Environmental concerns** | **9** | **17** | **26** |
| invasive species impact | 7 | 13 | 20 |
| herbicide impact | 2 | 4 | 6 |

**Table 2.** Frequency, or number of times, each theme and subtheme was mentioned by either timber oriented or non-timber oriented family forest owners and both added together to show total frequency.

Site selection involved locating cooperating forest owners and geographic locations that were representative of typical forest stand conditions across the state. Sites ranged from the upper Piedmont to the upper Coastal Plain. Winter treatments were chosen in order to avoid killing deciduous native trees and shrubs which were dormant at the time.

Prior to the focus group discussion, the most representative examples of treatments and varying results were located on each tract and a walking path between examples (stops) was determined. Special effort was made to expose forest owners to the variability between the different treatments, the variability, if any, within each treatment, and the terminal variability where a treatment ends and non-treatment areas persist. The participants were separated into two groups by their main forest management objective, either timber production or non-timber production. Each group had about a dozen participants.

Discussions at each stop along the walking tour were directed by the moderator to bring out the reasoning and specific factors used by participants to evaluate the biological and economic effectiveness of the various herbicide treatments. The order of questioning is important (Krueger and Casey 2000). First, participants were asked what they saw and how they perceived the vegetation with no knowledge of the treatment techniques or proven effectiveness. After initial discussions began to fade, an expert on herbicides explained the treatments in detail including their cost. A new round of moderator-led questions focused on benefit/cost relationships and willingness to treat privet using these treatments. The moderator used specific questions in order to probe deeper into why participants responded as they did (motivations). They were asked to justify the factors they employed in evaluation and to explain reasons for each perception of treatment.

The focus group data were compiled as a comprehensive transcript made from the recorded interviews. The conversations were analyzed for comparisons and frequencies. Frequent, specific and comparative quotes from both timber and non-timber forest owners were identified. Forest owner perceptions, concerns, and comments were categorized and subthemes were established.

## Results and Discussion

The themes that surfaced due to their specific nature within the dialogue and their frequency of occurrence were observed (Table 2). Major themes were biological effectiveness, economic

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issues, field focus group critique, and environmental impacts. Subthemes centered on regrowth concerns, control effectiveness, chemical selectivity, timber quality and investment return, cost-share incentives, retreatment and guarantees, demonstration value, aesthetics, invasive impacts, and chemical impacts.

During discussions, participants observed, walked through, and experienced varying degrees of privet control. They moved from areas that were extremely void of any live privet (due to chemical and mechanical treatments) to untreated (control) areas where the privet was dense and exceeded 12 feet in height. The most frequent of the biological concerns brought up by participants was the possibility and probability for regrowth after the treatments. A typical concern was stated as, "Do you have to come back the second year and spray again because of the seeds? This stuff produces seeds like nobody's business."

A second major biological issue was the selectivity of chemicals used for the treatments. Participants were not aware that treatments were done in winter while hardwoods and other deciduous plants were dormant. So a typical concern was, "I am real curious as to what you used to not harm any of the rest of the hardwood trees around here." Often, a participant would compare one treatment area with the other, "Back there (cut and spray) where you cut it down it looks like you sprayed the stumps and it looked like a good kill and I didn't see anything coming back out … and it was good. But along here (spray only), you see the tops are still living and that implies that the rest of the plant is still living and would come back out…I would be unhappy." It was apparent to the groups that the spray-only glyphosate treatment was not as effective as the other treatments.

Regardless of effectiveness, participants discussed concerns they have about paying for Chinese privet control. Would controlling Chinese privet promote timber growth and increase future harvest values enough to justify the cost of management? Timber quality was a concern. Participants recognized that there were some treatment areas that were void of valuable timber sizes and species and noted that treatments would not be worth the cost unless timber quality was sufficient. Some sort of quality timber stand seems to be necessary before an investment in privet control would be considered. A typical comment was, "Yeah, well, your timber value…if you got good timber, it's valuable, you know, and it's (privet) taking a lot of plant food and moisture from the timber…if it's a stand of beautiful hardwoods, I would come near to considering it."

Forest owners associated timber harvest time as a period when revenue was available for treatments. This appeared to be another factor motivating the forest owners to favor harvest time applications. Participants indicated that the cut and spray glyphosate treatment (most expensive) was very effective due to its open appearance and its low expectancy for retreatment. The discussion produced the sentiment that landowners would rather pay more up front to cut and spray than possibly pay again for follow-up treatments. Retreatment concerns led to discussion on negotiation and contractual guarantees from hired herbicide applicators to avoid high retreatment cost and low biological effectiveness. Some form of cost-share assistance would be a decision-making factor with regard to privet control for many of the participants.

Field focus groups were a successful way to gain insight into the perceptions of South Carolina family forest owners with regard to invasive species management practices. While unconventional, and potentially difficult, in-field focus groups are possible. They offer a setting which puts participants in contact with each other and in actual field conditions to observe management applications. Extension agencies could benefit from some of the techniques used for in-field focus groups, because of their demonstration benefits. Surprisingly, field focus groups were perceived as a highly effective demonstration method. Participants were consistent and enthusiastic in feeling that the focus group was a great invasive species management and herbicide demonstration technique. This aspect could be utilized in an extension setting.

Participants repeatedly brought up environmental quality issues such as the impacts (both positive and negative) of invasive plants on wildlife and biodiversity, as well as the impact of herbicide applications on water quality. A participant stated, "I wouldn't mess with it around the creek because that's where I see most of my wildlife … I see most of my wildlife in the privet around the creek." It was expected that some of these environmental concerns would surface when discussing invasive plant management and herbicides. However, the outdoor nature of the focus groups themselves could have brought more emphasis to these issues because participants were experiencing, not just hearing about or seeing pictures of, privet infested ecosystems.

Through discussions about herbicide treatment efficacy, the decisive factors that forest owners consider when weighing management options on wild weed control were identified. Methods or chemicals that show selectivity when applied are important to landowners. The interviews found that controlling only target species and leaving desirable species could be a decisive factor when choosing management options. It is clear that much of the information regarding effectiveness was frequently and strongly driven by cost.

## Conclusions

Specifically, it surfaced that the presence of valuable timber, cost-share incentives, and control guarantees from contracted herbicide applicators are determining factors related to the feasibility, affordability, and willingness for forest owners to engage in large-scale herbicide treatment for Chinese privet control. Perceived low timber value, lack of growth and yield projections, and the possibility of mediocre treatments requiring costly follow-up applications could discourage family forest owners from participation in invasive species management. Managers should address these cost-sensitive views when suggesting invasive species control to family forest owners. Treatments with low expectancy for regrowth or follow-up applications may be the best recommendation. We did expect to see differences between timber-oriented and non-timber-oriented forest owners, but these did not surface. Also, harvest and reforestation periods are good times to approach invasive plant control because of their perceived effectiveness with respect to timing and availability of harvest revenue.

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