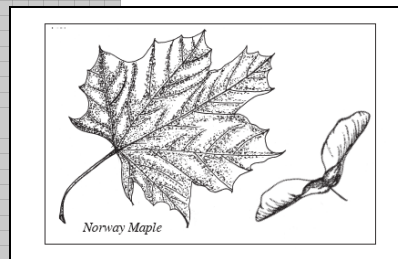
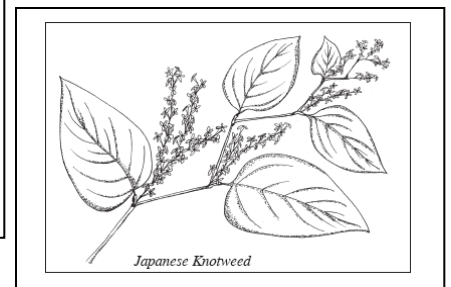


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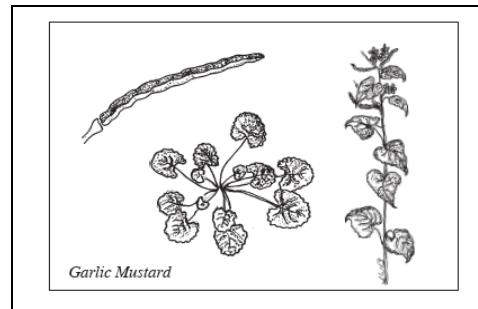
# Public Awareness of Invasive Plants and Insects in the Catskills and Lower Hudson Region



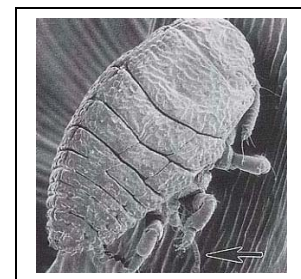
*Norway Maple*



*Japanese Knotweed*



*Garlic Mustard*



*Hemlock woolly adelgid*

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## **EXECUTIVE SUMMARY**

Increasingly, the forests in the Catskill and lower Hudson region are being threatened by the spread of exotic insect pests and invasive plants. To minimize this spread, the Watershed Agricultural Council (WAC) would like to support a forestry education and early detection program. However, little is known about people's current level of awareness and knowledge of invasive plants and insects. The surveys reported herein were conducted by the Human Dimensions Research Unit (HDRU) at Cornell University to provide the baseline information that would inform WAC's development of education programs.

The study area consisted of 10 counties in the Catskill region (Delaware, Schoharie, Greene, Ulster, and Sullivan) and the lower Hudson region (Orange, Rockland, Westchester, Putnam, and Dutchess). Three audiences were targeted for the survey effort: non-industrial private landowners, local government officials, and local forestry professionals. Landowners were divided into four groups based on the location and size of their property so that possible differences in awareness or educational needs could be detected. Local officials surveyed included town supervisors, town planners, town highway supervisors, city or village Department of Public Works supervisors, and chairpersons of town conservation advisory committees -- people at the local government level who might be involved with invasive species management. Forestry and tree professionals included foresters, loggers, arborists, landscapers, and nursery operators that WAC believed were active in the Catskill or Lower Hudson region.

The purpose of the study was to: (1) assess the current knowledge and awareness levels of each target audience with respect to invasive plants and insects, and (2) identify effective means of educating these audiences about the prevention and early detection of invasive species. Questionnaires were mailed to the survey audiences in early April, 2007. Up to three reminder mailings were sent over the course of the following month. A telephone follow-up survey was conducted with 25 nonrespondents in each landowner strata, 50 nonrespondents in the local officials' stratum, and 70 nonrespondents in the forestry professionals' stratum to determine whether their answers to key questions differed from those of respondents.

### **Survey of Landowners**

Of the 4,000 questionnaires mailed, 394 were undeliverable and 1,047 completed questionnaires were returned, for an adjusted response rate of 29%. In general, respondents were more aware of and concerned about invasive species than nonrespondents. Thus, when looking at the results of the mail survey, we can assume that awareness and concern for invasive species is slightly overestimated.

### **Conclusions and Recommendations for Educational Outreach to Landowners**

- Awareness of invasive species among landowners was low. Over half of the respondents had never heard of 12 of the 14 invasive plants and insects we asked about in the survey. Outreach efforts should focus first on increasing basic awareness and knowledge of invasive species. We recommend assessing existing identification guides to determine

the utility of developing a field guide to invasives that includes management recommendations.

- No one species was believed to be common in any area. Norway maple, Japanese barberry, and garlic mustard were cited most often. About one-quarter of Lower Hudson landowners and fewer Catskill area landowners indicated these species were present on their property.
- Most respondents were concerned to some degree about the presence of invasive plants and insects in North America and on their property in particular. Most people believed that invasive species can easily spread to other areas, and that insects can move from one area to another in firewood. They also believed that invasive plants and insects can have a negative impact on native species. Thus, landowners' attitudes indicate a level of concern about invasive species that could lead to action, if they had some awareness and knowledge of specific invasive species. In fact, the action that most people were willing to do was to learn how to identify invasive plants or insects. Half to two-thirds of landowners were willing to engage in other actions, such as providing access to their property so others could monitor for invasive species and removal of invasive plants or trees containing invasive insects. A "Landowner Assessment Tool" could be developed that could be used to help landowners to inspect their property for the occurrence of invasives, and subsequently to develop a plan of action to control the invasives. Training sessions (e.g., field tours, webcasts, video clips) could be provided that demonstrate how to use this tool.
- Fewer people were willing to apply chemicals such as pesticides, herbicides, or insecticides on their property. However, some of the invasive species (e.g., tree of heaven, Japanese knotweed) can be controlled only with herbicides. Some educational efforts to help landowners understand the limits and potentials of pesticides seems warranted, otherwise the problem species will persist and municipal efforts to control the invasives will be resisted by the community.
- Landowners indicated they would most likely turn to brochures or fact sheets, web sites, or Cooperative Extension personnel for information about invasive species in the future. Over half also expressed interest in periodic newsletters and special mailings to their homes. Therefore, we would recommend these methods for future communication efforts. Since no one method was preferred by everyone, multiple methods should be used. Perhaps using press releases to let people know that other, more detailed information sources exist would serve to get the word out several times a year.
- Periodic newsletters were among the most likely sources to be used for future information, so we recommend attempting to get articles in the newsletters currently read by the most respondents – Cornell Cooperative Extension, The Conservationist, and The Nature Conservancy. Information in the newsletter from the Watershed Agricultural Council would be most likely to reach landowners owning large parcels in the Catskills. Information in the newsletter from the New York State Farm Bureau would be most likely to reach landowners owning large parcels in the Lower Hudson area.

### **Specific Audience Analysis**

The Watershed Agricultural Council identified four invasive species they would like to better inform landowners about. We used information from the survey to identify and describe

landowners who were not currently knowledgeable about each of the four species in turn (Norway maple, Japanese barberry, Japanese knotweed, and tree of heaven), and then ascertain the most likely ways to reach them with information. The recommendations were very similar for each species because most respondents were not knowledgeable about any species.

We recommended a multi-pronged approach using fact sheets, web sites, and Cornell Cooperative Extension. The message should appeal to landowners' nature and aesthetic values, and try to increase awareness of the species in question, since most people have never heard of the species before.

### **Survey of Forestry and Tree Professionals**

Of the 958 questionnaires mailed, 76 were undeliverable and 243 completed questionnaires were returned, for an adjusted response rate of 28%. This response rate was surprisingly low for an audience whom we thought would have a strong interest in the topic. However, during the course of the mailing process it came to our attention that some members of the sample might not work in the study area. This could have contributed to the low response rate, because some survey recipients did not think the survey applied to them, and thus did not respond. We found from the nonrespondent telephone follow-up that 26% of nonrespondents did not work in the study area.

### **Conclusions and Recommendations for Educational Outreach to Forestry and Tree Professionals**

- Respondents to this survey covered a wide range of professions that could be involved with the management of invasive plants and insects. Among mail survey respondents, one-third (32%) identified themselves as foresters, 29% were loggers, 28% were arborists, 16% were landscapers, and 8% were nursery/greenhouse operators. Respondents worked throughout the study area. Therefore, the recommendations for educational outreach likely will apply throughout the study area and for the professions listed above.
- Most forestry and tree professionals had at least heard of the invasive trees, shrubs, and insects that we asked about. They were less likely to be familiar with the herbs and vines on the list. Outreach efforts should focus on increasing the knowledge base of professionals. Perhaps existing identification guides should be assessed to determine the utility of developing a field guide to invasives that includes management recommendations. A website could be developed that allows reporting of invasives and links to sources of information. The website could link to a geospatial database that shows reported or actual hotspots for invasives.
- The most commonly seen invasive species included Norway maple, bush honeysuckles, and the hemlock woolly adelgid. Also common, according to more than 35% of respondents were Japanese knotweed, Japanese barberry, and tree of heaven.
- Almost all respondents felt strongly that healthy forests were important to them. Almost all also agreed, either strongly or somewhat, that healthy trees can improve the health of the forest and that healthy forests require active management to remain healthy. Over two-thirds of tree and forestry professionals strongly agreed that invasive plants and

insects can easily spread and have a negative impact on native species, and that invasive insects can spread in firewood. Thus, professionals' attitudes indicate a level of concern about invasive species and a belief in forest management that would lead to support for invasive species management actions. In fact, many of the respondents would be willing to undertake any of the actions we suggested, including reporting invasive species to the appropriate agency, removing trees containing invasive insects, and training landowners to identify invasive species.

- Professionals most frequently listed four information sources that they would most likely use as sources of invasive species information in the future – brochures or fact-sheets, DEC foresters, Cooperative Extension personnel, and web sites. The most popular topics were learning more about the existing laws, regulations and quarantines regarding invasive species, and how best to remove, control or eradicate invasive plants and insects. Therefore, we would recommend using these sources for future communication efforts and developing educational materials on these topics, if they do not already exist. Since no one source was preferred by everyone, multiple sources should be used.
- Another suggestion would be to develop sample text that foresters can insert into management plans associated with each of the invasive species.
- It would be useful to determine how many tree and forestry professionals are NYS Certified Pesticide Applicators (we suspect not a lot), and help them see how this skill is a job opportunity, given the interest among landowners for controlling invasives. Training in IPM for these audiences related to the control of invasive species could be developed if the need is verified.

## **Survey of Local Officials**

Of the 372 questionnaires mailed, 3 were undeliverable and 104 completed questionnaires were returned, for an adjusted response rate of 28%. Respondents and nonrespondents were very similar in their job duties and their awareness of and concern for invasive plants and insects.

## **Conclusions and Recommendations for Educational Outreach to Local Officials**

- Local officials who responded to our survey consisted of town highway supervisors (52%), town supervisors (24%), town planners (6%), city or village Department of Public Works supervisors (2%), chairpersons of town conservation advisory committees (5%), and others in a variety of job categories (11%). These percentages do not necessarily reflect local officials' proportions in the work force, but rather, these are all people at the local government level who might be involved with invasive species management.
- Less than half of the respondents had ever heard of many of the invasive plants and insects we asked about in the questionnaire. The species most likely to be known was Norway maple. About one-quarter of respondents thought it was common in their area along with Japanese barberry, Japanese knotweed, garlic mustard, and bush honeysuckles. Outreach efforts should focus first on increasing basic awareness and knowledge of invasive species. The field identification guide and website mentioned for tree and forestry professionals would have application to this audience.

- Most of the respondents felt strongly that healthy forests were important to them. Almost all also agreed, either strongly or somewhat, that healthy trees can improve the health of the forest and that healthy forests require active management to remain healthy. Over two-thirds of local officials agreed that invasive plants and insects can easily spread and have a negative impact on native species, and that invasive insects can spread in firewood. Their opinions on these questions were not held as strongly as those of most tree and forestry professionals, who “strongly agreed” with these statements. However, local officials’ attitudes indicate a level of concern about invasive species and a belief in forest management that would lead to general support for invasive species management actions. In fact, over half of the respondents were willing to engage in a variety of activities to control invasive plants and insects. The most commonly cited activities included reporting invasive species to the appropriate agency, mowing, and training municipal employees to identify invasive species.
- Local officials would be most likely to turn to the following sources for information about invasive species -- brochures or fact sheets, periodic newsletters, web sites, Cooperative Extension personnel, DEC foresters, and other government employees (e.g., Soil and Water Conservation District, NYC DEP, NRCS). They would like to learn more about how to identify invasive plants and insects, how to control them, how to prevent their spread, and whom to contact for more information. Since educational programs would be related to their job function, almost half of the respondents wanted the programs to be held during the day on a weekday. Therefore, we would recommend using these sources for future communication efforts and developing educational materials on these topics, if they do not already exist. Holding programs during the workday also seems reasonable to reach many members of this audience. However, since no one source was preferred by everyone, multiple sources should be used. Perhaps also creating a database of highway crews who have successfully dealt with specific invasives could provide an opportunity for other highway supervisors to contact them and learn from their experiences.

## **ACKNOWLEDGMENTS**

We thank Tom Pavlesich of the Watershed Agricultural Council for his oversight on this project and his review of the questionnaires and report, as well as providing the survey samples. John Swartz, New York City Department of Environmental Protection, also assisted with questionnaire and report review. We also appreciate the interest of the Catskill Regional Invasive Species Partnership in this project.

Special thanks are extended to HDRU staff members Karlene Smith and Linda Weaver, who implemented the survey and entered the data on computer. Margie Peech assisted with table preparation and report formatting.

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## **INTRODUCTION**

The Catskill and lower Hudson region of New York State are primarily forested and have two large watersheds, Catskill/Delaware and Croton, which provide the water supply for New York City. The Watershed Agricultural Council (WAC) is a not-for-profit group that works closely with the New York City Department of Environmental Protection (NYC DEP), USDA Forest Service, and other local groups to protect the New York City water supply from agricultural and forestry pollution and ensure the economic viability of farming and forestland stewardship in the region. The underlying premise of WAC is that a well-managed working forest landscape is beneficial for water quality and rural economic viability.

Increasingly, the forests in the Catskill and lower Hudson region are being threatened by the spread of exotic insect pests and invasive plants. To minimize this spread, the WAC would like to support a forestry education and early detection program. However, little is known about people's current level of awareness and knowledge of invasive plants and insects. The surveys reported herein were conducted by the Human Dimensions Research Unit (HDRU) at Cornell University to provide the baseline information that would inform WAC's development of education programs.

The study area consisted of 10 counties in the Catskill region (Delaware, Schoharie, Greene, Ulster, and Sullivan) and the lower Hudson region (Orange, Rockland, Westchester, Putnam, and Dutchess) (Fig. 1). The Catskill region is more rural and forested in nature, whereas the lower Hudson region is more developed with many bedroom communities for New York City.

Three audiences were targeted for the survey effort: non-industrial private landowners, local government officials, and local forestry professionals. Landowners were divided into four groups based on the location and size of their property so that possible differences in awareness or educational needs could be detected. The purpose of the study was to: (1) assess the current knowledge and awareness levels of each target audience with respect to invasive plants and insects, and (2) identify effective means of educating these audiences about the prevention and early detection of invasive species.

## **METHODS**

Mail questionnaires were prepared and sent to the three survey audiences in April, 2007. The questionnaires were developed based on a literature review of past survey efforts, especially a concurrent effort to survey forest owners in New York State regarding their general management practices and educational needs. Some questions used in the current surveys were identical to those used in the statewide survey, allowing for comparative analysis. Other questions specific to invasive species and possible management actions were developed in consultation with WAC, NYC DEP, and Cornell Cooperative Extension. Each questionnaire contained a few questions specific to the audience (e.g., amount of land owned, type of local official or forestry professional), but most questions were the same and covered the following

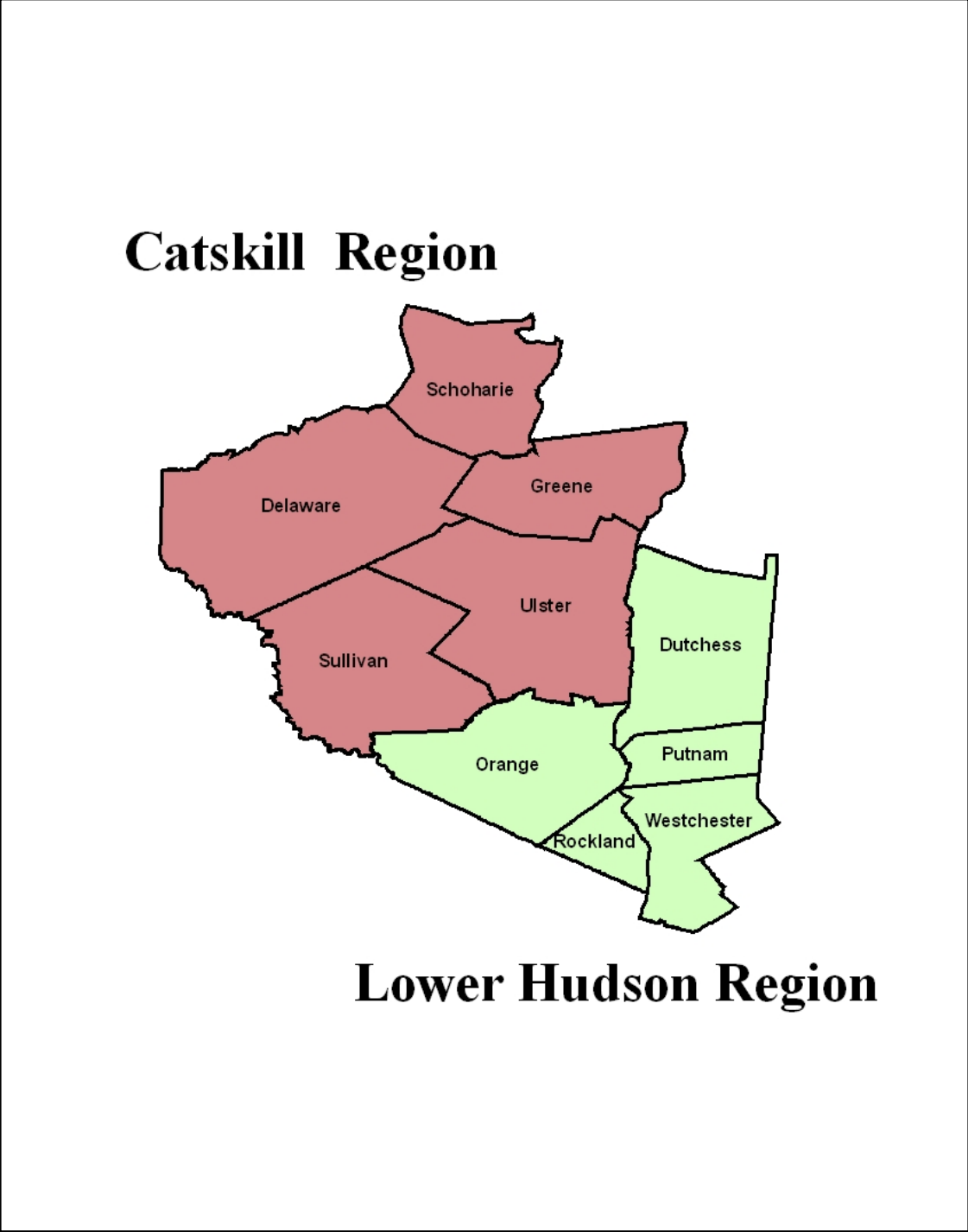


Figure 1. Map showing study area and regions within the study area.

topics: 1) awareness of 14 invasive plants and insects, 2) concerns/beliefs about invasive species and forest management, 3) past management activities undertaken related to invasive species or willingness to engage in those in the future, and 4) educational needs including how best to reach them with educational materials. See Appendix A for exact content and wording of the mail questionnaires.

The sample of landowners receiving the mail questionnaire was divided into four strata. First they were divided into two groups based on property location – Catskill region (Delaware, Schoharie, Greene, Ulster, and Sullivan) versus the Lower Hudson region (Orange, Rockland, Westchester, Putnam, and Dutchess) (Fig. 1). Landowners in each region were further divided based on the size of the property they owned – 5 to 50 acres versus 51+ acres. Thus, four strata of 1,000 landowners each – large Catskill, small Catskill, large Lower Hudson, and small Lower Hudson – were selected from property tax rolls to receive the survey. This stratification allowed us to compare landowners in the two regions with different property characteristics to better understand their potential diversity of knowledge of invasive species and educational needs.

Local officials surveyed included town supervisors, town planners, town highway supervisors, city or village Department of Public Works supervisors, and chairpersons of town conservation advisory committees -- people at the local government level who might be involved with invasive species management. All of the people in the 10-county study area that were identified (N=372) were sent surveys.

Forestry and tree professionals were identified from lists compiled by the WAC. This group included foresters, loggers, arborists, landscapers, and nursery operators that WAC believed were active in the Catskill or Lower Hudson region. All professionals thus identified (N=958) were sent surveys.

Questionnaires were mailed to the survey audiences in early April, 2007. Up to three reminder mailings were sent over the course of the following month. A telephone follow-up survey was conducted with 25 nonrespondents in each landowner strata, 50 nonrespondents in the local officials' stratum, and 70 nonrespondents in the forestry professionals' stratum to determine whether their answers to key questions differed from those of respondents.

Data were entered on the computer and analyzed using SPSS (a statistical package for the social sciences). Data were analyzed by survey audience, and within the landowner sample, by stratum and by respondents who were not familiar with certain invasive species that the Watershed Agricultural Council thought might be early candidates for development of educational programs. Chi-square and t-tests were used to test for significant differences between the landowner strata. Factor analysis (principal components analysis with varimax rotation) and reliability tests (Cronbach's alpha) were used to categorize reasons for owning wooded property among landowners.

## RESULTS, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The remainder of the report will be divided into three main subsections, each focusing on a different survey audience. We will discuss audience characteristics, awareness of invasive species, and preferences for educational outreach. In the discussion, comparisons will be made to other survey audiences when appropriate. Conclusions and recommendations for educational outreach will be made at the end of each section for the specific survey audience being examined.

### Survey of Landowners

#### Mail Survey Response and Nonrespondent Comparisons

Of the 4,000 questionnaires mailed, 394 were undeliverable and 1,047 completed questionnaires were returned, for an adjusted response rate of 29%. The response rate was higher for the Catskill area strata than for the Lower Hudson area strata (Table 1). All of the response rates were low, but this was expected given the anticipated lack of knowledge/concern among these audiences regarding invasive species.

<b>Strata</b>	Initial sample size	# of undeliverables	# of returns	Response rate (%)
<i>Landowners</i>	4,000	394	1,047	29.0
Large parcels, Catskill Area	1,000	73	308	33.2
Small parcels, Catskill Area	1,000	116	272	30.8
Large parcels, Lower Hudson Area	1,000	85	222	24.3
Small parcels, Lower Hudson Area	1,000	120	242	27.5
<i>Local Officials</i>	372	3	104	28.2
<i>Forestry &amp; Tree Professionals</i>	958	76	243	27.6

In general, respondents were more aware of and concerned about invasive species than nonrespondents. It is typical in mail surveys for those who are most interested in the topic to be most likely to reply. In this case, respondents were more likely than nonrespondents to have heard of all five of the invasive plants and insects that we asked about. About 15% more respondents were aware of a given species than nonrespondents. Interestingly, among those who had heard of a specific species, there was no difference between respondents and nonrespondents in terms of their level of knowledge about the species. Respondents and nonrespondents were equally knowledgeable about any given species. Thus, when looking at the results of the mail survey where we asked about 14 species, we can assume that awareness is slightly overestimated for each species, but knowledge is not.



Respondents were more likely than nonrespondents to be concerned about invasive plants and insects, and feel that they were a threat to forests in their area. However, nonrespondents were more willing to take certain actions (i.e., report invasive species to a hotline, plant only native species) to prevent the spread of invasive species. This finding could be the result of different methods being used to collect data rather than a true difference between respondents and nonrespondents. It might have been harder for nonrespondents interviewed on the telephone to respond that they weren't going to do anything to prevent the spread of invasive species than mail questionnaire respondents.

Respondents and nonrespondents did not differ in the average size of their property, nor in the average number of acres of woodland owned. Both groups generally disagreed with the statement that “you don't have to worry about the forest because Mother Nature will take care of the trees.”

### **Characteristics of Landowners and Their Properties**

Most respondents (68%) to the survey were male. Respondents ranged in age from 26 to 92 with a mean age of 59 years old. This older average age was similar to what we found in the statewide survey of forest owners (Connelly et al. 2007). Lower Hudson area respondents were more likely to have a college degree (55%) than Catskill area respondents (49%).

Respondents' properties reflected the characteristics of the strata from which they were sampled. Landowners who owned large parcels (defined as 51+ acres) owned 97-99 acres on average. Landowners who owned small parcels (defined as 5-50 acres) owned 14-16 acres on average. There was no difference between the Catskill area and the Lower Hudson area in terms of average parcel size. However in the Catskill area, wooded land accounted for about two-thirds of a landowner's acreage. In the Lower Hudson region, it accounted for just under half, on average.

### **Reasons for Owning Wooded Property (For Those That Do)**

Using factor analysis we identified three factors that explain why people own wooded property, and have termed the factors – nature and aesthetic values, traditional uses, and utilitarian values. These three factors explained 56% of the variance in reasons for owning wooded property and had a relatively high reliability (Cronbach's alpha = 0.69). Most respondents identified nature and aesthetic values such as “to enjoy beauty or scenery” or “to protect nature and biological diversity” as being very important reasons why they own wooded land (Table 2). Traditional uses were very important to roughly one-third of the respondents; these included recreational uses of the land and being able to pass the land onto their heirs. As would be expected, being able to pass the land on was more important to owners of large parcels than small parcels. Utilitarian values such as production of firewood or timber were important to only a few people. Respondents could indicate important reasons for owning forest land from more than one of the factors identified. Thus, factors do not represent a profile of different owner objectives, but broad categories of how owners use and enjoy their land.

The identification of these three factors was almost identical to the results obtained in a statewide survey of forest owners (Connelly et al. 2007). The amount of variance explained and the reliability were the same. Also, the relative importance of each factor was the same locally and statewide. In another use of this list of reasons in the National Woodland Owner Survey, the three top reasons for owning wooded land by Northern Family Forest Owners, which includes New York State, were among the top reasons identified in our study (Butler and Leatherberry, 2004). These reasons (to enjoy beauty or scenery, for privacy, and to protect nature and biologic diversity) were included as part of our Nature and Aesthetic Values factor.

### **Awareness and Knowledge of Invasive Species**

Over half of the respondents had never heard of 12 of the 14 invasive plants and insects we asked about in the survey (Table 3). Some species such as tree of heaven and Japanese stiltgrass were completely unfamiliar to most people. The two species that more people were aware of were Norway maple and the Asian longhorned beetle. One-half to two-thirds at least recognized the name of these species. Over one-quarter of respondents felt they knew something about the species, beyond recognizing the name. This was especially true in the Catskill area, where 35-40% of respondents indicated they knew something about the Asian longhorned beetle. Readers are encouraged to examine Table 3 in more detail for information on particular invasive species.

### **Invasive Species on Landowners' Properties**

Most landowners did not think they had any one particular invasive plant or insect we asked about on their property, but over half thought they had at least one of the 14 we asked about. To aid in species identification, a brochure was prepared by WAC and included with the questionnaire. In the Lower Hudson region, large parcel owners were more likely (72%) than small parcel owners (63%) to think they had at least one of the fourteen invasive species on their property. Comparable data for the Catskill area were 54% for owners of small parcels and 47% for owners of large parcels. But no one species was believed to be common in any area. Norway maple, Japanese barberry, and garlic mustard were cited by about one-quarter of Lower Hudson landowners and fewer Catskill area landowners as being present on their property (Table 3). Species such as the emerald ash borer, which have not been identified by experts as being present yet in New York State, were thought to be present by several property owners on their land. This highlights the difficulty of proper plant and insect identification.

**Table 2. For those respondents who owned wooded land in New York, the reasons for owning that land, by landowner strata.**

Reasons for owning wooded land	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	Mean Importance* (% indicating “very important”)			
<i>Factor 1: Nature and aesthetic values</i>				
To enjoy beauty or scenery**	4.6 (76.4)	4.7 (81.3)	4.3 (64.4)	4.7 (81.3)
To protect nature and biological diversity**	4.3 (60.7)	4.3 (60.3)	4.0 (44.6)	4.3 (58.9)
For privacy	4.4 (63.7)	4.4 (62.3)	4.3 (63.5)	4.6 (75.9)
As part of my home, vacation home, or farm	4.6 (77.0)	4.5 (73.2)	4.5 (72.6)	4.6 (79.3)
<i>Factor 2: Traditional uses</i>				
To pass land on to my children or other heirs **	3.9 (56.7)	3.4 (35.1)	3.5 (41.8)	3.0 (29.4)
For hunting or fishing**	3.4 (43.3)	2.5 (24.1)	2.8 (28.1)	2.0 (13.8)
For recreation, other than hunting or fishing**	3.8 (41.0)	3.5 (39.3)	3.1 (27.6)	3.0 (25.0)
<i>Factor 3: Utilitarian values</i>				
For production of sawlogs, pulpwood, or other timber products**	2.1 (7.0)	1.4 (3.1)	1.9 (3.4)	1.2 (2.6)
For production of firewood or biofuel (energy)**	2.5 (12.4)	2.2 (11.9)	2.5 (12.5)	2.0 (6.8)
For cultivation/collection of non-timber forest products (e.g., maple syrup, mushrooms)	1.9 (6.6)	1.6 (4.3)	1.7 (4.0)	1.4 (4.1)
For land investment (I hope to sell all or part of my wooded land at a profit)**	2.0 (7.3)	1.9 (5.3)	2.5 (15.0)	1.9 (6.8)
*Importance was measured on a 5-point Likert-type scale where 1 = not at all important to 5 = very important.				
**Statistically significant difference between landowner strata at P = 0.05 using Chi-square test.				

**Table 3. Extent of knowledge about specific invasive species and presence on landowners' property, by landowner strata.**

Invasive Species	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	Percent			
<b>Trees</b>				
<i>Norway maple*</i>				
Never heard of before	34.4	32.3	32.2	38.4
Recognize name	36.9	47.2	33.2	36.7
Know something about it	28.7	20.5	34.6	24.9
Have on my property**	15.4	15.1	26.5	21.3
<i>Tree of heaven</i>				
Never heard of before	78.5	83.0	73.3	74.5
Recognize name	10.2	6.5	8.4	12.3
Know something about it	11.3	10.5	18.3	13.2
Have on my property**	6.7	5.8	18.2	13.0
<b>Shrubs</b>				
<i>Japanese barberry</i>				
Never heard of before	59.3	62.0	56.6	59.6
Recognize name	20.9	22.8	20.9	17.3
Know something about it	19.8	15.2	22.5	23.1
Have on my property**	12.6	13.8	28.8	24.2
<i>Bush honeysuckles</i>				
Never heard of before	49.8	54.4	46.3	55.3
Recognize name	28.6	26.8	31.8	23.2
Know something about it	21.6	18.8	21.9	21.5
Have on my property**	12.2	13.3	21.8	16.4
<i>Buckthorn</i>				
Never heard of before	60.7	67.9	63.1	68.1
Recognize name	27.7	25.7	27.4	22.0
Know something about it	11.6	6.4	9.5	9.9
Have on my property	11.4	7.6	14.1	11.6
<i>Japanese knotweed*</i>				
Never heard of before	64.5	71.0	74.6	78.5
Recognize name	12.3	13.3	13.0	10.3
Know something about it	23.2	15.7	12.4	11.2
Have on my property	10.6	7.6	8.8	7.7

<b>Table 3. (cont.)</b>				
<b>Invasive Species</b>	<b>Landowner Strata</b>			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	<b>Percent</b>			
<b><i>Herbs</i></b>				
<i>Garlic mustard</i>				
Never heard of before	65.8	63.4	67.7	63.8
Recognize name	22.8	19.3	19.3	15.9
Know something about it	11.4	17.3	13.0	20.3
Have on my property**	12.6	20.0	22.9	30.0
<i>Japanese stiltgrass</i>				
Never heard of before	85.3	88.4	83.9	80.7
Recognize name	8.7	8.0	10.9	12.3
Know something about it	6.0	3.6	5.2	7.0
Have on my property	6.7	4.0	8.2	10.1
<b><i>Vines</i></b>				
<i>Asiatic bittersweet*</i>				
Never heard of before	73.5	74.1	66.6	63.4
Recognize name	14.7	14.7	14.4	17.0
Know something about it	11.8	11.2	19.0	19.6
Have on my property**	6.3	5.3	15.9	16.4
<i>Mile-a-minute*</i>				
Never heard of before	79.9	81.4	68.5	66.0
Recognize name	11.2	10.5	15.5	18.1
Know something about it	8.9	8.1	16.0	15.9
Have on my property**	5.1	4.4	8.2	14.5
<i>Kudzu</i>				
Never heard of before	53.1	59.3	54.8	52.9
Recognize name	19.8	14.6	18.5	17.6
Know something about it	27.1	26.1	26.7	29.5
Have on my property	2.4	2.2	1.2	4.3
<b><i>Insects</i></b>				
<i>Hemlock woolly adelgid</i>				
Never heard of before	58.2	63.4	58.7	58.8
Recognize name	15.3	13.3	14.8	12.3
Know something about it	26.5	23.3	26.5	28.9
Have on my property**	10.2	15.1	20.6	17.9

<b>Table 3. (cont.)</b>				
<b>Invasive Species</b>	<b>Landowner Strata</b>			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	<b>Percent</b>			
<i>Asian longhorned beetle*</i>				
Never heard of before	33.1	38.4	42.2	45.9
Recognize name	26.3	26.3	29.4	27.5
Know something about it	40.6	35.3	28.4	26.6
Have on my property	6.7	6.7	6.5	5.8
<i>Emerald ash borer</i>				
Never heard of before	67.3	73.8	61.0	66.4
Recognize name	20.2	14.3	24.1	19.9
Know something about it	12.5	11.9	14.9	13.7
Have on my property**	2.0	3.1	6.5	7.2
*Statistically significant difference between strata for level of awareness/knowledge at P = 0.05 using Chi-square test.				
**Statistically significant difference between strata for whether species was found on property or not at P = 0.05 using Chi-square test.				

### **Beliefs about Forestland and Concerns about Invasive Species**

Almost all landowners said that healthy forests were important to them (Table 4). Most also agreed that “harvesting trees can improve the health of the forest” and “healthy forests require active management to remain healthy.” The importance of harvesting trees was strongly agreed to by more large parcel owners than small parcel owners. Most respondents did not agree with the statement that “you don’t have to worry about the forest because Mother Nature will take care of the trees.” These responses indicate that most respondents favor some type of forest management.

**Table 4. Respondents' beliefs about forests and forest management, by survey audience.**

Beliefs about forests and forest management	Landowner Strata				Forestry Professionals	Local Officials
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area		
	Percent					
<i>Healthy forests are important to me*</i>						
Strongly agree	91.9	91.3	85.6	93.7	94.0	78.2
Somewhat agree	7.8	7.6	12.9	5.5	5.6	18.8
Neither agree nor Disagree	0.3	1.1	1.0	0.0	0.0	2.0
Somewhat Disagree	0.0	0.0	0.0	0.4	0.0	0.0
Strongly disagree	0.0	0.0	0.0	0.0	0.4	0.0
Don't know	0.0	0.0	0.5	0.4	0.0	1.0
<i>Healthy trees can improve the health of the forest*</i>						
Strongly agree	51.7	34.9	47.4	24.3	68.5	46.0
Somewhat agree	35.3	43.0	31.5	45.3	24.1	39.0
Neither agree nor Disagree	7.2	9.3	10.8	13.0	3.5	8.0
Somewhat Disagree	2.4	3.9	3.9	6.1	2.6	2.0
Strongly disagree	0.3	1.9	1.0	1.7	0.9	1.0
Don't know	3.1	7.0	5.4	9.6	0.4	4.0
<i>Healthy forests require active management to remain healthy*</i>						
Strongly agree	28.3	34.4	36.0	33.9	52.4	36.4
Somewhat agree	42.1	37.5	29.5	38.7	28.6	40.4
Neither agree nor Disagree	14.5	12.9	19.2	15.2	9.5	15.2
Somewhat Disagree	7.2	5.1	5.4	5.7	5.2	4.0
Strongly disagree	2.4	2.7	2.5	1.7	3.0	1.0
Don't know	5.5	7.4	7.4	4.8	1.3	3.0

<b>Table 4. (cont.)</b>						
<b>Beliefs about forests and forest management</b>	<b>Landowner Strata</b>				Forestry Professionals	Local Officials
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area		
	<b>Percent</b>					
<i>People who own forestland have the right to use that land as they see fit*</i>						
Strongly agree	25.9	13.3	24.3	11.8	21.1	18.2
Somewhat agree	28.4	22.4	31.6	23.2	35.1	25.3
Neither agree nor Disagree	17.5	14.1	12.9	14.8	12.3	12.1
Somewhat Disagree	16.4	27.1	19.3	27.9	17.5	30.3
Strongly disagree	10.8	23.1	10.9	20.1	14.0	11.1
Don't know	1.0	0.0	1.0	2.2	0.0	3.0
<i>The primary use of forests should be for products useful to humans*</i>						
Strongly agree	15.2	15.9	13.0	10.4	22.4	17.3
Somewhat agree	16.3	19.1	20.0	16.1	31.1	25.5
Neither agree nor Disagree	23.1	17.1	23.0	18.6	21.5	21.4
Somewhat Disagree	23.1	17.1	21.5	27.0	14.9	18.4
Strongly disagree	20.9	29.6	21.0	27.0	10.1	14.3
Don't know	1.4	1.2	1.5	0.9	0.0	3.1
<i>Deer are a threat to forest ecosystems*</i>						
Strongly agree	4.9	6.6	17.4	15.2	27.2	10.3
Somewhat agree	12.3	13.1	15.9	19.9	27.2	18.6
Neither agree nor Disagree	14.4	13.1	19.9	19.9	14.0	14.4
Somewhat Disagree	17.3	18.9	16.9	13.0	13.6	18.6
Strongly disagree	42.3	30.5	20.9	16.0	14.5	30.9
Don't know	8.8	17.8	9.0	16.0	3.5	7.2



<b>Table 4. (cont.)</b>						
<b>Beliefs about forests and forest management</b>	<b>Landowner Strata</b>					
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area		
	<b>Percent</b>					
<i>Any cutting of trees harms the water quality of nearby streams*</i>						
Strongly agree	3.8	5.4	4.5	9.7	1.7	3.0
Somewhat agree	10.3	10.9	11.0	12.8	8.7	15.8
Neither agree nor Disagree	22.7	18.7	21.0	21.7	8.7	25.7
Somewhat Disagree	23.7	23.0	24.0	25.7	24.5	28.8
Strongly disagree	27.1	20.2	27.5	12.8	53.8	16.8
Don't know	12.4	21.8	12.0	17.3	2.6	9.9
<i>You don't have to worry about the forest because Mother Nature will take care of the trees*</i>						
Strongly agree	2.8	1.6	4.4	1.3	2.2	2.0
Somewhat agree	13.6	6.7	7.8	6.9	5.7	8.9
Neither agree nor Disagree	12.9	11.8	15.2	10.3	10.9	17.8
Somewhat Disagree	29.3	24.4	25.5	24.1	28.4	27.7
Strongly disagree	39.0	53.1	44.6	56.1	52.8	39.6
Don't know	2.4	2.4	2.5	1.3	0.0	4.0
*Statistically significant difference between audiences at P = 0.05 using Chi-square test.						

Landowners were more diversified in their opinion about the type of forest management that is appropriate. For the statement “the primary use of forests should be for products useful to humans”; over half disagreed with the statement, one-quarter agreed and one-quarter neither agreed nor disagreed (Table 4). Landowners also varied in their opinion about whether forest landowners have the right to use their land as they see fit. In this case, about half of the large parcel owners agreed and half of the small parcel owners disagreed.

The two statements that required some ecological knowledge received more “don't know” responses than the other statements (Table 4). Among those who had an opinion, about half disagreed with the statements that “deer are a threat to forest ecosystems” and “any cutting of trees harms the water quality of nearby streams;” the remainder were split between agreeing and neither agreeing nor disagreeing.

Table 4 also shows how these questions were answered by forestry professionals and local officials, which will be discussed in more detail in their respective sections of the report. Generally, compared to landowners, forestry professionals feel more strongly and local officials feel less strongly about each statement.

Most respondents were concerned to some degree about the presence of invasive plants and insects in North America and on their property in particular (Table 5). Fewer were concerned about invasive species in the forests, probably because more people said they didn't know if these plants and insects posed a threat to the forest. Most people believed that invasive species can easily spread to other areas and that insects can move from one area to another in firewood. They also believed that invasive plants and insects can have a negative impact on native species.

Table 5 also shows how these questions were answered by forestry professionals and local officials, which will be discussed in more detail in their respective sections of the report. Generally, forestry professionals were more likely to agree strongly that invasive plants and insects pose a threat, whereas local officials were more likely to only somewhat agree, with landowners falling between these two groups.

### **Actions Taken to Remove Invasive Species and Willingness to Take Action in the Future**

Of the landowners who believed they had at least one of the fourteen invasive species we asked about on their property, almost 40% of those with land in the Catskills and 60% with land in the Lower Hudson region had done something to remove them from their property (Table 6). The most common actions taken were removal of shrubs/vines/herbs and mowing. Actions mentioned by about one-quarter of respondents included tree removal and application of pesticides, herbicides, or insecticides. Less frequently mentioned actions included contacting someone for assistance, advice, or to report the invasive species. There were no statistically significant differences between landowner strata for any of these actions.

Most landowners were willing to take some action in the future to prevent or remove invasive species from their property (Table 7). The action that the most people were willing to do was to learn how to identify invasive plants or insects. This would be of great value because of the finding reported earlier that many people were not able to correctly identify the invasive species we asked about. Half to two-thirds of landowners were willing to engage in most of the other actions listed on the questionnaire, which ranged from providing access to their property so others could monitor for invasive species to removal of invasive plants or trees containing invasive insects. Fewer people were willing to apply chemicals such as pesticides, herbicides, or insecticides on their property.

The only difference between landowner strata related to taking actions to control invasives concerned willingness to plant only native species on their property. Catskill landowners with large parcels were the most willing to plant native species and Lower Hudson area landowners with large parcels were the least willing. Small parcel landowners were intermediate in their willingness.

**Table 5. Respondents' beliefs about the threat of invasive species and their transport, by survey audience.**

Beliefs about invasive species	Landowner Strata				Forestry Professionals	Local Officials
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area		
	Percent					
<i>Invasive plants/insects in North America are a concern to me*</i>						
Strongly agree	57.7	63.4	61.1	64.7	66.7	49.5
Somewhat agree	31.1	25.0	26.6	26.1	26.2	39.8
Neither agree nor Disagree	6.8	8.1	6.9	5.0	4.9	7.8
Disagree (somewhat or strongly)	0.3	0.4	2.0	0.4	2.2	1.0
Don't know	4.1	3.1	3.4	3.8	0.0	1.9
<i>Invasive plants/insects on my property (region, town) are a concern to me*</i>						
Strongly agree	65.8	63.5	64.1	64.7	65.2	49.4
Somewhat agree	24.5	23.5	24.4	24.7	27.0	43.7
Neither agree nor Disagree	5.2	8.8	7.0	7.2	5.0	4.9
Disagree (somewhat or strongly)	0.7	1.5	1.5	0.4	2.3	1.0
Don't know	3.8	2.7	3.0	3.0	0.5	1.0
<i>Invasive plants/insects pose a threat to the forests in my area*</i>						
Strongly agree	41.8	41.7	48.0	42.7	57.0	37.1
Somewhat agree	23.9	25.1	20.0	25.7	25.8	32.4
Neither agree nor Disagree	12.8	15.1	19.5	13.1	11.3	21.6
Disagree (somewhat or strongly)	2.8	2.3	1.0	0.8	4.1	2.0
Don't know	18.7	15.8	11.5	17.7	1.8	6.9

<b>Table 5. (cont.)</b>						
<b>Beliefs about invasive species</b>	<b>Landowner Strata</b>				<b>Forestry Pro- fessionals</b>	<b>Local Officials</b>
	<b>Large parcels, Catskill Area</b>	<b>Small parcels, Catskill Area</b>	<b>Large parcels, Lower Hudson Area</b>	<b>Small parcels, Lower Hudson Area</b>		
	<b>Percent</b>					
<i>Invasive plants/insects can easily spread to other areas*</i>						
Strongly agree	65.5	68.2	66.7	70.8	72.7	59.4
Somewhat agree	20.8	19.5	22.5	19.0	22.0	29.7
Neither agree nor Disagree	4.1	5.0	3.4	1.3	2.7	5.9
Disagree (somewhat or strongly)	0.7	0.0	1.5	0.0	2.2	0.0
Don't know	8.9	7.3	5.9	8.9	0.4	5.0
<i>Invasive plants/insects have a negative impact on native species*</i>						
Strongly agree	58.5	61.4	63.0	60.6	61.9	55.3
Somewhat agree	23.2	19.5	22.5	18.2	24.7	17.5
Neither agree nor Disagree	4.8	7.6	6.5	8.5	5.8	10.7
Disagree (somewhat or strongly)	2.1	2.7	2.5	2.1	5.8	10.7
Don't know	11.4	8.8	5.5	10.6	1.8	5.8
<i>Invasive insects can move from one area to another in firewood*</i>						
Strongly agree	60.1	61.7	60.5	57.0	67.4	44.6
Somewhat agree	19.9	19.7	21.7	16.4	21.3	36.9
Neither agree nor Disagree	7.6	7.2	7.4	7.6	5.0	9.7
Disagree (somewhat or strongly)	0.7	0.4	0.5	0.0	2.7	1.0
Don't know	11.7	11.0	9.9	19.0	3.6	7.8
*Statistically significant difference between audiences at P = 0.05 using Chi-square test.						

**Table 6. For those respondents who have invasive species on their property, what actions they have taken to remove them, by landowner strata.**

	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
<i>Done something to remove invasives*</i>	Percent			
No	61.7	62.1	38.8	39.8
Yes	38.3	37.9	61.2	60.2
<i>If yes, measures taken:</i>	% checking**			
Removed shrubs/vines/herbs	50.0	54.5	66.2	66.2
Mowed	54.5	36.4	50.0	40.3
Removed trees	20.5	22.7	37.8	31.2
Applied pesticides, herbicides, or Insecticides	18.2	25.0	29.7	20.8
Contacted a forestry professional, arborist, or pest control specialist	9.1	11.4	14.9	14.3
Contacted an extension agent, government employee, or agency hotline	4.5	4.5	12.2	5.2
*Statistically significant difference between landowner strata at P = 0.05 using Chi-square test.				
**Percentages can add to more than 100% because more than one action could be taken.				

**Table 7. Actions respondents would be willing to take to prevent or remove invasive species from their property, by landowner strata.**

Actions Willing to Take	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	% checking*			
Learn how to identify invasive plants or insects myself	77.2	76.6	80.7	74.7
Provide access to my land so that professionals can monitor for invasive plants or insects	68.2	71.5	70.6	66.4
Remove invasive shrubs/vines/herbs	66.1	65.2	69.0	66.4
Mow or otherwise cut back plants	64.7	64.8	67.5	69.9
Report invasive plants or insects on my property to an established hotline	64.0	68.8	65.5	64.2
Remove trees containing invasive insects	66.1	67.2	65.0	60.7
Remove invasive trees	61.9	62.9	65.5	59.4
Not bring firewood from another area Onto my property	63.4	59.0	61.7	57.6
Plant only native species**	65.7	58.6	51.8	56.3
Provide access to my land so that trained volunteers can monitor for invasive plants or insects	54.3	57.8	57.4	53.3
Apply pesticides, herbicides, or insecticides	31.1	34.4	40.6	36.2
*Percentages can add to more than 100% because more than one action could be taken. **Statistically significant difference between landowner strata at P = 0.05 using Chi-square test.				

### **Educational Opportunities**

One of the major objectives of this study was to determine how best to reach landowners with information about invasive species. We found that most landowners had not used any sources of information in the past to learn about invasive species (Table 8), perhaps because this is a relatively new topic in the study area. The most commonly used sources to date were brochures or fact sheets, newsletters, books, and friends or family members. Each of these sources was accessed by about one-third of respondents. Landowners with large parcels were more likely to have gotten information from consulting foresters or someone else in the forest industry, likely as a result of a potential timber harvest.

**Table 8. Sources of information used in the past when respondents had questions about invasive plants and insects, by landowner strata.**

Sources of information	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	% checking*			
Brochures or fact-sheets	34.9	35.8	42.7	41.8
Friends/neighbors/family members	26.4	29.3	29.3	33.7
Periodic newsletters	28.3	27.2	35.4	23.6
Books	21.7	24.6	22.6	29.8
Cooperative Extension personnel	20.2	16.4	27.4	23.1
Web site on the Internet	18.2	19.4	18.3	24.5
Special mailing to my home	20.2	19.0	21.3	17.3
TV or radio programs	12.0	17.2	16.5	16.3
Consulting forester**	17.8	9.1	17.7	12.0
Someone in the forest industry, such as a logger, sawmill operator, or timber buyer**	19.0	8.6	20.1	4.3
DEC forester	16.3	9.1	11.6	9.6
Other government employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	12.8	9.1	14.6	9.6
Classes or workshops	9.7	8.2	7.9	7.2
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)**	11.6	5.2	7.9	6.3
Visits to demonstration areas	7.4	6.0	4.3	5.3
New York Forest Owners Association or Catskill Forest Association**	10.1	3.9	2.4	1.4
Video or DVD for home viewing	2.3	3.9	2.4	4.8
E-mail listserv	3.1	2.2	1.8	2.4
Cornell Master Forest Owner Volunteer	3.9	0.9	3.0	1.4
Podcast available from Internet	1.6	2.2	1.8	1.0
Other source	2.3	3.0	4.3	3.8
*Percentages can add to more than 100% because more than one source could be used.				
**Statistically significant difference between landowner strata at P = 0.05 using Chi-square test.				

More important for educators are the sources of information respondents think they will turn to for information about invasive species in the future. In this case, over half of the respondents thought they would use hard copy sources such as brochures, fact sheets, periodic newsletters, or special mailings to their home (Table 9). Web sites were a likely source for 40-60% of landowners, with smaller parcel owners being more likely to use this source. Web

sites were among the single most likely source to be used by landowners. Other electronic sources such as email listservs and podcasts were not that popular, but were more likely to be used in the future than in the past. Educators should look at Table 9 in more detail as they consider options for educational efforts in different parts of the study area.

**Table 9. Sources of information respondents think they might use in the future, and the most likely source, if they have questions about invasive plants and insects, by landowner strata.**

Sources of information	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	% checking* (% saying most likely source)			
Brochures or fact-sheets**	57.8 (13.9)	69.4 (17.2)	58.5 (13.2)	62.0 (16.2)
Friends/neighbors/family members**	29.1 (4.1)	37.9 (2.9)	23.2 (1.3)	34.6 (6.3)
Periodic newsletters**	55.8 (4.9)	60.8 (11.5)	47.6 (5.3)	46.6 (3.6)
Books	30.2 (0.8)	39.2 (2.9)	31.1 (0.0)	30.3 (1.8)
Cooperative Extension personnel	45.7 (18.8)	44.8 (11.5)	48.8 (19.7)	42.3 (11.7)
Web site on the Internet**	43.8 (16.4)	58.6 (10.6)	39.0 (14.5)	52.9 (20.8)
Special mailing to my home	50.4 (3.3)	60.8 (7.7)	50.0 (9.2)	52.9 (10.8)
TV or radio programs**	19.8 (1.6)	32.3 (1.0)	17.1 (2.6)	24.0 (1.8)
Consulting forester	39.9 (10.7)	37.5 (2.9)	34.8 (2.6)	30.3 (5.4)
Someone in the forest industry, such as a logger, sawmill operator, or timber buyer	24.0 (0.0)	19.4 (1.0)	21.3 (2.6)	14.9 (0.9)
DEC forester	44.2 (7.4)	45.3 (4.8)	40.2 (9.2)	37.0 (7.2)
Other government employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	32.9 (2.5)	35.3 (3.8)	32.9 (5.3)	27.4 (2.7)
Classes or workshops	29.5 (0.0)	31.9 (1.0)	29.9 (0.0)	25.0 (1.8)
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)	32.9 (1.6)	36.2 (0.0)	28.0 (1.3)	27.4 (0.0)
Visits to demonstration areas	32.9 (0.8)	36.2 (1.0)	30.5 (0.0)	29.3 (0.9)



<b>Table 9. (cont.)</b>				
<b>Sources of information</b>	<b>Landowner Strata</b>			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	% checking* (% saying most likely source)			
New York Forest Owners Association or Catskill Forest Association**	35.3 (4.1)	35.3 (1.9)	26.2 (0.0)	19.2 (0.9)
Video or DVD for home viewing	38.0 (3.3)	44.8 (9.6)	37.8 (6.6)	35.1 (4.5)
E-mail listserv	22.5 (0.0)	22.8 (0.0)	17.1 (1.3)	17.8 (0.9)
Cornell Master Forest Owner Volunteer	34.9 (2.5)	36.2 (5.8)	34.1 (0.0)	28.4 (0.9)
Podcast available from Internet	13.2 (0.0)	17.2 (1.0)	12.8 (0.0)	15.9 (0.9)
Other source	2.7 (3.3)	4.3 (1.9)	1.2 (5.3)	3.9 (0.0)
*Percentages can add to more than 100% because more than one source could be checked.				
**Statistically significant difference between landowner strata at P = 0.05 using Chi-square test.				

Since periodic newsletters were among the most likely sources for future information, the specific organizations or publications that respondents are currently getting information from might help in choosing the specific sources to use in educational efforts. Cornell Cooperative Extension was the most popular among the options provided (Table 10). Several sources, such as The Conservationist, the Watershed Agricultural Council, and the Catskill Forest Association, were more popular among landowners owning large parcels in the Catskill area than other landowner strata. The New York State Farm Bureau was more popular among landowners owning large parcels in the Lower Hudson area than other landowner strata. However, no one organization or publication was currently accessed by over 50% of respondents, indicating the need for multiple outlets for educational communication or the need to aggressively market sources and organizations if few are involved.

Respondents noted a variety of characteristics of educational programs that they thought would be important features in attracting them to a particular program. Those chosen by over half of the respondents included having the material available when they were available to learn, having the material available on paper, having the costs be minimal, and having a real person they can talk to (Table 11). Having information available on the Internet was more popular among small parcel landowners than large landowners. Having workshops on the weekend was more popular among Catskill landowners than Lower Hudson landowners, perhaps because the landowners in the Catskills were more likely to live away from their property and only visit the area on weekends.

**Table 10. Organizations or publications (that might carry information about invasive plants and insects) that respondents currently get information from, by landowner strata.**

Organizations or publications (that might carry information on invasive species)	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	% checking*			
Cornell Cooperative Extension**	43.1	20.8	38.4	24.9
The Conservationist**	29.3	20.1	20.9	15.6
The Nature Conservancy	15.8	18.6	19.0	20.7
Audubon	11.1	13.4	16.1	11.8
Watershed Agricultural Council**	22.2	7.8	4.7	1.3
Catskill Forest Association**	20.9	12.3	0.9	0.4
New York State Farm Bureau**	9.1	1.9	22.7	4.2
New York Forest Owners Association**	8.4	3.0	2.8	0.8
Northern Woodlands**	7.7	4.1	0.0	0.4
Other	12.5	11.9	11.8	13.1

\*Percentages can add to more than 100% because more than one organization/publication could be checked.  
\*\*Statistically significant difference between landowner strata at P = 0.05 using Chi-square test.

**Table 11. Most important features related to respondents' selection of educational materials and programs on invasive plants and insects, by landowner strata.**

Most important features	Landowner Strata			
	Large parcels, Catskill Area	Small parcels, Catskill Area	Large parcels, Lower Hudson Area	Small parcels, Lower Hudson Area
	% checking*			
Available when I'm ready to learn	53.5	61.1	53.6	59.4
Available on paper (e.g., newsletter, book)	54.7	58.0	56.5	50.9
Cost needs to be minimal	52.3	53.1	58.3	53.8
A real person I can talk to	53.1	50.9	56.0	51.4
Available from the Internet**	42.2	55.8	42.9	60.4
Direct access to a technical expert	31.8	38.9	31.5	35.4
Program or workshop available on the weekend**	22.9	25.7	12.5	19.3
Program or workshop available during the weekday evenings	12.4	11.1	12.5	15.1
Program or workshop available during the day on a weekday	12.8	10.2	13.1	12.3
Opportunity to network with others	11.2	12.8	10.7	12.7
Other features	2.7	3.1	3.0	5.2
*Percentages can add to more than 100% because more than one feature could be checked.				
**Statistically significant difference between landowner strata at P = 0.05 using Chi-square test.				

### Conclusions and Recommendations for Educational Outreach to Landowners

- Awareness of invasive species among landowners was low. Over half of the respondents had never heard of 12 of the 14 invasive plants and insects we asked about in the survey. Outreach efforts should focus first on increasing basic awareness and knowledge of invasive species. We recommend assessing existing identification guides to determine the utility of developing a field guide to invasives that includes management recommendations.
- No one species was believed to be common in any area. Norway maple, Japanese barberry, and garlic mustard were cited most often. About one-quarter of Lower Hudson landowners and fewer Catskill area landowners indicated these species were present on their property.
- Most respondents were concerned to some degree about the presence of invasive plants and insects in North America and on their property in particular. Most people believed that invasive species can easily spread to other areas, and that insects can move from one area to another in firewood. They also believed that invasive plants and insects can have

a negative impact on native species. Thus, landowners' attitudes indicate a level of concern about invasive species that could lead to action, if they had some awareness and knowledge of specific invasive species. In fact, the action that most people were willing to do was to learn how to identify invasive plants or insects. Half to two-thirds of landowners were willing to engage in other actions, such as providing access to their property so others could monitor for invasive species and removal of invasive plants or trees containing invasive insects. A "Landowner Assessment Tool" could be developed that could be used to help landowners to inspect their property for the occurrence of invasives, and subsequently to develop a plan of action to control the invasives. Training sessions (e.g., field tours, webcasts, video clips) could be provided that demonstrate how to use this tool.

- Fewer people were willing to apply chemicals such as pesticides, herbicides, or insecticides on their property. However, some of the invasive species (e.g., tree of heaven, Japanese knotweed) can be controlled only with herbicides. Some educational efforts to help landowners understand the limits and potentials of pesticides seems warranted, otherwise the problem species will persist and municipal efforts to control the invasives will be resisted by the community.
- Landowners indicated they would most likely turn to brochures or fact sheets, web sites, or Cooperative Extension personnel for information about invasive species in the future. Over half also expressed interest in periodic newsletters and special mailings to their homes. Therefore, we would recommend these methods for future communication efforts. Since no one method was preferred by everyone, multiple methods should be used. Perhaps using press releases to let people know that other, more detailed information sources exist would serve to get the word out several times a year.
- Periodic newsletters were among the most likely sources to be used for future information, so we recommend attempting to get articles in the newsletters currently read by the most respondents – Cornell Cooperative Extension, The Conservationist, and The Nature Conservancy. Information in the newsletter from the Watershed Agricultural Council would be most likely to reach landowners owning large parcels in the Catskills. Information in the newsletter from the New York State Farm Bureau would be most likely to reach landowners owning large parcels in the Lower Hudson area.

### **Specific Audience Analysis**

The Watershed Agricultural Council identified four invasive species they would like to better inform landowners about. We used information from the survey to identify and describe landowners who were not currently knowledgeable about each of the four species in turn (Norway maple, Japanese barberry, Japanese knotweed, and tree of heaven), and then ascertain the most likely ways to reach them with information. The recommendations were very similar for each species because most respondents were not knowledgeable about any species.

#### **– Landowners Not Knowledgeable About Norway Maple**

About one-third (34%) of the respondents to our survey had never heard of Norway maple before receiving the survey; another two-fifths (39%) recognized the name but did not know any more about the species. These respondents come from all four landowner strata, but

were slightly more likely to own smaller parcels of land than larger ones (Table 3). Almost half (49%) of these landowners had graduated from college; virtually all (97%) from high school. For those with wooded property, most (65-75%) thought nature and aesthetic values were very important reasons for owning the land. Fifty-five percent indicated a very important reason for owning the land was to protect nature and biological diversity. Most (53-72%) did not think utilitarian values, such as timber harvest or land investment, were important reasons why they owned wooded property.

Landowners who were not currently knowledgeable about Norway maple indicated that in the future if they had questions about invasive species, they would most likely turn to brochures or fact sheets, web sites, or Cooperative Extension personnel for information (Table 12). Over half also expressed interest in periodic newsletters and special mailings to their homes. Currently, some of them get information from Cornell Cooperative Extension, The Nature Conservancy, and The Conservationist (a magazine produced by NYS DEC), so these might be good venues for future articles/information on Norway maple (Table 13).

Most of these landowners (75%) were interested in learning how to identify invasive species (Table 14). Many were also willing to have professionals monitor invasive plants on their property. Perhaps of greatest importance for the management of Norway maple was that 62% would be willing to have invasive trees removed from their property, and an almost equal number would be willing to plant only native species in the future.

In summary, to reach these landowners with information about Norway maple, we recommend a multi-pronged approach using fact sheets, web sites, and Cornell Cooperative Extension. The message should appeal to landowners' nature and aesthetic values, and provide information on how to identify Norway maple and how to remove them from their property. Because Norway maple is a tree, some landowners will need to receive chainsaw safety training to ensure they don't hurt themselves or others if they personally undertake the management.

**Table 12. For respondents who are not knowledgeable about selected species, sources of information they think they might use in the future, and the most likely source, if they have questions about invasive plants and insects.**

Sources of information	Not knowledgeable about:			
	Norway maple	Japanese barberry	Japanese knotweed	Tree of heaven
	% checking* (% saying most likely source)			
Brochures or fact-sheets	66.7 (16.4)	63.7 (15.7)	65.4 (16.4)	62.8 (15.8)
Friends/neighbors/family members	32.2 (4.0)	31.9 (3.8)	33.4 (3.2)	31.7 (3.7)
Periodic newsletters	55.7 (7.2)	53.3 (6.8)	54.8 (7.1)	53.3 (6.2)
Books	30.5 (1.1)	31.6 (1.0)	31.4 (1.3)	30.9 (0.6)
Cooperative Extension personnel	43.9 (14.0)	44.0 (13.7)	44.8 (12.5)	43.3 (14.5)
Web site on the Internet	50.8 (15.1)	51.3 (15.1)	51.8 (16.8)	50.7 (14.8)
Special mailing to my home	56.1 (9.4)	54.8 (8.6)	56.4 (9.6)	54.7 (8.6)
TV or radio programs	24.1 (2.2)	23.9 (1.7)	23.6 (1.3)	23.0 (1.9)
Consulting forester	38.0 (5.0)	37.9 (5.8)	37.4 (6.1)	35.9 (6.5)
Someone in the forest industry, such as a logger, sawmill operator, or timber buyer	20.5 (0.0)	21.3 (0.7)	21.1 (1.0)	20.7 (0.9)
DEC forester	42.7 (7.9)	43.5 (7.5)	43.5 (7.1)	41.5 (8.0)
Other government employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	32.0 (3.2)	32.7 (2.4)	33.4 (2.3)	32.1 (3.1)
Classes or workshops	29.1 (0.4)	29.5 (0.7)	29.7 (0.3)	29.6 (0.3)
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)	30.6 (1.1)	31.8 (0.7)	31.7 (0.6)	30.5 (0.9)
Visits to demonstration areas	32.2 (1.1)	31.9 (0.7)	32.7 (0.6)	32.6 (0.6)

<b>Table 12. (cont.)</b>				
<b>Sources of information</b>	Not knowledgeable about:			
	Norway maple	Japanese barberry	Japanese knotweed	Tree of heaven
	% checking* (% saying most likely source)			
New York Forest Owners Association or Catskill Forest Association	30.3 (1.8)	30.5 (1.4)	30.0 (1.0)	30.2 (1.2)
Video or DVD for home viewing	40.1 (5.0)	39.8 (6.2)	41.0 (6.1)	39.7 (5.9)
E-mail listserv	20.0 (0.4)	20.3 (0.7)	21.1 (0.6)	20.5 (0.6)
Cornell Master Forest Owner Volunteer	34.8 (2.5)	33.9 (2.7)	35.0 (2.6)	33.6 (2.5)
Podcast available from Internet	15.3 (0.4)	14.8 (0.7)	15.6 (0.6)	15.2 (0.6)
Other source	2.9 (1.8)	2.9 (3.4)	2.9 (2.9)	3.1 (2.8)
*Percentages can add to more than 100% because more than one source could be checked.				

<b>Table 13. For respondents who are not knowledgeable about selected species, organizations or publications (that might carry information about invasive plants and insects) from which they currently get information.</b>				
<b>Organizations or publications (that might carry information on invasive species)</b>	Not knowledgeable about:			
	Norway maple	Japanese barberry	Japanese knotweed	Tree of heaven
	% checking*			
Cornell Cooperative Extension	29.2	29.6	28.6	31.1
The Conservationist	18.4	19.9	19.0	21.0
The Nature Conservancy	16.2	15.9	15.9	15.7
Audubon	11.0	10.5	10.9	11.6
Watershed Agricultural Council	9.1	8.8	7.9	9.1
Catskill Forest Association	9.4	9.1	8.4	8.8
New York State Farm Bureau	8.1	7.7	7.6	7.8
New York Forest Owners Association	3.0	3.2	3.1	3.3
Northern Woodlands	3.0	3.2	2.5	3.0
*Percentages can add to more than 100% because more than one organization/publication could be checked.				

<b>Table 14. For respondents who are not knowledgeable about selected species, actions they would be willing to take to prevent or remove invasive species from their property.</b>				
<b>Actions willing to take</b>	<b>Not knowledgeable about:</b>			
	<b>Norway maple</b>	<b>Japanese barberry</b>	<b>Japanese knotwood</b>	<b>Tree of heaven</b>
	<b>% checking*</b>			
Learn how to identify invasive plants or insects myself	75.3	75.0	75.5	75.7
Provide access to my land so that professionals can monitor for invasive plants or insects	69.8	69.0	69.7	68.3
Remove invasive shrubs/vines/herbs	65.8	64.5	66.0	66.6
Mow or otherwise cut back plants	64.9	64.5	66.0	65.6
Report invasive plants or insects on my Property to an established hotline	65.8	65.0	65.7	65.5
Remove trees containing invasive Insects	64.7	65.0	64.8	64.5
Remove invasive trees	61.5	61.5	62.1	61.8
Not bring firewood from another area onto my property	60.5	60.6	61.4	60.0
Plant only native species	57.7	57.5	58.2	58.5
Provide access to my land so that trained volunteers can monitor for invasive plants or insects	57.4	55.9	56.8	56.1
Apply pesticides, herbicides, or Insecticides	34.8	35.0	34.9	35.9
*Percentages can add to more than 100% because more than one action could be taken.				

– **Landowners Not Knowledgeable About Japanese Barberry**

Over half (60%) of the respondents to our survey had never heard of Japanese barberry before receiving the survey; another one-fifth (21%) recognized the name but did not know any more about the species. These respondents come from all four landowner strata (Table 3). Almost half (49%) of these landowners had graduated from college; virtually all (97%) from high school. For those with wooded property, most (64-75%) thought nature and aesthetic values were very important reasons for owning the land. Fifty-five percent indicated a very important reason for owning the land was to protect nature and biological diversity. Most (52-70%) did not think utilitarian values, such as timber harvest or land investment, were important reasons why they owned wooded property.

Landowners who were not currently knowledgeable about Japanese barberry indicated that in the future if they had questions about invasive species, they would most likely turn to brochures or fact sheets, web sites, or Cooperative Extension personnel for information (Table 12). Over half also expressed interest in periodic newsletters and special mailings to their



homes. Currently, some of them get information from Cornell Cooperative Extension, The Nature Conservancy, and The Conservationist (a magazine produced by NYS DEC), so these might be good venues for future articles/information on Japanese barberry (Table 13).

Most of these landowners (75%) were interested in learning how to identify invasive species (Table 14). Many were also willing to have professionals monitor invasive plants on their property. Perhaps of greatest importance for the management of Japanese barberry was that 64% would be willing to have invasive shrubs/vines/herbs removed from their property, and an almost equal number would be willing to plant only native species in the future.

In summary, to reach these landowners with information about Japanese barberry, we recommend a multi-pronged approach using fact sheets, web sites, and Cornell Cooperative Extension. The message should appeal to landowners' nature and aesthetic values, and try to increase awareness of Japanese barberry, since most people had never heard of the species before the survey. Educational materials should suggest alternatives to Japanese barberry because some people plant it for the wildlife value of the fruit.

#### **– Landowners Not Knowledgeable About Japanese Knotweed**

Almost three-quarters (72%) of the respondents to our survey had never heard of Japanese knotweed before receiving the survey; another 12% recognized the name but did not know any more about the species. These respondents come from all four landowner strata, but were slightly more likely to have land in the Lower Hudson region than the Catskills (Table 3). Half (51%) of these landowners had graduated from college; virtually all (98%) from high school. For those with wooded property, most (65-77%) thought nature and aesthetic values were very important reasons for owning the land. Fifty-six percent indicated a very important reason for owning the land was to protect nature and biological diversity. Most (51-71%) did not think utilitarian values, such as timber harvest or land investment, were important reasons why they owned wooded property.

Landowners who were not currently knowledgeable about Japanese knotweed indicated that in the future if they had questions about invasive species, they would most likely turn to brochures or fact sheets, web sites, or Cooperative Extension personnel for information (Table 12). Over half also expressed interest in periodic newsletters and special mailings to their homes. Currently, some of them get information from Cornell Cooperative Extension, The Nature Conservancy, and The Conservationist (a magazine produced by NYS DEC), so these might be good venues for future articles/information on Japanese knotweed (Table 13).

Most of these landowners (75%) were interested in learning how to identify invasive species (Table 14). Many were also willing to have professionals monitor invasive plants on their property. Perhaps of greatest importance for the management of Japanese knotweed was that 66% would be willing to have invasive shrubs/vines/herbs removed from their property, and an almost equal number would be willing to plant only native species in the future.

In summary, to reach these landowners with information about Japanese knotweed, we recommend a multi-pronged approach using fact sheets, web sites, and Cornell Cooperative

Extension. The message should appeal to landowners' nature and aesthetic values, and try to increase awareness of Japanese knotweed, since most people had never heard of the species. Because herbicides are the most effective control of Japanese knotweed, educational efforts should emphasize the general advantages and disadvantages of pesticides and the specific role and fate of herbicides that are registered in New York for control of Japanese knotweed.

– **Landowners Not Knowledgeable About Tree of Heaven**

Over three-quarters (78%) of the respondents to our survey had never heard of tree of heaven before receiving the survey; another 9% recognized the name but did not know any more about the species. These respondents come from all four landowner strata (Table 3). Half (50%) of these landowners had graduated from college; virtually all (98%) from high school. For those with wooded property, most (65-75%) thought nature and aesthetic values were very important reasons for owning the land. Fifty-five percent indicated a very important reason for owning the land was to protect nature and biological diversity. Most (51-70%) did not think utilitarian values, such as timber harvest or land investment, were important reasons why they owned wooded property.

Landowners who were not currently knowledgeable about tree of heaven indicated that in the future if they had questions about invasive species, they would most likely turn to brochures or fact sheets, web sites, or Cooperative Extension personnel for information (Table 12). Over half also expressed interest in periodic newsletters and special mailings to their homes. Currently, some of them get information from Cornell Cooperative Extension, The Nature Conservancy, and The Conservationist (a magazine produced by NYS DEC), so these might be good venues for future articles/information on tree of heaven (Table 13).

Most of these landowners (76%) were interested in learning how to identify invasive species (Table 14). Many were also willing to have professionals monitor invasive plants on their property. Perhaps of greatest importance for the management of tree of heaven was that 62% would be willing to have invasive trees removed from their property, and an almost equal number would be willing to plant only native species in the future.

In summary, to reach these landowners with information about tree of heaven, we recommend a multi-pronged approach using fact sheets, web sites, and Cornell Cooperative Extension. The message should appeal to landowners' nature and aesthetic values, and try to increase awareness of tree of heaven, since most people had never heard of the species. Because this species is a tree, some landowners will need to receive chainsaw safety training to ensure they don't hurt themselves or others if they personally undertake the management. Herbicides are the most effective control of tree of heaven. Thus, educational efforts should emphasize the general advantages and disadvantages of pesticides and the specific role and fate of herbicides that are registered in NY for control of tree of heaven.

## **Survey of Forestry and Tree Professionals**

### **Mail Survey Response and Nonrespondent Comparisons**

Of the 958 questionnaires mailed, 76 were undeliverable and 243 completed questionnaires were returned, for an adjusted response rate of 28%. This response rate was surprisingly low for an audience whom we thought would have a strong interest in the topic. However, during the course of the mailing process it came to our attention that some members of the sample might not work in the study area. This could have contributed to the low response rate because some survey recipients did not think the survey applied to them, and thus did not respond. We found from the nonrespondent telephone follow-up that 26% of nonrespondents did not work in the study area. Thus, a noteworthy proportion of our original sample was not part of our intended audience, and their nonresponse, while explainable, makes the overall response rate appear low.

Respondents were more likely to identify themselves as foresters, whereas nonrespondents were more likely to be loggers or nursery/greenhouse operators, perhaps reflecting their level of interest in the survey topic. There were no differences between respondents and nonrespondents in the locations worked within the study area.

Respondents were more likely than nonrespondents to have heard of all five of the invasive plants and insects that we asked about. With the exception of the Asian longhorned beetle, respondents were more likely than nonrespondents to have seen the other four invasive species occasionally or commonly in the area where they worked.

Respondents and nonrespondents were equally concerned about invasive species and their potential threat to forests. Nonrespondents were slightly more willing to take certain actions (i.e., identify invasive species in the field, report invasive species to the appropriate agency) to prevent the spread of invasive species. This seemingly unusual finding could be the result of different methods being used to collect data, rather than a true difference between respondents and nonrespondents. It might have been harder for nonrespondents, who were interviewed by telephone, to indicate that they were not going to do anything to prevent the spread of invasive species, than mail questionnaire respondents.

### **Characteristics of Forestry and Tree Professionals**

This survey audience covers a wide range of professions that could be involved with the management of invasive plants and insects. Among mail survey respondents, one-third (32%) identified themselves as foresters, 29% were loggers, 28% were arborists, 16% were landscapers, and 8% were nursery/greenhouse operators. Other job categories listed less frequently included sawmill operators, excavators, and Cooperative Extension educators. (Respondents could indicate more than one job category, so the percentages above add to more than 100%.)

Respondents worked throughout the study area (Fig. 2). Delaware County had the highest percentage of workers (43%); Rockland, the lowest (12%). About 20-30% of respondents worked in each of the remaining counties.

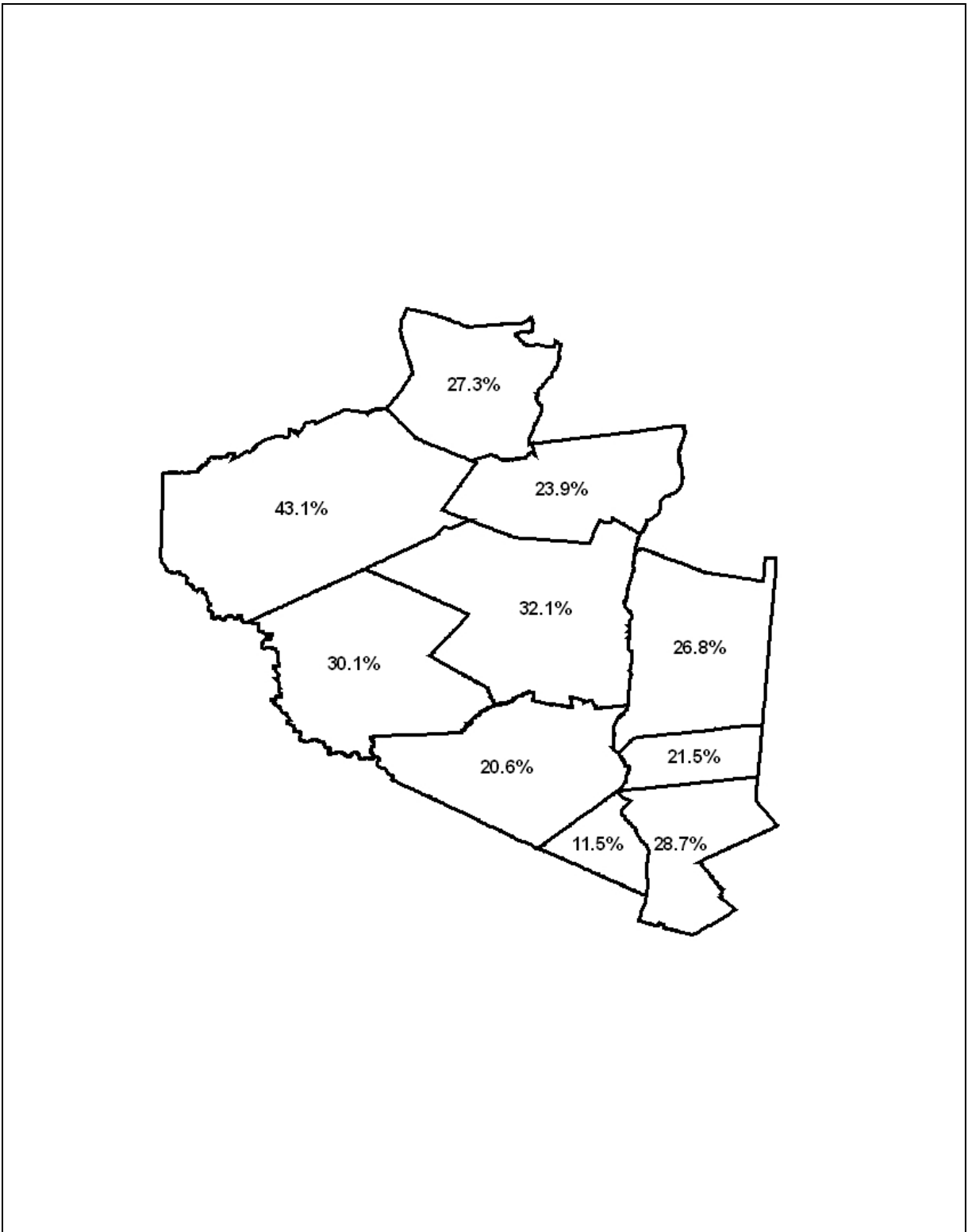


Figure 2. Percent of responding forestry and tree professionals working in each county.

Almost all respondents (94%) were men. They ranged in age from 20 to 95 with an average age of 50. Almost all of them (96%) had finished high school, and 47% had finished college.

### Awareness of Invasive Species

Most forestry and tree professionals had at least heard of the invasive trees, shrubs, and insects that we asked about (Table 15). They were less likely to be familiar with the herbs and vines on the list. The most commonly seen invasive species included Norway maple, bush honeysuckles, and the hemlock woolly adelgid. Also common, according to more than 35% of respondents were Japanese knotweed, Japanese barberry, and tree of heaven. Interestingly, 16% of respondents indicated that they had seen the emerald ash borer in the study area, which according to state experts is not yet found in New York State.

<b>Table 15. Forestry and tree professionals' level of awareness of specific invasive plants and insects in the Catskill and Lower Hudson regions.</b>				
<b>Invasive Species</b>	Never heard of before	Heard of, but have never seen	Have seen occasionally in my area	Have seen commonly in my area
	Percent			
<i>Trees</i>				
Norway maple	6.3	13.9	30.5	49.3
Tree of heaven	27.3	16.4	19.5	36.8
<i>Shrubs</i>				
Japanese barberry	14.7	16.6	30.9	37.8
Bush honeysuckles	12.7	19.2	26.3	41.8
Buckthorn	20.1	30.8	29.9	19.2
Japanese knotweed	24.4	13.4	23.5	38.7
<i>Herbs</i>				
Garlic mustard	30.2	20.5	19.2	30.1
Japanese stiltgrass	44.8	27.6	17.1	10.5
<i>Vines</i>				
Asiatic bittersweet	26.7	20.3	24.0	29.0
Mile-a-minute	32.4	39.4	17.1	11.1
Kudzu	29.2	54.1	10.2	6.5
<i>Insects</i>				
Hemlock woolly adelgid	7.8	25.6	24.6	42.0
Asian longhorned beetle	7.8	76.2	12.3	3.7
Emerald ash borer	11.4	72.7	13.2	2.7

## Beliefs about Forestland and Concerns about Invasive Species

Almost all respondents felt strongly that healthy forests were important to them (Table 4). Almost all also agreed, either strongly or somewhat, that healthy trees can improve the health of the forest and that healthy forests require active management to remain healthy. Consistent with their belief in management, most disagreed with the statement “you don’t have to worry about the forest because Mother Nature will take care of the trees.” Over half believed that the primary use of the forest should be for products useful to humans and over half saw deer as a threat to the forest ecosystem. They were more divided in their opinion of whether forest landowners have the right to use the land as they see fit; 56% agreed, 32% disagreed, the remainder neither agreed nor disagreed. Unlike landowners (discussed earlier), most professionals had an opinion about these statements, and their opinions tended to be more strongly held than those of landowners or local officials (discussed in the next section of the report).

Respondents were asked about a variety of factors that might affect forest health and how concerned they were about each one. The factor of greatest concern to the most people was invasive insects, followed by invasive plants and urban/suburban sprawl (Table 16). Most respondents were at least moderately concerned about air and water pollution, and to a slightly lesser extent, native insects or plant diseases and wild animals, such as deer.

Factors that may affect forest health	Level of concern			
	Very	Moderately	Somewhat	Not at all
	Percent			
Air and water pollution	38.9	30.6	23.6	6.9
Invasive insects	66.0	20.5	11.2	2.3
Invasive plants	48.9	25.8	22.1	3.2
Urban/suburban sprawl	47.0	28.4	18.6	6.0
Fire	16.0	15.1	34.9	34.0
Wind or ice storms	16.6	32.7	32.3	18.4
Native insects or plant diseases	28.2	32.2	30.5	9.1
Wild animals, such as deer	35.1	25.3	23.0	16.6
Domestic animals, such as cows	7.1	14.7	27.0	51.2

The concern for forest health and the impact of invasive species was reiterated in another set of questions specifically on invasive species, where again, most respondents believed invasive species were a concern and posed a threat to forests in their area (Table 5). Over two-thirds of tree and forestry professionals strongly agreed that invasive plants and insects can 1) easily spread, 2) have a negative impact on native species, and 3) invasive insects can spread in firewood.

## Actions Taken to Remove Invasive Species and Willingness to Take Action in the Future

Half or more of the respondents have done and in the future would be willing to do the following activities to prevent or remove invasive plants or insects from the region: 1) identify invasive species in the field, 2) remove invasive trees, and 3) remove invasive shrubs/vines/herbs (Table 17). Over half of the respondents would be willing to do the following activities in the future, even though many have not done them in the past: 1) remove trees containing invasive insects, 2) train landowners to identify invasive species, and 3) address invasive species in forest management plans. Almost three-quarters of respondents would be willing to report invasive species to the appropriate agency, but only 20% have done so in the past, perhaps because the species are not present in their area or they do not know whom to contact.

<b>Table 17. Activities forestry and tree professionals have done or would be willing to do to prevent or remove invasive plants or insects from the region.</b>		
<b>Activities to prevent or remove invasive plants or insects</b>	Have done in the past	Would do in the future
	% checking*	
Identify invasive species in the field	62.7	54.2
Remove invasive trees	53.3	52.8
Remove invasive shrubs/vines/herbs	50.0	53.3
Mow or otherwise cut back plants	50.0	45.3
Suggest landowners plant only native species	44.3	46.2
Train landowners to identify invasive species	41.0	57.5
Address invasive species in forest management plans	40.6	53.8
Apply pesticides, herbicides, or insecticides to kill invasive species	39.6	42.9
Remove trees containing invasive insects	35.8	60.4
Not transport firewood from one area to another	32.5	46.7
Report invasive species to the appropriate agency	20.3	70.8
*Percentages can add to more than 100% because more than one activity could be checked.		

### Educational Opportunities

Many respondents had used a variety of sources in the past to learn more about invasive species (Table 18). These numbers are two to three times greater than for landowners, who had generally not accessed many sources of information about invasive species in the past (Table 8). Some sources appeared not to be as popular as future sources for forestry and tree professionals as they were in the past (e.g., brochures or fact sheets, periodic newsletters, books), while others, particularly electronic media such as listservs or podcasts, were more likely to be accessed in the future. However, when professionals were asked for the one most likely source to be used in the future, four of the most popular ones in the past were listed – brochures or fact-sheets, DEC foresters, Cooperative Extension personnel, and web sites on the Internet.

<b>Table 18. Sources of information forestry and tree professionals have used or are likely to use in the future when they have questions about invasive plants and insects.</b>			
	Have used	Will likely use in the future	Most likely to use in the future
<b>Sources of information</b>	% checking*		Percent
Brochures or fact-sheets	76.3	53.5	17.6
Periodic newsletters	69.3	47.0	6.7
Books	59.5	43.3	2.5
Cooperative Extension personnel	50.7	48.4	15.8
Web site on the Internet	45.1	47.9	15.8
Special mailing to my workplace	49.8	43.3	5.0
TV or radio programs	19.5	31.6	0.8
Consulting forester	34.9	29.3	2.5
DEC forester	44.7	42.8	17.6
Other government employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	31.2	40.9	3.3
Classes or workshops	62.3	47.0	7.5
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)	24.2	40.5	0.8
Visits to demonstration areas	30.7	47.9	0.0
New York Forest Owners Association or Catskill Forest Association	11.6	34.9	1.7
Video or DVD	20.0	38.6	0.8
E-mail listserv	13.5	34.9	0.0
Podcast available from Internet	1.9	27.9	0.8
Other source	8.4	5.6	0.8
*Percentages can add to more than 100% because more than one source could be checked.			

Three-quarters of respondents were interested in learning more about four of the five topics we suggested for educational efforts in the future (Table 19). The most popular topics were learning more about the existing laws, regulations and quarantines regarding invasive species, and how best to remove, control or eradicate invasive plants and insects. Least popular was learning who to contact with questions about invasive species, but still over half of the respondents were interested in this topic.

Professionals were asked what program features were most important to them when they made a decision about material use or participation. The most commonly cited feature was having the material available on paper, such as in newsletters or books (Table 20). Also important to about half of the respondents were having the material available when they were ready to learn, and having a real person to talk to.



<b>Table 19. Topics forestry and tree professionals would like to have more information on.</b>	
<b>Topics</b>	<b>% checking*</b>
What are the existing laws, regulations and quarantines regarding invasive species	77.2
How to best remove, control or eradicate invasive plants and insects	76.7
How to identify invasive plants and insects in the field	71.8
How to prevent the spread of invasive plants and insects	70.9
Whom to contact with questions about invasive species	57.8
*Percentages can add to more than 100% because more than one topic could be chosen.	

<b>Table 20. Most important features related to forestry and tree professionals' selection of educational materials and programs on invasive plants and insects.</b>	
<b>Most important features</b>	<b>% checking*</b>
Available when I'm ready to learn	52.1
Available on paper (e.g., newsletter, book)	60.2
Cost needs to be minimal	41.7
A real person I can talk to	47.9
Available from the Internet	45.5
Direct access to a technical expert	41.7
Program or workshop available on the weekend	28.0
Program or workshop available during the weekday evenings	28.9
Program or workshop available during the day on a weekday	36.5
Opportunity to network with others	28.0
Other features	6.6
*Percentages can add to more than 100% because more than one feature could be selected.	

### **Conclusions and Recommendations for Educational Outreach to Forestry and Tree Professionals**

- Respondents to this survey covered a wide range of professions that could be involved with the management of invasive plants and insects. Among mail survey respondents, one-third (32%) identified themselves as foresters, 29% were loggers, 28% were arborists, 16% were landscapers, and 8% were nursery/greenhouse operators. Respondents worked throughout the study area. Therefore, the recommendations for educational outreach likely will apply throughout the study area and for the professions listed above.
- Most forestry and tree professionals had at least heard of the invasive trees, shrubs, and insects that we asked about. They were less likely to be familiar with the herbs and vines on the list. Outreach efforts should focus on increasing the knowledge base of professionals. Perhaps existing identification guides should be assessed to determine the utility of developing a field guide to invasives that includes management

recommendations. A website could be developed that allows reporting of invasives and links to sources of information. The website could link to a geospatial database that shows reported or actual hotspots for invasives.

- The most commonly seen invasive species included Norway maple, bush honeysuckles, and the hemlock woolly adelgid. Also common, according to more than 35% of respondents were Japanese knotweed, Japanese barberry, and tree of heaven.
- Almost all respondents felt strongly that healthy forests were important to them. Almost all also agreed, either strongly or somewhat, that healthy trees can improve the health of the forest and that healthy forests require active management to remain healthy. Over two-thirds of tree and forestry professionals strongly agreed that invasive plants and insects can easily spread and have a negative impact on native species, and that invasive insects can spread in firewood. Thus, professionals' attitudes indicate a level of concern about invasive species and a belief in forest management that would lead to support for invasive species management actions. In fact, many of the respondents would be willing to undertake any of the actions we suggested, including such things as reporting invasive species to the appropriate agency, removing trees containing invasive insects, and training landowners to identify invasive species.
- When professionals were asked for the one most likely source of invasive species information they would use in the future, they listed the following four sources – brochures or fact-sheets, DEC foresters, Cooperative Extension personnel, and web sites. The most popular topics were learning more about the existing laws, regulations and quarantines regarding invasive species, and how best to remove, control or eradicate invasive plants and insects. Therefore, we would recommend using these sources for future communication efforts and developing educational materials on these topics, if they do not already exist. Since no one source was preferred by everyone, multiple sources should be used.
- Another suggestion would be to develop sample text that foresters can insert into management plans associated with each of the invasive species.
- It would be useful to determine how many tree and forestry professionals are NYS Certified Pesticide Applicators (we suspect not a lot), and help them see how this skill is a job opportunity, given the interest among landowners for controlling invasives. Training in IPM for these audiences related to the control of invasive species could be developed if the need is verified.

## **Survey of Local Officials**

### **Mail Survey Response and Nonrespondent Comparisons**

Of the 372 questionnaires mailed, 3 were undeliverable and 104 completed questionnaires were returned, for an adjusted response rate of 28%. We found from the nonrespondent telephone follow-up that 28% of nonrespondents did not work in the study area. It appears from looking back at the sample list that officials from towns and villages in several counties outside the study area were included in the sample. This likely accounts in part for the low response rate, because the survey was not applicable to part of the sample.

Respondents and nonrespondents were very similar in their job duties and their awareness of and concern for invasive plants and insects. They were equally aware of three of the five invasive species we asked about. For two species, Norway maple and Japanese knotweed, respondents were twice as likely as nonrespondents to have heard of the species. There was no difference between respondents and nonrespondents in their level of concern about invasive species or the threat they posed to forests in the area. Nonrespondents were just as willing as respondents to report invasive species to the appropriate agency or identify invasive species in the field. Nonrespondents, however, were more willing to use only native plant species in community plantings.

### Characteristics of Local Officials and Their Communities

Local officials who responded to our survey consisted of town highway supervisors (52%), town supervisors (24%), town planners (6%), city or village Department of Public Works supervisors (2%), chairpersons of town conservation advisory committees (5%), and others in a variety of job categories (11%). These percentages do not necessarily reflect local officials' proportions in the work force, but rather, these are all people at the local government level who might be involved with invasive species management. Approximately one-third (37%) were involved in deciding what type of plant material is used in their town, and most of them (75%) spent part of the budget they were responsible for on plant material, planting, or mowing.

The most common local community attributes and activities represented by respondents included highway shoulder mowing programs and zoning regulations (Table 21). About one-third of respondents said their community had a conservation advisory council; far fewer had rules about tree planting or invasive species. Also, few had planning or staffing functions specific to forest/tree management.

<b>Table 21. Town or municipal attributes and activities identified by local officials.</b>	
<b>Town/municipality attributes</b>	<b>% checking*</b>
Highway shoulder mowing program	84.7
Zoning regulations	71.4
Conservation advisory council	32.7
Tree ordinance	18.4
Environmental management committee	14.3
Restrictions/regulations on transfer of construction fill	11.2
Staff forester/arborist	4.1
Urban/community forest management plan	3.1
Street tree inventory	3.1
Restrictions/quarantines on import of plants or insects	1.0
*Percentages can add to more than 100% because more than one attribute could be checked.	

## Awareness of Invasive Species

Less than half of the respondents had ever heard of many of the invasive plants and insects we asked about in the questionnaire (Table 22). The species most likely to be known was Norway maple. About one-quarter of respondents thought it was common in their area along with Japanese barberry, Japanese knotweed, garlic mustard, and bush honeysuckles. As with the other survey audiences, methods for accurate identification of invasive species are needed, as evidenced by 13% of respondents who indicated they have seen the emerald ash borer in their area when it has not yet been detected in New York State.

## Beliefs about Forestland and Concerns about Invasive Species

Most of the respondents felt strongly that healthy forests were important to them (Table 4). Almost all also agreed, either strongly or somewhat, that healthy trees can improve the health of the forest and that healthy forests require active management to remain healthy. Consistent with their belief in management, most disagreed with the statement “you don’t have to worry

<b>Table 22. Local officials’ level of awareness of specific invasive plants and insects in their area.</b>				
<b>Invasive Species</b>	Never heard of before	Heard of, but have never seen	Have seen occasionally in my area	Have seen commonly in my area
	Percent			
<i>Trees</i>				
Norway maple	22.2	27.3	24.2	26.3
Tree of heaven	68.4	10.5	9.5	11.6
<i>Shrubs</i>				
Japanese barberry	41.0	13.7	21.1	24.2
Bush honeysuckles	33.3	26.0	18.8	21.9
Buckthorn	54.2	21.3	20.2	4.3
Japanese knotweed	40.9	17.2	17.2	24.7
<i>Herbs</i>				
Garlic mustard	52.0	13.0	11.0	24.0
Japanese stiltgrass	64.5	12.9	15.1	7.5
<i>Vines</i>				
Asiatic bittersweet	58.3	12.5	12.5	16.7
Mile-a-minute	54.8	24.2	14.7	6.3
Kudzu	53.5	35.1	6.2	5.2
<i>Insects</i>				
Hemlock woolly adelgid	48.4	21.1	17.9	12.6
Asian longhorned beetle	34.0	51.1	11.7	3.2
Emerald ash borer	48.0	38.8	11.2	2.0

about the forest because Mother Nature will take care of the trees.” For the other opinion questions, such as primary use of the forest and landowner rights to manage, respondents were divided. Also, respondents were less likely than other survey audiences to have strong opinions on these topics.

Respondents were asked about a variety of factors that might affect forest health and how concerned they were about each one. Air and water pollution along with invasive insects were of greatest concern to this audience (Table 23). These were followed closely by concerns about invasive plants, urban/suburban sprawl, fire, and wind or ice storms. Thus, respondents were concerned about many factors that might affect forest health.

The concern for forest health and the impact of invasive species was reiterated in another set of questions specifically on invasive species, where again, many respondents indicated invasive species were a concern and posed a threat to forests in their area (Table 5). Over two-thirds of local officials agreed that invasive plants and insects can 1) easily spread, 2) have a negative impact on native species, and 3) invasive insects can spread in firewood. Their opinions on these questions were not held as strongly as those of most tree and forestry professionals, who “strongly agreed” with these statements.

<b>Table 23. Local officials’ level of concern about certain factors that may affect forest health.</b>				
<b>Factors that may affect forest health</b>	<b>Level of Concern</b>			
	<b>Very</b>	<b>Moderately</b>	<b>Somewhat</b>	<b>Not at all</b>
	<b>Percent</b>			
Air and water pollution	43.9	33.7	17.3	5.1
Invasive insects	44.2	33.7	20.0	2.1
Invasive plants	37.5	34.4	25.0	3.1
Urban/suburban sprawl	36.7	33.7	23.5	6.1
Fire	34.1	20.6	27.8	17.5
Wind or ice storms	33.0	28.0	30.0	9.0
Native insects or plant diseases	29.0	28.0	35.5	7.5
Wild animals, such as deer	25.0	30.0	23.0	22.0
Domestic animals, such as cows	10.2	22.4	28.6	38.8

### **Actions Taken to Remove Invasive Species and Willingness to Take Action in the Future**

Respondents have engaged in very few activities in the past to control invasive species (Table 24). The activity done most often was mowing, which was not surprising since over half of our respondents were highway supervisors. All other activities had been done by less than one-quarter of respondents. However, in the future over half of the respondents were willing to engage in a variety of activities to control invasive plants and insects. The most commonly cited activities included reporting invasive species to the appropriate agency, mowing, and training municipal employees to identify invasive species.

## Educational Opportunities

In the past, local officials have gotten information about invasive species from a variety of sources, primarily print sources -- brochures or fact sheets, and periodic newsletters, and people sources -- Cooperative Extension personnel, and other government employees (e.g., Soil and Water Conservation District, NYC DEP, NRCS) (Table 25). Few had contacted DEC or consulting foresters. In the future, local officials would turn to these same sources and several others for information. Among the new sources they would turn to are web sites and DEC foresters.

Two-thirds to three-quarters of local officials wanted to learn more about how to identify invasive plants and insects, how to control them, how to prevent their spread, and whom to contact for more information (Table 26). Fewer were interested in topics with more long-term goals, such as developing a forest management plan.

<b>Table 24. Activities local officials have done or would be willing to do to prevent or remove invasive plants or insects from their town or municipality.</b>		
	Have done in the past	Would do in the future
<b>Activities to prevent or remove invasive plants or insects</b>	% checking*	
Mow or otherwise cut back plants	41.8	58.2
Identify invasive species in the field	24.2	50.5
Remove invasive shrubs/vines/herbs	23.1	38.5
Remove invasive trees	18.7	37.4
Apply pesticides, herbicides, or insecticides to kill invasive species	17.6	27.5
Use only native plant species in community plantings	15.4	49.5
Train municipal employees to identify invasive species	14.3	57.1
Train landowners or volunteers to identify invasive species	7.7	44.0
Address invasive species in urban/community forest management plans	7.7	39.6
Report invasive species to the appropriate agency	7.7	69.2
Hire a professional forester or arborist	7.7	18.7
Remove trees containing invasive insects	7.7	39.6
Stockpile dirt from construction activities to prevent transport of invasive plants	6.6	34.1
Not transport firewood from one area to another	5.5	23.1
Develop regulations to control the spread of invasive species	1.1	36.3
*Percentages can add to more than 100% because more than one activity could be checked.		

**Table 25. Sources of information local officials have used or are likely to use in the future when they have questions about invasive plants and insects.**

Sources of information	Have used	Will likely use in the future	Most likely to use in the future
	% checking*		Percent
Brochures or fact-sheets	57.0	52.7	16.3
Periodic newsletters	40.9	50.5	0.0
Books	28.0	34.4	0.0
Cooperative Extension personnel	37.6	49.5	16.3
Web site on the Internet	31.2	46.2	11.6
Special mailing to my workplace	31.2	51.6	7.0
TV or radio programs	12.9	21.5	0.0
Consulting forester	17.2	32.3	0.0
DEC forester	28.0	49.5	16.3
Other government employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	44.1	44.1	23.2
Classes or workshops	19.4	45.2	2.3
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)	19.4	29.0	0.0
Visits to demonstration areas	17.2	38.7	0.0
New York Forest Owners Association or Catskill Forest Association	4.3	24.7	0.0
Video or DVD	7.5	38.7	4.7
E-mail listserv	9.7	18.3	0.0
Podcast available from Internet	3.2	20.4	0.0
Other source	2.2	2.2	2.3
*Percentages can add to more than 100% because more than one source could be checked.			

**Table 26. Topics local officials would like to have more information on.**

Topics	% checking*
How to best remove, control or eradicate invasive plants and insects	74.5
How to prevent the spread of invasive plants and insects	70.2
Whom to contact with questions about invasive species	69.1
How to identify invasive plants and insects in the field	68.1
How to assess the health of trees in your community	42.6
How to develop an urban/community forest management plan	24.5
*Percentages can add to more than 100% because more than one topic could be chosen.	

In choosing educational materials or programs, key considerations for over half of the respondents included keeping costs minimal, having a real person to talk to, but also having the material available on the Internet and on paper (Table 27). Since educational programs would be related to their job function, almost half of the respondents wanted the programs to be held during the day on a weekday.

<b>Table 27. Most important features related to local officials' selection of educational materials and programs on invasive plants and insects.</b>	
<b>Most important features</b>	<b>% checking*</b>
Available when I'm ready to learn	39.6
Available on paper (e.g., newsletter, book)	51.0
Cost needs to be minimal	63.5
A real person I can talk to	55.2
Available from the Internet	56.3
Direct access to a technical expert	39.6
Program or workshop available on the weekend	12.5
Program or workshop available during the weekday evenings	20.8
Program or workshop available during the day on a weekday	45.8
Opportunity to network with others	22.9
Other features	2.1
*Percentages can add to more than 100% because more than one feature could be selected.	

### **Conclusions and Recommendations for Educational Outreach to Local Officials**

- Local officials who responded to our survey consisted of town highway supervisors (52%), town supervisors (24%), town planners (6%), city or village Department of Public Works supervisors (2%), chairpersons of town conservation advisory committees (5%), and others in a variety of job categories (11%). These are all people at the local government level who might be involved with invasive species management.
- Less than half of the respondents had ever heard of many of the invasive plants and insects we asked about in the questionnaire. The species most likely to be known was Norway maple. About one-quarter of respondents thought it was common in their area along with Japanese barberry, Japanese knotweed, garlic mustard, and bush honeysuckles. Outreach efforts should focus first on increasing basic awareness and knowledge of invasive species. The field identification guide and website mentioned for tree and forestry professionals would have application to this audience.
- Most of the respondents felt strongly that healthy forests were important to them. Almost all also agreed, either strongly or somewhat, that healthy trees can improve the health of the forest and that healthy forests require active management to remain healthy. Over two-thirds of local officials agreed that invasive plants and insects can easily spread and have a negative impact on native species, and that invasive insects can spread in firewood. Their opinions on these questions were not held as strongly as those of most tree and forestry professionals, who “strongly agreed” with these statements. However, local officials’ attitudes indicate a level of concern about invasive species and a belief in



forest management that would lead to general support for invasive species management actions. In fact, over half of the respondents were willing to engage in a variety of activities to control invasive plants and insects. The most commonly cited activities included reporting invasive species to the appropriate agency, mowing, and training municipal employees to identify invasive species.

- Local officials would be most likely to turn to the following sources for information about invasive species -- brochures or fact sheets, periodic newsletters, web sites, Cooperative Extension personnel, DEC foresters, and other government employees (e.g., Soil and Water Conservation District, NYC DEP, NRCS). They would like to learn more about how to identify invasive plants and insects, how to control them, how to prevent their spread, and whom to contact for more information. Since educational programs would be related to their job function, almost half of the respondents wanted the programs to be held during the day on a weekday. Therefore, we would recommend using these sources for future communication efforts and developing educational materials on these topics, if they do not already exist. Holding programs during the workday also seems reasonable to reach many members of this audience. However, since no one source was preferred by everyone, multiple sources should be used. Perhaps also creating a database of highway crews who have successfully dealt with specific invasives could provide an opportunity for other highway supervisors to contact them and learn from their experiences.

## **LITERATURE CITED**

- Butler, B. J., and E. C. Leatherberry. 2004. America's family forest owners (plus responses by Best, Kilgore, Sampson, and Larson). *Journal of Forestry* 102(7): 4-9.
- Connelly, N.A., T.L. Brown, and P.J. Smallidge. 2007. An assessment of family forest owners in New York State, 2007. HDRU Publ. No. 07-6. Dept. of Nat. Resour., N.Y.S. Coll. Agric. And Life Sci., Cornell Univ., Ithaca, N.Y.

## **APPENDIX A: STUDY QUESTIONNAIRES**

# INVASIVE PLANTS AND INSECTS

## A SURVEY OF LOCAL OFFICIALS IN THE CATSKILLS AND LOWER HUDSON REGION



## INVASIVE PLANTS AND INSECTS: A SURVEY OF LOCAL OFFICIALS IN THE CATSKILLS AND LOWER HUDSON REGION

Research conducted by the  
Human Dimensions Research Unit  
Department of Natural Resources  
Cornell University

Conducted in cooperation with  
the Watershed Agricultural Council

The purpose of this survey is to learn more about invasive plants and insects in the Catskill and Lower Hudson Regions of New York State. We would like to learn more about your experiences with invasive species, how concerned you are about these plants and insects, and what educational materials or methods you might be interested in to help you to learn more about them. The Watershed Agricultural Council and its partners will use the information from survey respondents to improve and develop new educational materials, services and programs to meet your needs.

Please complete this questionnaire at your earliest convenience, seal it with the white resealable label provided, and drop it in any mailbox; return postage has been provided. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. The information you provide will remain strictly confidential and will never be associated with your name.



Cornell University  
Human Dimensions Research Unit

**THANK YOU FOR YOUR HELP!**

**THE CATSKILL AND LOWER HUDSON REGION**

1. Does your town or municipality have any of the following? (Please check all that apply.)

- \_\_\_\_\_ urban/community forest management plan
- \_\_\_\_\_ street tree inventory
- \_\_\_\_\_ staff forester/arborist
- \_\_\_\_\_ tree ordinance
- \_\_\_\_\_ highway shoulder mowing program
- \_\_\_\_\_ restrictions/quarantines on import of plants or insects
- \_\_\_\_\_ restrictions/regulations on transfer of construction fill
- \_\_\_\_\_ environmental management committee
- \_\_\_\_\_ conservation advisory council
- \_\_\_\_\_ zoning regulations

2. Please indicate your level of concern about each of the factors below on the health of forests in the Catskills and Lower Hudson Region. (Check one box for each item.)

Factors that May Affect Forest Health	Not at all concerned	Somewhat concerned	Moderately concerned	Very concerned
Air and water pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic animals, such as cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild animals, such as deer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive insects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Native insects or plant diseases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wind or ice storms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urban/suburban sprawl	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**INVASIVE SPECIES**

3. Have you heard of or seen any of the plants or insects shown on the enclosed flyer in your town or municipality? (Check one box for each plant or insect.)

	Never heard of before	Heard of, but have never seen	Have seen occasionally in my area	Have seen commonly in my area
<b>Trees</b>				
Norway maple	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tree of heaven	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Shrubs</b>				
Buckthorn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Japanese barberry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bush honeysuckles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Herbs</b>				
Japanese stiltgrass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garlic mustard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Vines</b>				
Asiatic bittersweet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kudzu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mile-a-minute	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Insects</b>				
Hemlock woolly adelgid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asian longhorned beetle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emerald ash borer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Please indicate how strongly you agree or disagree with each of the following statements: (Check one box for each statement.)

	Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree	Don't Know
Invasive plants/insects in North America are a concern to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects in my town or municipality are a concern to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects pose a threat to the forests in my area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects have a negative impact on native species.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects can easily spread to other areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive insects can move from one area to another in firewood.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants might be in the dirt going to or from construction sites in my area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Have you done or would you be willing to do any of the following activities to prevent or remove invasive plants or insects from your town or municipality? (Please check all that apply.)

Have done in the past	Would do in the future	
<input type="checkbox"/>	<input type="checkbox"/>	address invasive species in urban/community forest management plans
<input type="checkbox"/>	<input type="checkbox"/>	identify invasive species in the field
<input type="checkbox"/>	<input type="checkbox"/>	train landowners or volunteers to identify invasive species
<input type="checkbox"/>	<input type="checkbox"/>	train municipal employees to identify invasive species
<input type="checkbox"/>	<input type="checkbox"/>	report invasive species to the appropriate agency
<input type="checkbox"/>	<input type="checkbox"/>	hire a professional forester or arborist
<input type="checkbox"/>	<input type="checkbox"/>	remove invasive trees
<input type="checkbox"/>	<input type="checkbox"/>	remove invasive shrubs/vines/herbs
<input type="checkbox"/>	<input type="checkbox"/>	remove trees containing invasive insects
<input type="checkbox"/>	<input type="checkbox"/>	apply pesticides, herbicides, or insecticides to kill invasive species
<input type="checkbox"/>	<input type="checkbox"/>	mow or otherwise cut back plants
<input type="checkbox"/>	<input type="checkbox"/>	use only native plant species in community plantings
<input type="checkbox"/>	<input type="checkbox"/>	not transport firewood from one area to another
<input type="checkbox"/>	<input type="checkbox"/>	develop regulations to control the spread of invasive species
<input type="checkbox"/>	<input type="checkbox"/>	stockpile dirt from construction activities to prevent transport of invasive plants

## EDUCATIONAL OPPORTUNITIES

**6a. Please indicate which of the following sources of help and information you have used when you had questions about invasive plants and insects. ALSO, please indicate which sources you would likely use in the future if you had questions, even if you haven't used them in the past. (Check ALL that apply.)**

Source of information	Have used?	Likely use in the future?
Brochures or fact-sheets	<input type="checkbox"/>	<input type="checkbox"/>
Periodic newsletters	<input type="checkbox"/>	<input type="checkbox"/>
Special mailing to my workplace	<input type="checkbox"/>	<input type="checkbox"/>
Classes or workshops	<input type="checkbox"/>	<input type="checkbox"/>
Visits to demonstration areas	<input type="checkbox"/>	<input type="checkbox"/>
Books	<input type="checkbox"/>	<input type="checkbox"/>
Web site on the Internet	<input type="checkbox"/>	<input type="checkbox"/>
Podcast available from Internet	<input type="checkbox"/>	<input type="checkbox"/>
E-mail listserv	<input type="checkbox"/>	<input type="checkbox"/>
Video or DVD	<input type="checkbox"/>	<input type="checkbox"/>
Consulting forester	<input type="checkbox"/>	<input type="checkbox"/>
Department of Environmental Conservation (DEC) forester	<input type="checkbox"/>	<input type="checkbox"/>
Other govt. employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	<input type="checkbox"/>	<input type="checkbox"/>
Cooperative Extension personnel	<input type="checkbox"/>	<input type="checkbox"/>
TV or radio programs	<input type="checkbox"/>	<input type="checkbox"/>
New York Forest Owners Association or Catskill Forest Association	<input type="checkbox"/>	<input type="checkbox"/>
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify: _____ _____)	<input type="checkbox"/>	<input type="checkbox"/>

**6b. Please circle the one source above that you would be most likely to use in the future.**

**7. Which of the following topics would you like to have more information on? (Please check all that apply.)**

- \_\_\_\_\_ How to assess the health of trees in your community
- \_\_\_\_\_ How to develop an urban/community forest management plan
- \_\_\_\_\_ How to identify invasive plants and insects in the field
- \_\_\_\_\_ How to prevent the spread of invasive plants and insects
- \_\_\_\_\_ How to best remove, control or eradicate invasive plants and insects
- \_\_\_\_\_ Whom to contact with questions about invasive species

**8. What features are most important in your selection of educational materials and programs related to invasive plants and insects? (Check ALL that apply.)**

- \_\_\_\_\_ Available when I'm ready to learn
- \_\_\_\_\_ Opportunity to network with others
- \_\_\_\_\_ Cost needs to be minimal
- \_\_\_\_\_ Available from the Internet
- \_\_\_\_\_ Available on paper (e.g., newsletter, book)
- \_\_\_\_\_ Direct access to a technical expert
- \_\_\_\_\_ A real person I can talk to
- \_\_\_\_\_ Program or workshop available on the weekend
- \_\_\_\_\_ Program or workshop available during the weekday evenings
- \_\_\_\_\_ Program or workshop available during the day on a weekday
- \_\_\_\_\_ Other features (Please describe: \_\_\_\_\_  
\_\_\_\_\_)

## FOREST LANDS

9. Please indicate how strongly you agree or disagree with each of the following statements: (Check one box for each statement.)

	Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree	Don't Know
Healthy forests are important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The primary use of forests should be for products useful to humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You don't have to worry about the forest because mother nature will take care of the trees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People who own forestland have the right to use that land as they see fit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvesting trees can improve the health of the forest.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any cutting of trees harms the water quality of nearby streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deer are a threat to forest ecosystems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Healthy forests require active management to remain healthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## BACKGROUND INFORMATION

10. What percent of the budget that you are responsible for is spent on plant material, planting, mowing, plant resource management, etc.?

- 0%  
 1-33%  
 34-66%  
 67-100%

11. Are you involved in deciding what trees, plants or shrubs are planted in your town or municipality?

- No  
 Yes

12. Which job category best describes the work you do?

- Town Supervisor  
 Town Highway Supervisor  
 City or Village Department of Public Works Supervisor  
 Other (Please specify: \_\_\_\_\_)

Please use the space below for any comments you wish to make.

**Thank you for your time and effort!**

To return this questionnaire, simply seal it with the white removable seal, and drop it in the mail (return postage has been provided).

# INVASIVE PLANTS AND INSECTS

## A SURVEY OF FORESTRY AND TREE PROFESSIONALS IN THE CATSKILLS AND LOWER HUDSON REGION



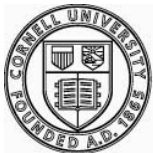
### INVASIVE PLANTS AND INSECTS: A SURVEY OF FORESTRY AND TREE PROFESSIONALS

Research conducted by the  
Human Dimensions Research Unit  
Department of Natural Resources  
Cornell University

Conducted in cooperation with  
the Watershed Agricultural Council

The purpose of this survey is to learn more about invasive plants and insects in the Catskill and Lower Hudson Regions of New York State. We would like to learn more about your experiences with invasive species, how concerned you are about these plants and insects, and what educational materials or methods you might be interested in to help you to learn more about them. The Watershed Agricultural Council and its partners will use the information from survey respondents to improve and develop new educational materials, services and programs to meet your needs.

Please complete this questionnaire at your earliest convenience, seal it with the white resealable label provided, and drop it in any mailbox; return postage has been provided. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. The information you provide will remain strictly confidential and will never be associated with your name.



Cornell University  
Human Dimensions Research Unit

**THANK YOU FOR YOUR HELP!**



**THE CATSKILL AND LOWER HUDSON REGION**

1. Which job category best describes the work you do in the Catskill and Lower Hudson Regions of New York State (as shown on the map on the front cover)? *(Please check all that apply.)*

- \_\_\_\_\_ forester
- \_\_\_\_\_ logger
- \_\_\_\_\_ arborist
- \_\_\_\_\_ landscaper
- \_\_\_\_\_ nursery / greenhouse operator
- \_\_\_\_\_ other (please describe: \_\_\_\_\_)

2. Which counties in the region do you work in? *(Please check all that apply.)*

- \_\_\_\_\_ Delaware
- \_\_\_\_\_ Dutchess
- \_\_\_\_\_ Greene
- \_\_\_\_\_ Orange
- \_\_\_\_\_ Putnam
- \_\_\_\_\_ Rockland
- \_\_\_\_\_ Schoharie
- \_\_\_\_\_ Sullivan
- \_\_\_\_\_ Ulster
- \_\_\_\_\_ Westchester

3. Please indicate your level of concern about each of the factors below on the health of forests in the Catskills and Lower Hudson Region. *(Check one box for each item.)*

Factors that May Affect Forest Health	Not at all concerned	Somewhat concerned	Moderately concerned	Very concerned
Air and water pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic animals, such as cows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild animals, such as deer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive insects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Native insects or plant diseases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wind or ice storms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urban/suburban sprawl	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## INVASIVE SPECIES

4. Have you heard of or seen any of the plants or insects shown on the enclosed flyer during the course of your work in the Catskill and Lower Hudson Regions of New York State? (Check one box for each plant or insect.)

	Never heard of before	Heard of, but have never seen	Have seen occasionally in my area	Have seen commonly in my area
<b>Trees</b>				
Norway maple	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tree of heaven	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Shrubs</b>				
Buckthorn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Japanese barberry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bush honeysuckles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Herbs</b>				
Japanese stiltgrass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garlic mustard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Vines</b>				
Asiatic bittersweet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kudzu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mile-a-minute	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Insects</b>				
Hemlock woolly adelgid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asian longhorned beetle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emerald ash borer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Please indicate how strongly you agree or disagree with each of the following statements: (Check one box for each statement.)

	Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree	Don't Know
Invasive plants/insects in North America are a concern to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects in the Catskill and Lower Hudson Region are a concern to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects pose a threat to the forests in my area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects have a negative impact on native species.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects can easily spread to other areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive insects can move from one area to another in firewood.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Have you done or would you be willing to do any of the following activities to prevent or remove invasive plants or insects from the Region? (Please check all that apply.)

<u>Have done in the past</u>	<u>Would do in the future</u>	
_____	_____	address invasive species in forest management plans
_____	_____	identify invasive species in the field
_____	_____	train landowners to identify invasive species
_____	_____	report invasive species to the appropriate agency
_____	_____	remove invasive trees
_____	_____	remove invasive shrubs/vines/herbs
_____	_____	remove trees containing invasive insects
_____	_____	apply pesticides, herbicides, or insecticides to kill invasive species
_____	_____	mow or otherwise cut back plants
_____	_____	suggest landowners plant only native species
_____	_____	not transport firewood from one area to another

## EDUCATIONAL OPPORTUNITIES

**7a. Please indicate which of the following sources of help and information you have used when you had questions about invasive plants and insects. ALSO, please indicate which sources you would likely use in the future if you had questions, even if you haven't used them in the past. (Check ALL that apply.)**

Source of information	Have used?	Likely use in the future?
Brochures or fact-sheets	<input type="checkbox"/>	<input type="checkbox"/>
Periodic newsletters	<input type="checkbox"/>	<input type="checkbox"/>
Special mailing to my workplace	<input type="checkbox"/>	<input type="checkbox"/>
Classes or workshops	<input type="checkbox"/>	<input type="checkbox"/>
Visits to demonstration areas	<input type="checkbox"/>	<input type="checkbox"/>
Books	<input type="checkbox"/>	<input type="checkbox"/>
Web site on the Internet	<input type="checkbox"/>	<input type="checkbox"/>
Podcast available from Internet	<input type="checkbox"/>	<input type="checkbox"/>
E-mail listserv	<input type="checkbox"/>	<input type="checkbox"/>
Video or DVD	<input type="checkbox"/>	<input type="checkbox"/>
Consulting forester	<input type="checkbox"/>	<input type="checkbox"/>
Department of Environmental Conservation (DEC) forester	<input type="checkbox"/>	<input type="checkbox"/>
Other govt. employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	<input type="checkbox"/>	<input type="checkbox"/>
Cooperative Extension personnel	<input type="checkbox"/>	<input type="checkbox"/>
TV or radio programs	<input type="checkbox"/>	<input type="checkbox"/>
New York Forest Owners Association or Catskill Forest Association	<input type="checkbox"/>	<input type="checkbox"/>
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify: _____ _____)	<input type="checkbox"/>	<input type="checkbox"/>

**7b. Please circle the one source above that you would be most likely to use in the future.**

**8. Which of the following topics would you like to have more information about? (Please check all that apply.)**

- \_\_\_\_\_ How to identify invasive plants and insects in the field
- \_\_\_\_\_ How to prevent the spread of invasive plants and insects
- \_\_\_\_\_ How to best remove, control or eradicate invasive plants and insects
- \_\_\_\_\_ Whom to contact with questions about invasive species
- \_\_\_\_\_ What are the existing laws, regulations and quarantines regarding invasive species

**9. What features are most important in your selection of educational materials and programs related to invasive plants and insects? (Check ALL that apply.)**

- \_\_\_\_\_ Available when I'm ready to learn
- \_\_\_\_\_ Opportunity to network with others
- \_\_\_\_\_ Cost needs to be minimal
- \_\_\_\_\_ Available from the Internet
- \_\_\_\_\_ Available on paper (e.g., newsletter, book)
- \_\_\_\_\_ Direct access to a technical expert
- \_\_\_\_\_ A real person I can talk to
- \_\_\_\_\_ Program or workshop available on the weekend
- \_\_\_\_\_ Program or workshop available during the weekday evenings
- \_\_\_\_\_ Program or workshop available during the day on a weekday
- \_\_\_\_\_ Other features (Please describe: \_\_\_\_\_  
\_\_\_\_\_)

## FOREST LANDS

**10. Please indicate how strongly you agree or disagree with each of the following statements:** *(Check one box for each statement.)*

	Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree	Don't Know
Healthy forests are important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The primary use of forests should be for products useful to humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You don't have to worry about the forest because mother nature will take care of the trees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People who own forestland have the right to use that land as they see fit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvesting trees can improve the health of the forest.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any cutting of trees harms the water quality of nearby streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deer are a threat to forest ecosystems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Healthy forests require active management to remain healthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## BACKGROUND INFORMATION

**Please tell us about your background so we can better understand your responses. All information is confidential.**

**11. Are you male or female?** *(Check one.)*

Male       Female

**12. In what year were you born?**      19\_\_\_\_

**13. What is the highest level of formal education you have completed?**

*(Check one.)*

- Less than high school
- High school diploma / G.E.D.
- Some college or technical school
- Associate's Degree
- College undergraduate degree (e.g., B.A., B.S.)
- Graduate degree (e.g., M.S., Ph.D., M.D.)

**Please use the space below for any comments you wish to make.**

**Thank you for your time and effort!**

To return this questionnaire, simply seal it with the white removable seal, and drop it in the mail (return postage has been provided).

# INVASIVE PLANTS AND INSECTS

## A SURVEY OF LANDOWNERS IN THE CATSKILLS AND LOWER HUDSON REGION



### INVASIVE PLANTS AND INSECTS: A SURVEY OF LANDOWNERS

Research conducted by the  
Human Dimensions Research Unit  
Department of Natural Resources  
Cornell University

Conducted in cooperation with  
the Watershed Agricultural Council

The purpose of this survey is to learn more about the presence of invasive plants and insects in the Catskill and Lower Hudson Regions of New York State. We would like to understand how concerned you are about these plants and insects and what educational materials will help you to learn more about them. The Watershed Agricultural Council and its partners will use the information from survey respondents to improve and develop new educational materials, services and programs to meet your needs.

Your name was randomly selected from landowners who own 5 or more acres of land listed on the New York State property tax rolls in the counties shown on the front cover of the questionnaire. Please have the person in your household who is most familiar with this property answer the questionnaire.

Please complete this questionnaire at your earliest convenience, seal it with the white resealable label provided, and drop it in any mailbox; return postage has been provided. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. The information you provide will remain strictly confidential and will never be associated with your name.



Cornell University  
Human Dimensions Research Unit

**THANK YOU FOR YOUR HELP!**

**YOUR LAND IN THE CATSKILL  
AND LOWER HUDSON REGION**

1. How many acres of land do you own in the Catskill and Lower Hudson Region of New York State (as shown on the map on the front cover) and how many of those acres are wooded?

\_\_\_\_\_ total acres owned  
\_\_\_\_\_ acres of wooded land

(If you don't own any wooded or forested land, skip to Question 3.)

2. People own wooded land for many reasons. How important are the following as reasons for why you own wooded land in New York?

(Check one box for each reason.)

How important are the following as reasons for why you own wooded land in New York?	Not at all important	Slightly important	Somewhat important	Moderately important	Very important
To enjoy beauty or scenery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To protect nature and biological diversity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For land investment (I hope to sell all or part of my wooded land at a profit)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As part of my home, vacation home, or farm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To pass land on to my children or other heirs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For cultivation/collection of non-timber forest products (e.g., maple syrup, mushrooms)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For production of firewood or biofuel (energy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For production of sawlogs, pulpwood, or other timber products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For hunting or fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For recreation, other than hunting or fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify): _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Do you have, or have you seen any of the plants or insects shown on the enclosed flyer on your property? (Please check all that you have seen.)

TREES

\_\_\_\_\_ Norway maple  
\_\_\_\_\_ Tree of heaven

SHRUBS

\_\_\_\_\_ Buckthorn  
\_\_\_\_\_ Japanese barberry  
\_\_\_\_\_ Japanese knotweed  
\_\_\_\_\_ Bush honeysuckles

HERBS

\_\_\_\_\_ Japanese stiltgrass  
\_\_\_\_\_ Garlic mustard

INSECTS

\_\_\_\_\_ Hemlock woolly adelgid  
\_\_\_\_\_ Asian longhorned beetle  
\_\_\_\_\_ Emerald ash borer

VINES

\_\_\_\_\_ Asiatic bittersweet  
\_\_\_\_\_ Kudzu  
\_\_\_\_\_ Mile-a-minute

\_\_\_\_\_ I have never seen any of these plants or insects on my property.

(If you checked this item, skip to Question 5.)

4. Have you done anything to remove any of these plants or insects from your property?

\_\_\_\_\_ No

\_\_\_\_\_ Yes → What measures have you taken?

- \_\_\_\_\_ Removed trees
- \_\_\_\_\_ Removed shrubs/vines/herbs
- \_\_\_\_\_ Mowed
- \_\_\_\_\_ Applied pesticides, herbicides, or insecticides
- \_\_\_\_\_ Contacted a forestry professional, arborist, or pest control specialist
- \_\_\_\_\_ Contacted an extension agent, government employee, or agency hotline

## INVASIVE SPECIES

5. Before receiving this survey, to what extent had you heard about any of these plants or insects? (Check one box for each plant or insect.)

	Never heard of before	Recognize name, but that's it	Recognize name and know something about it
<b>Trees</b>			
Norway maple	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tree of heaven	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Shrubs</b>			
Buckthorn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Japanese barberry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bush honeysuckles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Herbs</b>			
Japanese stiltgrass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garlic mustard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Vines</b>			
Asiatic bittersweet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kudzu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mile-a-minute	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Insects</b>			
Hemlock woolly adelgid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asian longhorned beetle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emerald ash borer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please indicate how strongly you agree or disagree with each of the following statements: (Check one box for each statement.)

	Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree	Don't Know
Invasive plants/insects in North America are a concern to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects on my property are a concern to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects pose a threat to the forests in my area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects have a negative impact on native species.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive plants/insects can easily spread to other areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive insects can move from one area to another in firewood.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Would you be willing to do any of the following activities to prevent or remove invasive plants or insects from your property? (Please check all that you would consider.)

- provide access to my land so that professionals can monitor for invasive plants or insects
- provide access to my land so that trained volunteers can monitor for invasive plants or insects
- learn how to identify invasive plants or insects myself
- report invasive plants or insects on my property to an established hotline
- remove invasive trees
- remove invasive shrubs/vines/herbs
- remove trees containing invasive insects
- apply pesticides, herbicides, or insecticides
- mow or otherwise cut back plants
- plant only native species
- not bring firewood from another area onto my property

**8a. Please indicate which of the following sources of help and information you have used previously when you had questions about invasive plants and insects. ALSO, please indicate if you would likely use any of these sources in the future if you had questions, even if you haven't used them in the past. (Check ALL that apply.)**

Source of information	Have used?	Likely use in the future?
Brochures or fact-sheets	<input type="checkbox"/>	<input type="checkbox"/>
Periodic newsletters	<input type="checkbox"/>	<input type="checkbox"/>
Special mailing to my home	<input type="checkbox"/>	<input type="checkbox"/>
Classes or workshops	<input type="checkbox"/>	<input type="checkbox"/>
Visits to demonstration areas	<input type="checkbox"/>	<input type="checkbox"/>
Books	<input type="checkbox"/>	<input type="checkbox"/>
Web site on the Internet	<input type="checkbox"/>	<input type="checkbox"/>
Podcast available from Internet	<input type="checkbox"/>	<input type="checkbox"/>
E-mail listserv	<input type="checkbox"/>	<input type="checkbox"/>
Video or DVD for home viewing	<input type="checkbox"/>	<input type="checkbox"/>
Consulting forester	<input type="checkbox"/>	<input type="checkbox"/>
Department of Environmental Conservation (DEC) forester	<input type="checkbox"/>	<input type="checkbox"/>
Other govt. employee (e.g., Soil and Water Conservation District, NYC DEP, NRCS)	<input type="checkbox"/>	<input type="checkbox"/>
Cooperative Extension personnel	<input type="checkbox"/>	<input type="checkbox"/>
Cornell Master Forest Owner Volunteer	<input type="checkbox"/>	<input type="checkbox"/>
New York Forest Owners Association or Catskill Forest Association	<input type="checkbox"/>	<input type="checkbox"/>
Non-profit group (e.g., Nature Conservancy, Watershed Agricultural Council)	<input type="checkbox"/>	<input type="checkbox"/>
Someone in the forest industry, such as a logger, sawmill operator, or timber buyer	<input type="checkbox"/>	<input type="checkbox"/>
Friends / neighbors / family members	<input type="checkbox"/>	<input type="checkbox"/>
TV or radio programs	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify: _____ _____)	<input type="checkbox"/>	<input type="checkbox"/>

**8b. Please circle the one source above that you would be most likely to use in the future.**

**9. What features are most important in your selection of educational materials and programs related to invasive plants and insects? (Check ALL that apply.)**

- \_\_\_\_\_ Available when I'm ready to learn
- \_\_\_\_\_ Opportunity to network with others
- \_\_\_\_\_ Cost needs to be minimal
- \_\_\_\_\_ Available from the Internet
- \_\_\_\_\_ Available on paper (e.g., newsletter, book)
- \_\_\_\_\_ Direct access to a technical expert
- \_\_\_\_\_ A real person I can talk to
- \_\_\_\_\_ Program or workshop available on the weekend
- \_\_\_\_\_ Program or workshop available during the weekday evenings
- \_\_\_\_\_ Program or workshop available during the day on a weekday
- \_\_\_\_\_ Other features (Please describe: \_\_\_\_\_  
\_\_\_\_\_)



## FOREST LANDS

**10. Please indicate how strongly you agree or disagree with each of the following statements:** *(Check one box for each statement.)*

	Strongly Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Strongly Disagree	Don't Know
Healthy forests are important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The primary use of forests should be for products useful to humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You don't have to worry about the forest because mother nature will take care of the trees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People who own forestland have the right to use that land as they see fit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvesting trees can improve the health of the forest.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any cutting of trees harms the water quality of nearby streams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deer are a threat to forest ecosystems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Healthy forests require active management to remain healthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## BACKGROUND INFORMATION

**Please tell us about your background so we can better understand your responses. All information is confidential.**

**11. Are you male or female?** *(Check one.)*

Male       Female

**12. In what year were you born?**      19\_\_\_\_

**13. Is your primary residence:** *(Check one.)*

Urban       Suburban       Rural

**14. What is the highest level of formal education you have completed?** *(Check one.)*

- Less than high school
- High school diploma / G.E.D.
- Some college or technical school
- Associate's Degree
- College undergraduate degree (e.g., B.A., B.S.)
- Graduate degree (e.g., M.S., Ph.D., M.D.)

**15. Do you receive information from any of the following organizations or publications (that might carry information about invasive plants and insects)?** *(Check ALL that apply.)*

- Audubon
- Catskill Forest Association
- Cornell Cooperative Extension
- New York Forest Owners Association
- New York State Farm Bureau
- Northern Woodlands
- The Conservationist
- The Nature Conservancy
- Watershed Agricultural Council
- Other (Please specify: \_\_\_\_\_)

**Please use the space below for any comments you wish to make.**

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