
New York Residents' Perspectives on Invasive Species



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This publication is one of a series of reports resulting from investigations dealing with public issues in environmental and natural resources management. The Human Dimensions Research Unit (HDRU) in the Department of Natural Resources at Cornell University studies the social and economic aspects of natural resources and the environment and the application of social and economic insights in management planning and policy. A list of HDRU publications may be obtained by accessing our website at: <http://www2.dnr.cornell.edu/hdru/index-2.html>.



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EXECUTIVE SUMMARY

Invasive species have been proliferating in New York State for many years, despite the efforts of many organizations and state agencies. The general public, and also specific user groups, can help prevent the spread of invasive species. Understanding the level of awareness, knowledge, and concern about invasive species among the general public and the behaviors engaged in by specific stakeholder groups can guide educators and outreach coordinators as they develop programs to encourage people to behave in such a way as to prevent the spread of invasive species. This type of information has never been gathered before on a statewide basis and can serve as a baseline against which future outreach efforts can be measured.

We expected many residents of New York to have little awareness of invasive species. Therefore, we conducted a two-part study with part one being an initial screening survey to identify those with some level of awareness of invasive species, and part two being a follow-up survey of these individuals to measure their concern about invasive species, and their invasive species-related behaviors. This report details the results of the follow-up survey, which was conducted by email and mail in the winter of 2015.

The specific objectives of this portion of the study were to:

- Assess New Yorkers' level of concern about invasive species.
- Evaluate New Yorkers' knowledge about invasive species.
- Determine the degree to which key stakeholder groups in New York are taking actions that limit the spread of invasive species.
- Assess the willingness of New York residents to change their behavior to reduce the spread of invasive species.
- Determine what types of messages or arguments are most likely to encourage New Yorkers to change their behaviors to limit the spread of invasive species.
- Identify the sources of information from which stakeholders get information about invasive species.

We conducted a web/mail survey of New York State residents in six regions based on PRISM boundaries: New York City-Long Island, Lower Hudson and Catskills, Capital/Mohawk, Adirondacks/St. Lawrence-Eastern Lake Ontario, Finger Lakes, and Western New York. The survey sample consisted of individuals who: (a) had completed a previous telephone screening survey we had conducted ; and (b) who had at least a basic level of awareness of invasive species.

The questions in the survey instrument covered the following topics:

- Knowledge of Invasive Species. These questions assessed general knowledge, knowledge of impacts, knowledge about vectors, and knowledge about the relationship of common activities to the spread of invasive species.
- Concerns about Invasive Species. These questions assessed overall concern, concerns in relation to other societal issues, and concerns about specific invasive species impacts.

- Respondents' Activities that may Contribute to the Spread of Invasive Species. We characterized these activities for people who had participated in any of the following activities during the past year: boating (with a boat they owned), fishing, camping, hiking, and gardening with flowers and vegetables.
- Willingness to Change Behavior. We assessed willingness to change behavior (at a general level) that could lead to the spread of invasive species.
- Message Testing. Several questions explored particular considerations that could influence willingness to change behavior. Understanding these considerations can shape invasive species messages.
- Information Sources (for information about invasive species).
- Demographic Information.

We used both a web version and a mail version of the survey. Individuals with internet access and an email address participated in the web version of the survey, and the remaining individuals participated in the mail version. The survey was conducted in January and February 2015. People who did not respond to the survey initially received up to 3 reminders encouraging their participation.

The results presented in this report reflect the perspectives and behaviors of New York State residents who are aware of what invasive species are (74% of residents). Survey respondents were also somewhat more knowledgeable about invasive species than nonrespondents. As a set, they were relatively highly educated and had a relatively high annual income. The proportion of white respondents (89%) was higher than the percentage of white residents in New York State (71%).

Respondents were concerned about invasive species in New York State (and environmental issues in general) and more than two-thirds considered themselves at least somewhat knowledgeable about invasive species. Regional differences in perspectives and behaviors were apparent with residents of New York City-Long Island less likely to be concerned and knowledgeable about invasive species according to a variety of measures.

Many members of each stakeholder group we considered (boaters, anglers, campers, hikers, and gardeners) took actions that could help prevent the spread of invasive species, but there also appeared to be opportunities to increase compliance with certain recommended behaviors for each stakeholder group.

Boaters seemed particularly aware of the role that their behavior could play in the spread of invasive species. Indeed, even non-boaters were often aware of the role that boats could play. These results suggest that outreach about boating has reached many New Yorkers.

The vast majority of respondents said they would be willing or very willing to change their behaviors if they found out they were contributing to the spread of invasive species in New York State. The arguments that respondents thought were most important for changing their behaviors had to do with the practicality of making those changes – how much it would cost, how much time it would take, and how difficult it would be.

Based on these results, we make the following recommendations:

- For each stakeholder group of interest, outreach may be able to focus on some recommended behaviors more than others given that compliance with some recommended behaviors is already quite high.
- Given that many New Yorkers are already aware of invasive species, concerned about them, and willing to change their behavior, convincing people that behavior change is important may not be the most important outreach objective. Instead, emphasizing the practicality of important behaviors or revising recommended actions in a way that makes them easier or less costly to carry out may have a bigger influence on stakeholder behavior.
- Because the evidence suggests that outreach about boating's contribution to the spread of invasive species has been particularly effective, outreach programs may be able to turn to these programs for insights into how to reach other key stakeholder groups effectively.

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We thank Human Dimensions Research Unit (HDRU) staff member, Karlene Smith, who helped administer the mail version of the survey. The Survey Research Institute at Cornell University administered the email version of the survey.

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TABLE OF CONTENTS

Executive Summary	i
Acknowledgments.....	iv
Table of Contents	v
List of Tables	vi
List of Figures	viii
Introduction.....	1
Methods.....	2
Sample Selection.....	2
Survey Instrument.....	3
Survey Implementation.....	4
Analysis.....	4
Results and Discussion	5
Survey Response.....	5
Statewide and Regional Results.....	5
Respondent Characteristics.....	5
Knowledge of Invasive Species	7
Concern about Invasive Species	11
Willingness to Change Behavior	13
Sources of Information on Invasive Species.....	14
Stakeholder Behaviors	15
Boaters	15
Anglers	16
Campers	16
Hikers.....	17
Gardeners	17
Characterization of Stakeholder Groups.....	18
Respondent Characteristics.....	18
Knowledge of Invasive Species	19
Concern about Invasive Species	21
Willingness to Change Behavior	24
Sources of Information on Invasive Species.....	24
Conclusions and Recommendations	26
Literature Cited	27
Appendix A: Follow-Up Survey Instrument.....	28

LIST OF TABLES

Table 1. Response rate by region and overall.	5
Table 2. Percentage of respondents and nonrespondents who said they “know something about” specific invasive species.	6
Table 3. Highest education level (%) by region.	6
Table 4. Annual household income by region (%).	7
Table 5. Respondents by race.	7
Table 6. Self-assessed knowledge of invasive species.	8
Table 7. Percentage of respondents who agree or strongly agree with statements about negative consequences of invasive species.	8
Table 8. Percentage of respondents who think various activities make a moderate or strong contribution to the spread of invasive species in New York State.	9
Table 9. Percentage of respondents who “don’t know” how much various activities contribute to the spread of invasive species in New York State.	9
Table 10. Percentage of respondents who agree or strongly agree with knowledge statements about invasive species.	10
Table 11. Concern about having invasive species in New York State by region (%).	11
Table 12. Perceived importance of public policy problems.	12
Table 13. Percentage of respondents very concerned about various effects of invasive species.	13
Table 14. Percentage agreeing or strongly agreeing that invasive species negatively affect things they like to do outside.	13
Table 15. Percentage of respondents considering reasons “very important” for changing their behavior if some of the things they were not doing were contributing to the spread of invasive species in New York State.	14
Table 16. Sources of information about invasive species.	15
Table 17. Frequency of boater behaviors (%).	15
Table 18. Frequency of angler behaviors (%).	16
Table 19. Frequency of camper behaviors (%).	17
Table 20. Frequency of hiker behaviors (%).	17
Table 21. Occurrence of gardener behaviors (%).	18
Table 22. Mean age by stakeholder group.	18
Table 23. Highest education level (%) by stakeholder group.	19
Table 24. Annual household income by stakeholder group.	19
Table 25. Self-assessed knowledge of invasive species by stakeholder group.	20
Table 26. Percentage of each stakeholder group who agree or strongly agree with statements about negative consequences of invasive species.	20
Table 27. Percentage of each stakeholder group who think various activities make a moderate or strong contribution to the spread of invasive species in New York State.	20
Table 28. Percentage of respondents who agree or strongly agree with knowledge statements about invasive species.	22
Table 29. Concern about having invasive species in New York State by stakeholder group.	23
Table 30. Percentage of respondents very concerned about various effects of invasive species.	23
Table 31. Percentage of stakeholder groups agreeing or strongly agreeing that invasive species negatively affect things they like to do outside.	23
Table 32. Willingness to change behavior by stakeholder group.	24

Table 33. Percentage of stakeholder groups considering reasons “very important” for changing their behavior if some of the things they were not doing were contributing to the spread of invasive species in New York State..... 25

Table 34. Sources of information about invasive species by stakeholder group..... 25

LIST OF FIGURES

Figure 1. New York State PRISM boundaries..... 3

INTRODUCTION

Invasive species, both aquatic and terrestrial, have been a concern in New York for a number of years. Following the 2005 report of the New York Invasive Species Task Force to the governor and legislature, a number of invasive species actions were taken. In 2007, Title 17 of the New York Environmental Conservation Law, the New York State Invasive Species Council Act, established the New York Invasive Species Council and an Invasive Species Advisory Committee to assess “the nature, scope and magnitude of the environmental, ecological, agricultural, economic, recreational, and social impacts caused by invasive species in the state” and to identify and coordinate actions to prevent, control, and manage invasive species. In 2008, the New York Invasive Species Clearinghouse was formed to provide an information clearinghouse. The iMapInvasives New York Program was formed to provide an on-line all-taxa invasive species database and mapping tool and integrate invasive species databases statewide. Eight Partnerships for Regional Invasive Species Management (PRISMs) were created to focus on regionally important invasive species concerns. The New York Invasive Species Research Institute was established. In late 2010, the Cornell Cooperative Extension Statewide Invasive Species Education Program (CCE ISP) was created. The Program's Mission is “to provide all New York stakeholders affected or potentially affected by (or influencing) invasive species with high quality science-based educational programs and cutting edge research-based information regarding invasive species of major concern to the State of New York” (<http://nyis.info/index.php?action=about>).

The Advisory Committee and the CCE ISP concluded that gaining an understanding of the public's knowledge and perceptions of the threat posed by invasive species to New York was integral to the development and implementation of effective invasive species prevention, education, and management efforts, as well as for evaluating the success of the state's legislative, regulatory, and education efforts to protect the state from further invasive species introductions. They perceived the need to collect data statewide on the level of awareness of New Yorkers about invasive species, what residents were currently doing that could impact the spread of invasive species (both positively and negatively), and how best to reach New Yorkers to encourage them to take action to prevent the spread of invasive species. They believed this information would be valuable as they and their partners worked to improve their prevention, outreach and management efforts. This type of information had never been gathered before on a statewide basis, and could also serve as a baseline against which to measure future outreach efforts.

The Human Dimensions Research Unit (HDRU) at Cornell University has conducted numerous studies about the relationship between environmental awareness, concern and behavior. In relation to invasive species, the HDRU recently completed a study that examined the awareness of aquatic invasive species among anglers living in the Great Lakes region and their actions to reduce the spread of aquatic invasive species (e.g., by removing plant material from fishing and boating equipment before moving to another water body) (Connelly et al. 2014).

The study reported herein allows us to apply our knowledge about the relationships between awareness, concern, and behavior to a broader audience of New York State residents and a broader range of invasive species. We expected many residents of New York to have a low level

of awareness of invasive species. Therefore, we conducted a three-part study with part one being an initial screening survey to identify those with some level of awareness of invasive species (Connelly et al. 2015), part two being a more in-depth follow-up survey by web/mail of those who had some level of awareness, and part three being a set of telephone interviews of particular stakeholder groups.

This report details the results of part two, the in-depth web/mail survey.

The specific objectives of this portion of the study were to:

- Assess New Yorkers' level of concern about invasive species.
- Evaluate New Yorkers' knowledge about invasive species.
- Determine the degree to which key stakeholder groups in New York are taking actions that limit the spread of invasive species.
- Assess the willingness of New York residents to change their behavior to reduce the spread of invasive species.
- Determine what types of messages or arguments are most likely to encourage New Yorkers to change their behaviors to limit the spread of invasive species.
- Identify the sources of information from which stakeholders get information about invasive species.

METHODS

Sample Selection

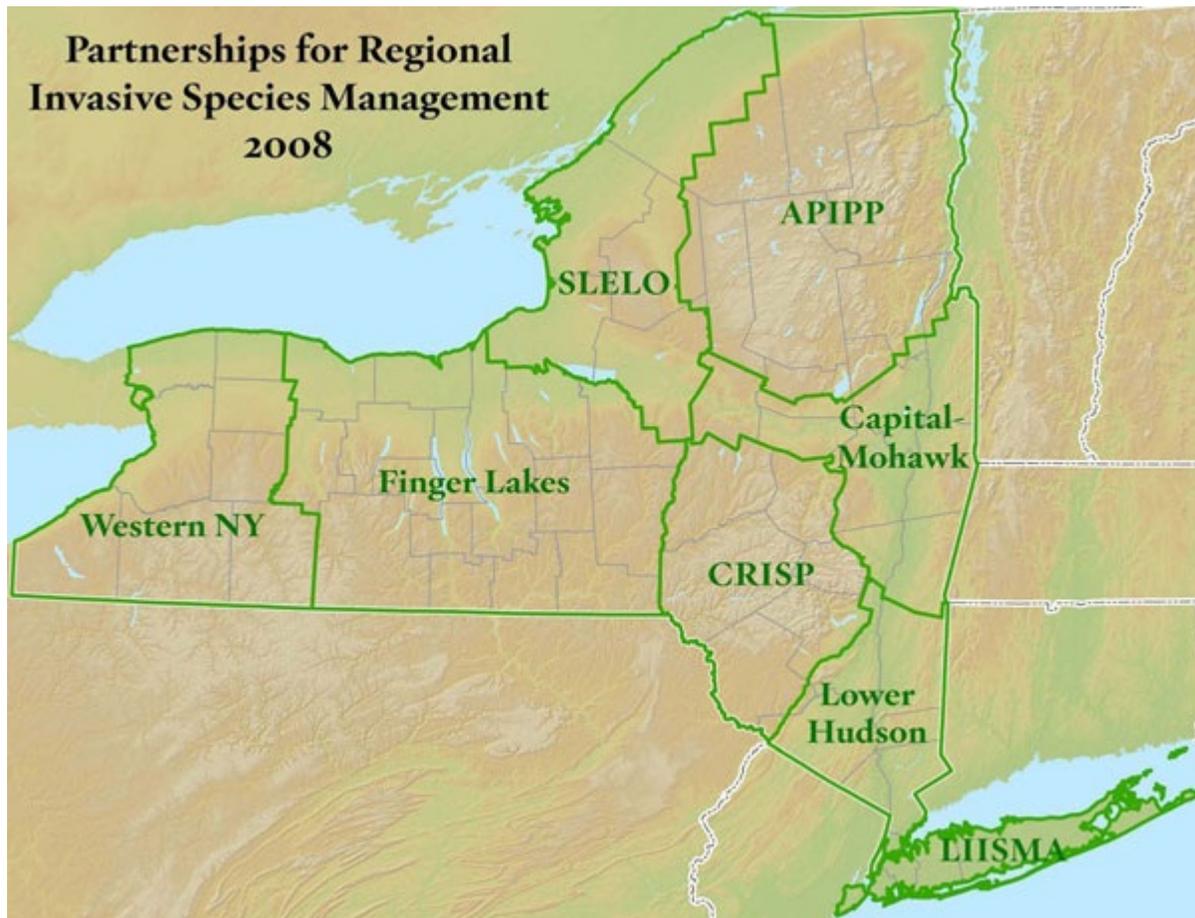
New York is divided into eight PRISM regions described above and depicted in Fig. 1. It was not financially feasible to survey a large enough sample to characterize each PRISM region. Therefore, several regions were grouped together including SLELO (St. Lawrence-Eastern Lake Ontario) and AIPPP (Adirondacks), and Lower Hudson and CRISP (Catskills). Since some counties were not contained wholly within a PRISM region (e.g., Saratoga), the county and those surveyed within it were assigned to the geographic region which contained the majority of the population of that county (e.g., Saratoga respondents were placed in the Capital/Mohawk region).

In the Finger Lakes and Western NY regions, we drew separate samples from large metropolitan counties (urban) and from areas outside of large metropolitan counties (rural) to ensure that we could characterize residents of both metropolitan counties (which would otherwise dominate the samples) and nonmetropolitan counties.

The survey sample consisted of individuals who: (a) had completed our original telephone screening survey; and (b) who had at least a basic level of awareness of invasive species. Individuals we judged to have a basic level of awareness of invasive species were those who had:

- Heard the term “invasive species” before; or
- Heard of non-native plants and animals that can cause harm to the environment, the economy, and society.

Figure 1. New York State PRISM boundaries.



The sample for the original telephone survey was provided by the Marketing Systems Group. It was drawn from New York State telephone listings and also contained a cell phone sample. The sample was stratified by the six geographic regions we had identified for the study.

Survey Instrument

The questions in the survey instrument covered the following topics:

- Knowledge of Invasive Species. These questions assessed general knowledge, knowledge of impacts, knowledge about vectors, and knowledge about the relationship of common activities to the spread of invasive species.
- Concerns about Invasive Species. These questions assessed overall concern, concerns in relation to other societal issues, and concerns about specific invasive species impacts.
- Respondents' Activities that may Contribute to the Spread of Invasive Species. We characterized these activities for people who had participated in any of the following activities during the past year: boating (with a boat they owned), fishing, camping, hiking, and gardening with flowers and vegetables

- Willingness to Change Behavior. We assessed willingness to change behavior (at a general level) that could lead to the spread of invasive species.
- Message Testing. Several questions explored particular considerations that could influence willingness to change behavior. Understanding these considerations can shape invasive species messages.
- Information Sources (for information about invasive species).
- Demographic Information.

One consideration in the design of the survey instrument was avoiding social desirability bias, which results in respondents answering questions based on how they think they should be answering them rather than accurately reflecting their perspectives and behaviors. In theory, it would be preferable to make direct observations of behaviors, but it is prohibitively costly and difficult to implement the methods needed to make reliable estimates of behavior for several different stakeholder groups on a statewide scale. To some degree, the possibility of bias can be reduced by carefully wording questions in a neutral manner and including questions that we would expect respondents to answer differently. However, social desirability bias cannot be eliminated completely. Nevertheless, the estimates in this report can be considered valid relative metrics, reflecting how widely some beliefs, perspectives, and behaviors occur relative to other beliefs, perspectives, and behaviors, the relative difference between people in different geographic regions and stakeholder groups, and (if future research is conducted) how they change over time.

The full text of the survey instrument is available in Appendix A.

Survey Implementation

We used both a web version and a mail version of the survey. Individuals with internet access and an email address participated in the web version of the survey, and the remaining individuals participated in the mail version. The survey was conducted in January and February 2015. People who did not respond to the survey initially received up to 3 reminders encouraging their participation.

Analysis

Data analysis was done using SPSS (IBM SPSS Statistics 20). Pearson's chi-square test and ANOVAs were used to test for statistically significant differences between regions.

Data reported by region are unweighted and reflect the number of people who were interviewed in that region. However, to make statements about New York State residents as a whole, respondent data was weighted in proportion to the population in each region from which our sample was drawn.

RESULTS AND DISCUSSION

Survey Response

Over 1,000 surveys were completed by New York State residents who had previously responded to our screening survey (Table 1). Forty-four percent of the web survey sample responded, and 52% of the mail survey sample responded; the overall response rate was 47%. Response rate varied by region. In most regions 44-50% of the sample responded, but in NYC & Long Island just over one-third (35%) responded.

Table 1. Response rate by region and overall.

Regions	Initial Sample		% Completed
	Size	Respondents	
NYC-LI	167	57	35
Lr. Hudson-Catskills	434	201	47
Capital-Mohawk	432	193	47
ADK/SLELO	485	232	50
Finger Lakes	507	243	49
Western NY	273	117	44
Overall	2298	1045*	47

*Includes two respondents whose region of residence could not be identified.

Respondents to the survey tended to be more aware of invasive species. Although everyone included in the survey sample knew what invasive species were (either knowing the term “invasive species” or recognizing the definition), respondents were more likely to have heard the term “invasive species” (94%) than nonrespondents (86%) ($p < 0.001$). Respondents were also more likely to say they “know something about” each specific invasive species we asked them about in the screening survey except for wild parsnip (Table 2).

Respondents were also more likely than nonrespondents to participate in certain activities, such as hiking (50% vs. 34%, $p < 0.001$) and gardening (73% vs. 64%, $p = 0.025$).

Statewide and Regional Results

Respondent Characteristics

The average age of respondents was 58 years, which did not vary significantly from region to region. Education, however, did vary by region (Table 3). The percentage of respondents with college undergraduate degrees or higher ranged from 39% in Adirondacks/St. Lawrence-Eastern Lake Ontario to 80% in New York City-Long Island. Total annual income followed a similar pattern (Table 4). Statewide, 43% of respondents earned more than \$100,000/year, but regionally that figure ranged from 16% in Adirondacks/St. Lawrence-Eastern lake Ontario to 52% in New York City-Long Island.

Table 2. Percentage of respondents and nonrespondents who said they “know something about” specific invasive species.

Invasive Species	Respondents	Nonrespondents
Emerald ash borer*	33	18
Hydrilla*	13	6
Kudzu*	24	11
Water chestnut*	27	19
Wild parsnip	17	12
Wild pigs*	42	28
Zebra mussels*	46	30

P≤0.025

Table 3. Highest education level (%) by region.

	Less than high school	High school /G.E.D.	Some college or tech. school	Associate degree	College undergrad degree	Graduate or professional degree
NYC-LI	1.9	13.0	3.7	1.9	38.9	40.7
Lr. Hudson-Catskills	1.6	11.5	18.2	7.8	27.1	33.9
Capital-Mohawk	2.2	11.5	18.1	9.3	30.2	28.6
ADK/SLELO	3.1	15.7	24.2	17.5	17.0	22.4
Finger Lakes	1.6	17.5	16.5	14.2	21.0	29.1
Western NY	1.9	11.3	23.8	14.4	21.2	27.4
Statewide	1.9	13.2	10.4	6.2	32.4	35.9

Table 4. Annual household income by region (%).

	Less than \$25,000	\$25,000 to \$49,999	\$50,000 to \$74,999	\$75,000 to \$99,999	\$100,000 or more
NYC-LI	6.2	10.4	10.4	20.8	52.1
Lr. Hudson- Catskills	11.4	13.6	19.3	13.1	42.6
Capital-Mohawk	7.0	17.2	22.3	17.2	36.3
ADK/SLELO	15.1	20.6	32.7	15.6	16.1
Finger Lakes	10.8	21.3	19.9	20.9	27.1
Western NY	11.2	28.3	21.3	15.2	24.0
Statewide	8.3	14.5	15.3	19.0	43.0

The vast majority of our respondents were white (Table 5). For the most part, racial composition did not differ by region, although the percentage of white respondents did differ significantly from a low of 85% in New York City-Long Island to a high of 97% in the Finger Lakes.

Table 5. Respondents by race.

Race	%
Hispanic, Latino, or Spanish	2.1
White	89.2
Black or African- American	2.9
Asian or Pacific Islander	3.6
Native American Indian	0.5
Other	3.7

Knowledge of Invasive Species

Sixty percent of respondents statewide said they knew “something” about invasive species (as opposed to “very little” at one extreme or “a lot” at the other extreme (Table 6). These percentages did not differ regionally.

Table 6. Self-assessed knowledge of invasive species.

Knowledge level	%
Very little	31.9
Something	59.9
A lot	8.2

We asked respondents to indicate their level of agreement or disagreement with 6 statements about the potential negative consequences of invasive species. At least 60% of respondents agreed or strongly agreed with each of the statements (Table 7). By far, the highest level of agreement was with the statement “Invasive species can harm *wildlife, fish, and ecosystems*,” with which 94% of respondents agreed or strongly agreed. The only statement for which the level agreement varied by region was “Invasive species can interfere with *people’s recreational activities*” ($p=0.004$). Agreement with this statement was:

- 92% in the Adirondacks/St. Lawrence-Eastern Lake Ontario;
- 86-88% in Western NY and Capital-Mohawk; and
- 75-79% in New York City-Long Island, Lower Hudson-Catskills, and Finger Lakes.

Table 7. Percentage of respondents who agree or strongly agree with statements about negative consequences of invasive species.

Statement	%
Invasive species can harm <i>wildlife, fish, and ecosystems</i> .	93.7
Invasive species can interfere with <i>people’s recreational activities</i> .	78.2
Invasive species can harm <i>domestic animals</i> .	70.0
Invasive species have negative effects on <i>the economy</i> .	68.1
Invasive species can interfere with <i>people’s ability to make a living</i> .	66.4
Invasive species can harm <i>people’s health</i> .	63.3

A number of questions were concerned with respondents’ knowledge of how invasive species spread (Table 8). The activities most commonly associated with the spread of invasive species were recreational boating and decorative plantings, which at least 50% of respondents believed made a moderate or strong contribution to the spread of invasive species. For many activities, beliefs varied from region to region. Residents in the Capital-Mohawk and Adirondack/St. Lawrence-Eastern Lake Ontario regions were most likely to think that recreational boating, fishing, and hiking contributed to the spread of invasive species. Residents of the Lower Hudson-Catskills region were most likely to think that the use of ATVs contributed. For all activities for which significant regional differences were detected, people living in the New York City-Long Island region were least likely to believe the activities made a moderate or strong contribution to the spread of invasive species.

Table 8. Percentage of respondents who think various activities make a moderate or strong contribution to the spread of invasive species in New York State.

	NYC- LI	Lr. Hudson- Catskills	Capital- Mohawk	ADK/ SLELO	Finger Lakes	Western NY	Statewide
Recreational boating*	46.4	62.4	85.4	83.1	74.8	74.4	58.1
Decorative plantings	46.4	59.3	57.9	58.8	51.5	58.2	50.7
Fishing*	32.1	42.0	55.5	51.1	48.8	42.0	38.3
Camping	27.3	39.7	41.8	44.7	35.6	35.7	32.1
Use of ATVs*	23.2	48.5	45.4	43.8	41.9	37.7	31.8
Hiking*	22.2	29.0	31.1	33.3	26.4	23.1	24.7

*Significant difference between regions ($p \leq 0.038$)

Uncertainty about how much these activities contributed to invasive species spread was substantial (Table 9). For each activity, one-fifth to one-third of respondents said they “don’t know” how much of a contribution the activity makes to the spread of invasive species. This percentage was highest for ATV use. Uncertainty was highest in New York City-Long Island. It was particularly low for recreational boating in the Capital-Mohawk and Adirondack-St. Lawrence Eastern Lake Ontario regions.

Table 9. Percentage of respondents who “don’t know” how much various activities contribute to the spread of invasive species in New York State.

	NYC- LI	Lr. Hudson- Catskills	Capital- Mohawk	ADK/ SLELO	Finger Lakes	Western NY	Statewide
Use of ATVs*	41.1	20.6	15.8	12.4	22.0	26.2	32.4
Decorative plantings	26.8	18.0	20.2	15.0	23.3	19.1	23.8
Fishing*	25.0	16.1	8.8	8.0	17.5	20.6	21.0
Camping	23.6	16.0	12.1	8.8	17.3	23.1	20.6
Hiking*	24.1	17.1	10.9	8.4	16.9	18.2	20.4
Recreational boating*	25.0	15.5	3.2	3.1	12.6	11.3	19.1

*Significant difference between regions ($p \leq 0.038$)

We asked a number of more specific questions about a variety of topics related to knowledge of invasive species (Table 10):

- How invasive species are moved to or invade new areas;
- Where people may encounter invasive species;
- Invasive species regulations;
- How to avoid invasive species; and
- Impacts of invasive species.

Table 10. Percentage of respondents who agree or strongly agree with knowledge statements about invasive species.

	NYC- LI	Lr. Hudson- Catskills	Capital- Mohawk	ADK/ SLELO	Finger Lakes	Western NY	Statewide
Invasive species can be transported on trailered boats*	71.7	81.6	91.9	91.6	84.0	82.9	77.5
Some plants that people encounter when hiking are invasive species.	77.8	78.6	80.5	75.2	74.2	74.3	77.2
Trading or transporting some invasive plants is illegal.*	66.7	78.1	81.1	84.1	79.5	85.8	72.9
Many fish used in aquariums are not native and may be invasive.	70.4	69.8	68.1	74.6	67.4	69.8	70.5
Some fish used in aquariums might be able to survive in the wild and invade natural waters.	69.8	72.4	71.9	70.0	65.3	67.4	69.5
Invasive species can be transported in firewood.*	54.9	76.6	87.6	90.1	83.0	85.9	67.4
Some common garden and landscaping plants are invasive species.	57.4	66.1	65.9	71.8	63.9	55.0	60.3
Invasive species can be transported on fishing gear.*	51.9	66.0	73.4	72.7	65.6	71.1	59.0
There are native substitutes for many invasive garden plants.	48.1	61.3	53.0	52.5	48.9	54.6	50.8

*Significant difference between regions ($p \leq 0.026$)

At least half of respondents agreed with all of these statements. More than three-quarters recognized that invasive species could be transported on trailered boats and that some plants that people encounter when hiking are invasive species.

Agreement with many statements varied regionally. Residents of the Capital-Mohawk and Adirondack/St. Lawrence-Eastern Lake Ontario regions were most likely to agree with statements related to boating, fishing, and moving firewood. For those statements for which significant regional differences existed, agreement was lowest in New York City-Long Island.

Very few people (fewer than 3%) disagreed with any of these statements. The percentage of respondents who said they “don’t know” whether they agree or disagree with the statements ranged from 10-20% for most statements. It was 29%, however, for the statement, “There are native substitutes for many invasive garden plants.”

Concern about Invasive Species

A strong majority of respondents (over 70%) were moderately or very concerned about having invasive species in New York State (Table 11). This percentage ranged from 67% in New York City-Long Island to 86% in Adirondacks-St. Lawrence-Eastern lake Ontario.

Table 11. Concern about having invasive species in New York State by region (%).

	Not at all Concerned	Slightly concerned	Moderately concerned	Very concerned
NYC-LI	1.8	36.6	36.8	29.8
Lr. Hudson- Catskills	2.5	15.7	47.0	34.8
Capital-Mohawk	1.0	18.7	45.6	34.7
ADK/SLELO	0.4	13.7	44.1	41.9
Finger Lakes	3.7	16.3	46.1	33.9
Western NY	0.0	19.6	34.2	46.1
Statewide	1.8	25.3	39.8	33.0

*Significant difference between regions (p=0.013)

Environmental concerns were generally high among the respondents. We asked them to rate the importance of a variety of public policy problems (Table 12). Three-quarters of respondents considered “protecting the environment” to be very important. This problem ranked second in the set of problems we asked about – behind only “defending U.S. against terrorism.” High concern about invasive species, therefore, is unsurprising in this group.

Table 12. Perceived importance of public policy problems.

Problem	% who consider it very important
Defending U.S. against terrorism	76.9
Protecting the environment	75.0
Reducing health care costs	66.5
Strengthening nation's economy	62.5
Dealing with global warming	61.9
Dealing with problems of poor	56.9
Improving the job situation	55.6
Reducing crime	49.4
Reducing middle class taxes	46.4
Reducing budget deficit	35.5
Strengthening the military	24.9

Respondents expressed how concerned they were personally about the negative effects of invasive species on a variety of things (Table 13). The highest level of concern was expressed about environmental resources, including ecosystems, fish, and (to a lesser extent) wildlife. Thirty-eight percent were very concerned about the effects of invasive species on people's health. About one-quarter were very concerned about effects on domestic animals, the economy, and people's ability to make a living. Only 18% were very concerned about effects on people's recreational activities.

The only concern which varied by region was the concern for people's recreational activities ($p=0.017$). The percentage of people very concerned about this effect was:

- 28-31% in Western New York, Capital-Mohawk, and Adirondacks/St. Lawrence-Eastern Lake Ontario;
- 19-24% in Lower Hudson-Catskills and Finger Lakes; and
- 13% in New York City-Long Island.

The percentage of respondents who agreed or strongly agreed that "some of the things I like to do outside are negatively affected by invasive species" followed a very similar regional pattern to the percentage who were concerned about recreational activities being affected by invasive species; it was highest in Western New York, Capital-Mohawk, and Adirondacks/St. Lawrence-Eastern Lake Ontario, and lowest in New York City-Long Island ($p=0.026$) (Table 14). Fewer than 10% statewide disagreed or strongly disagreed with this statement.

Table 13. Percentage of respondents very concerned about various effects of invasive species.

What is negatively affected?	% very concerned
Ecosystems	58.6
Fish	56.2
Wildlife	44.3
People's health	37.9
Domestic animals	27.6
The economy	23.5
People's ability to make a living	23.3
People's recreational activities	17.8

Table 14. Percentage agreeing or strongly agreeing that invasive species negatively affect things they like to do outside.

Region	% agreeing activities affected
NYC-LI	36.5
Lr. Hudson-Catskills	42.4
Capital-Mohawk	55.7
ADK/SLELO	50.9
Finger Lakes	43.4
Western NY	52.8
Statewide	41.3

Willingness to Change Behavior

Respondents indicated in general terms how willing they would be to change their behavior if they found out that some of the things they were doing were contributing to the spread of invasive species in New York State. Expressed willingness was very high:

- 0.4 were not at all willing;
- 9.8% were possibly willing;
- 36.4% were willing; and
- 53.3% were very willing.

To test the percentage of possible persuasive messages that could be used to encourage behavior change in outreach programs, we also asked how important they thought a variety of different reasons would be for changing their behavior if they found out they were contributing to the spread of invasive species (Table 15). The most important reasons had to do with the feasibility of changing their behavior – how much it would cost, how much time it would take, and how difficult it would be. The next most important reasons had to do with economic concerns about the invasive species. The least important reasons were concerned with invasive species interfering with things people like to do (either themselves or others). There were no regional differences in either overall willingness to change behavior or the perceived importance of particular reasons for changing behavior.

Table 15. Percentage of respondents considering reasons “very important” for changing their behavior if some of the things they were not doing were contributing to the spread of invasive species in New York State.

Reason	%
Your behavior could be changed without costing you more	52.3
Your behavior could be changed without you having to spend more time	51.6
Your behavior could be changed without much difficulty	50.4
Invasive species hurt the New York economy	40.8
Invasive species cost New Yorkers money	39.1
Invasive species interfere with things you like to do	32.2
Invasive species interfere with things other New Yorkers like to do	25.6

Sources of Information on Invasive Species

We asked respondents from which sources they had gotten information about invasive species (Table 16). Newspapers and other print materials were the most common sources; three-quarters of respondents had received information about invasive species from these sources. About half had received information from the TV or internet. Radio was the least common source.

The only source for which regional differences were detected was TV ($p=0.027$). TV was a source of information on invasive species for fewer than half of respondents (42-45%) in New York City-Long Island and Lower Hudson-Catskills; it was a source for more than half of respondents in the other regions (54-57%)

Table 16. Sources of information about invasive species.

Reason	%
Newspapers or other print materials	75.0
TV	47.7
Internet	46.0
Friends and family	38.0
Radio	17.7

Stakeholder Behaviors

We asked five stakeholder groups about several stakeholder-specific behaviors that could either prevent or facilitate the spread of invasive species. The groups considered were boaters, anglers, campers, hikers, and gardeners.

Boaters

Our sample included 197 people (10.8%) who owned boats they had used in the last year. We asked about four possible boater behaviors (Table 17). Draining water-holding compartments and cleaning vegetation off boats were the most common behaviors, with more than three-quarters of boaters always taking these actions. Drying boats was somewhat less common, but 62% of boaters still said they always did this. Washing boats with a hose after getting home was least common, with only about one-third of boaters always taking this action. This pattern is similar to that reported by Connelly et al. (2014) for New York State anglers. They found that draining water-holding compartments was a common behavior among anglers, but that washing boats and equipment was uncommon.

Table 17. Frequency of boater behaviors (%).

Behavior	Never	Some of the time	Most of the time	Always
Drain all water-holding compartments in your boat when taking it out of a water body.	6.7	3.4	6.6	82.2
Clean off vegetation that is caught on the boat.	3.0	6.7	11.3	78.9
Dry boats, trailers and all boating equipment before use in another water body.	16.5	6.4	15.2	62.0
Wash your boat with a hose when you get home.	17.6	35.1	13.4	34.0

Anglers

Our sample included 275 people (18.9%) who had gone fishing in the last year. We asked about four possible angler behaviors (Table 18). Three of these behaviors were concerned with the use of bait. Because only about half of New York State anglers use baitfish (Connelly and Knuth 2014), it is unsurprising, for example, that about half of anglers in our sample never buy certified baitfish or dump unused bait on dry land or in the trash. Our results suggest that almost all anglers who fish with bait are taking these actions at least some of the time. Taking leftover bait from one body of water to another, which has the potential to spread disease and invasive species, is not very common.

The most common of the behaviors we asked about was cleaning fishing equipment. Based on previous research (Connelly et al. 2014), we had speculated that anglers might be interpreting recommendations to cleaning boating and fishing equipment as applying only to boating equipment. Indeed, our results in this study show that anglers cleaning their fishing equipment is much less common than boaters cleaning their boating equipment.

Table 18. Frequency of angler behaviors (%).

Behavior	Never	Some of the time	Most of the time	Always
Clean your <i>fishing</i> equipment (e.g., rods, reels, lures) when you are done fishing in a body of water.	30.4	27.5	8.3	33.8
Buy baitfish that are “certified” disease free.	48.2	14.7	10.3	26.8
Dump unused bait on dry land or in the trash.	50.2	12.2	14.8	22.8
Take leftover bait from one body of water to another.	84.9	13.2	1.5	0.4

Campers

Our sample included 251 people (14.4%) who had gone camping in the last year. We asked about three possible camper behaviors (Table 19). Two of these behaviors, bringing firewood from home when going camping and taking leftover firewood home from camping, were undesirable. At least two-thirds of campers never took these actions. However, that still leaves one-fifth to one-third who take these actions at least some of the time.

The percentage of campers who clean their equipment before going home or to a different area was quite varied. Nearly one-third always cleaned their equipment, about one-fifth never cleaned it, and half cleaned it some or most of the time.

Table 19. Frequency of camper behaviors (%).

Behavior	Never	Some of the time	Most of the time	Always
Clean your camping equipment before going home or do a different area.	21.0	29.4	19.3	30.2
Bring firewood with you from home.	68.8	20.8	5.1	5.3
Take leftover firewood home with you from your campsite.	81.1	6.0	9.7	3.2

Hikers

Our sample included 509 people (43.7%) who had gone hiking in the last year. We asked about two possible hiker behaviors (Table 20). Cleaning off clothes and hiking gear before going home or to a different area was the more common of these two behaviors, but still more than 40% of hikers never took this action. Taking plants found hiking home was quite uncommon. However, because hiking is a fairly common activity, the 8% of people who take plants home is still a sizable number of New Yorkers.

Table 20. Frequency of hiker behaviors (%).

Behavior	Never	Some of the time	Most of the time	Always
Clean off your clothes and hiking gear before going home or to a different hiking area.	41.8	23.4	21.4	13.4
Take plants you find when you are hiking and plant them at home.	91.8	8.2	0.0	0.0

Gardeners

Our sample included 760 people (64.2%) who had gardened with flowers and vegetables in the last year. We asked about three possible gardener behaviors (Table 21). More than half of the gardeners had removed invasive garden plants at some point in the past. Almost one-third had found out whether plants were invasive before planting and replaced invasive plants with native or noninvasive plants.

Table 21. Occurrence of gardener behaviors (%).

Behavior	Ever Taken?
Removed invasive garden plants	56.6
Found out whether a plant was invasive before planting it	32.6
Replaced invasive garden plants with native or noninvasive plants	30.5

Characterization of Stakeholder Groups¹

Respondent Characteristics

The average age for respondents in all stakeholder groups was in the 50s (Table 22). Campers and hikers tended to be younger than boaters, anglers, and gardeners.

Table 22. Mean age by stakeholder group.

Stakeholder Group	Mean Age
Boaters	58.4
Anglers	57.3
Hikers	52.2
Campers	50.6
Gardeners	58.4

In all groups, at least half of respondents had a college degree (Table 23). More than three-quarters of hikers had at least a college degree. For most groups, half or nearly half had a household income of at least \$100,000/year (Table 24). For campers, 37% had a household income of over \$100,000/year. The racial composition of all groups was dominantly white (88-97%).

¹ Respondents could belong to multiple stakeholder groups.

Table 23. Highest education level (%) by stakeholder group.

Stakeholder Group	Less than high school	High school /G.E.D.	Some college or tech. school	Associate degree	College undergrad degree	Graduate or professional degree
Boaters	2.0	7.7	15.8	11.7	24.7	38.0
Anglers	7.1	9.1	14.1	14.3	15.5	39.9
Hikers	0.5	4.6	8.3	8.4	30.5	47.6
Campers	0.8	10.3	16.6	18.2	17.3	36.7
Gardeners	0.6	10.0	11.0	7.6	22.1	48.6

Table 24. Annual household income by stakeholder group.

Stakeholder Group	Less than \$25,000	\$25,000 to \$49,999	\$50,000 to \$74,999	\$75,000 to \$99,999	\$100,000 or more
Boaters	2.2	12.4	13.2	19.2	53.0
Anglers	3.6	12.5	13.8	17.0	53.2
Hikers	3.5	9.3	12.8	24.6	49.8
Campers	6.7	23.8	17.0	15.1	37.4
Gardeners	6.7	13.5	15.1	28.5	46.3

Knowledge of Invasive Species

Boaters indicated they had relatively high knowledge about invasive species, with 23% saying they knew a lot and only 13% saying they knew very little (Table 25). Nearly one-quarter of anglers and one-third of gardeners said they knew very little about invasive species.

Beliefs about the negative consequences of invasive species (Table 26) tended to be highest for anglers and campers, regardless of the type of negative consequence considered. They tended to be lowest for gardeners.

The perceived contribution of different activities to the spread of invasive species varied somewhat between stakeholder groups (Table 27). For the most part, stakeholders appeared neither more nor less likely to view activities with which they were involved as contributing to the spread of invasive species. For campers, however, more than half believed that camping made a moderate or strong contribution to the spread of invasive species in New York State; only about one-third of each of the other stakeholder groups believed the same about camping.

Table 25. Self-assessed knowledge of invasive species by stakeholder group.

Stakeholder Group	Very little	Something	A lot
Boaters	12.8	55.7	22.7
Anglers	23.8	61.6	14.6
Hikers	18.4	71.0	10.6
Campers	16.1	74.7	9.2
Gardeners	31.6	60.2	8.3

Table 26. Percentage of each stakeholder group who agree or strongly agree with statements about negative consequences of invasive species.

Statement	Boaters	Anglers	Hikers	Campers	Gardeners
Invasive species can harm <i>wildlife, fish, and ecosystems.</i>	97.5	98.5	98.6	97.9	94.6
Invasive species can interfere with <i>people's recreational activities.</i>	83.0	88.6	84.6	85.2	79.8
Invasive species can harm <i>domestic animals.</i>	69.3	79.8	69.4	80.1	62.6
Invasive species have negative effects <i>on the economy.</i>	73.2	79.8	67.6	80.6	70.9
Invasive species can interfere with <i>people's ability to make a living.</i>	60.8	77.2	70.0	77.7	67.9
Invasive species can harm <i>people's health.</i>	67.8	85.1	68.4	76.5	66.6

Table 27. Percentage of each stakeholder group who think various activities make a moderate or strong contribution to the spread of invasive species in New York State.

	Boaters	Anglers	Hikers	Campers	Gardeners
Recreational boating	66.7	69.7	63.3	75.5	68.3
Decorative plantings	51.6	62.6	57.1	62.2	56.5
Fishing	40.9	37.1	38.1	49.7	41.1
Camping	31.1	33.7	35.2	54.5	30.5
Use of ATVs	44.4	35.6	38.4	42.6	38.2
Hiking	20.1	21.6	22.3	24.4	24.6

Some of the more specific knowledge questions we asked (Table 28) had particular relevance to certain stakeholder groups. Two statements were particularly relevant to boaters and anglers:

- Invasive species can be transported on trailered boats; and
- Invasive species can be transported on fishing gear;

Compared to other stakeholder groups, boaters and anglers were particularly likely to agree or strongly agree with these statements.

Three statements were particularly relevant to gardeners:

- Trading or transporting some invasive plants is illegal;
- Some common garden and landscaping plants are invasive species; and
- There are native substitutes for many invasive garden plants.

Gardeners appeared neither more nor less inclined to consider these statements true.

One statement was most relevant to hikers:

- Some plants that people encounter when hiking are invasive species.

A strong majority of hikers agreed or strongly agreed that this statement was true, but not more so than other stakeholder groups.

One statement was most relevant to campers:

- Invasive species can be transported in firewood.

Over 85% of campers agreed or strongly agreed with this statement, but boaters and anglers had similar perceptions.

Concern about Invasive Species

Virtually all individuals in all stakeholder groups were at least somewhat concerned about invasive species (Table 29). More than 85% of campers were moderately or very concerned. More than 40% of boaters and anglers were very concerned.

Members of each stakeholder group indicated how concerned they were personally about the negative effects of invasive species on a variety of things (Table 30). Regardless of the type of concern, boaters had relatively high levels of concern about the negative effects of invasive species.

Anglers, campers, and boaters were particularly likely to agree or strongly agree that “some of the things I like to do outside are negatively affected by invasive species” (Table 31).

Table 28. Percentage of respondents who agree or strongly agree with knowledge statements about invasive species.

	Boaters	Anglers	Hikers	Campers	Gardeners
Invasive species can be transported on trailered boats	94.7	94.5	81.0	85.4	78.1
Some plants that people encounter when hiking are invasive species.	87.9	88.0	87.3	86.1	82.4
Trading or transporting some invasive plants is illegal.	78.2	80.9	71.7	80.5	74.8
Many fish used in aquariums are not native and may be invasive.	77.2	73.1	75.8	81.1	70.0
Some fish used in aquariums might be able to survive in the wild and invade natural waters.	83.8	74.3	79.4	78.4	73.1
Invasive species can be transported in firewood.	81.5	89.0	72.1	85.8	72.3
Some common garden and landscaping plants are invasive species.	64.3	72.1	70.4	57.7	62.6
Invasive species can be transported on fishing gear.	68.8	66.5	55.8	62.0	60.8
There are native substitutes for many invasive garden plants.	64.9	49.0	49.9	40.3	56.1

Table 29. Concern about having invasive species in New York State by stakeholder group.

Stakeholder Group	Not at all Concerned	Slightly concerned	Moderately concerned	Very concerned
Boaters	0.7	18.0	38.4	42.9
Anglers	0.6	23.9	32.9	42.6
Hikers	0.5	29.0	39.3	31.1
Campers	0.6	11.9	56.1	31.4
Gardeners	0.5	24.0	44.6	30.9

Table 30. Percentage of respondents very concerned about various effects of invasive species.

What is negatively affected?	Boaters	Anglers	Hikers	Campers	Gardeners
Ecosystems	76.0	55.4	62.6	62.0	61.7
Fish	79.7	47.2	51.4	55.7	54.2
Wildlife	61.3	40.8	40.0	52.4	42.8
People's health	54.8	33.1	30.8	39.0	39.4
Domestic animals	32.8	20.9	22.1	32.4	25.1
The economy	27.4	19.5	14.7	24.4	23.4
People's ability to make a living	26.3	16.5	14.7	19.0	21.5
People's recreational activities	34.9	23.3	14.2	23.9	16.1

Table 31. Percentage of stakeholder groups agreeing or strongly agreeing that invasive species negatively affect things they like to do outside.

Stakeholder Group	%
Boaters	51.7
Anglers	58.5
Hikers	47.3
Campers	55.1
Gardeners	45.3

Willingness to Change Behavior

At least a majority of all stakeholder groups said they would be very willing to change their behavior if they found out that some of the things they were doing were contributing to the spread of invasive species in New York State (Table 32). Boaters were especially likely to say they were very willing to change their behavior.

Table 32. Willingness to change behavior by stakeholder group.

Stakeholder Group	Not at all willing	Slightly willing	Moderately willing	Very willing
Boaters	0.4	3.8	26.7	69.2
Anglers	0.2	4.7	42.4	52.6
Hikers	0.6	6.3	40.1	53.0
Campers	0.9	7.5	39.8	51.8
Gardeners	0.3	5.3	43.2	51.2

As we found with the statewide sample, many members of all stakeholder groups found statements about the feasibility of taking action to prevent the spread of invasive species (cost, time, and difficulty) to be “very important” reasons for changing their behavior (Table 33). This was particularly true for hikers, campers, and gardeners. Although many anglers and boaters also considered these reasons “very important,” they tended to attribute a higher level of importance to some other reasons as well – such as economic concerns and the interference of invasive species with things they like to do.

Sources of Information on Invasive Species

The sources of information about invasive species that each stakeholder group used followed a similar pattern we found for all New Yorkers, with newspapers and other print materials dominating (Table 34). However, friends and family played a more important role for boaters, and the internet was relatively more important for hikers and campers.

Table 33. Percentage of stakeholder groups considering reasons “very important” for changing their behavior if some of the things they were not doing were contributing to the spread of invasive species in New York State.

Reason	Boaters	Anglers	Hikers	Campers	Gardeners
Your behavior could be changed without costing you more	42.7	47.4	59.2	48.4	57.1
Your behavior could be changed without you having to spend more time	47.2	50.3	57.9	54.3	58.5
Your behavior could be changed without much difficulty	39.8	52.2	56.1	57.6	54.9
Invasive species hurt the New York economy	45.4	52.8	35.6	39.7	43.6
Invasive species cost New Yorkers money	37.8	43.3	31.3	35.0	39.9
Invasive species interfere with things you like to do	40.4	48.3	37.1	46.1	38.1
Invasive species interfere with things other New Yorkers like to do	37.4	34.3	24.5	34.1	27.9

Table 34. Sources of information about invasive species by stakeholder group.

Source	Boaters	Anglers	Hikers	Campers	Gardeners
Newspapers or other print materials	90.1	90.6	80.0	75.8	80.4
TV	45.8	72.7	50.4	59.5	48.2
Internet	38.8	55.9	57.8	66.1	50.2
Friends and family	48.1	41.2	43.7	37.5	45.5
Radio	15.1	16.1	19.8	21.0	18.0

CONCLUSIONS AND RECOMMENDATIONS

The results presented in this report reflect the perspectives and behaviors of New York State residents who are aware of what invasive species are (74% of residents). Survey respondents were also somewhat more knowledgeable about invasive species than nonrespondents. As a set, they were relatively highly educated and had a relatively high annual income. The proportion of white respondents (89%) was higher than the percentage of white residents in New York State (71%).

Respondents were concerned about invasive species in New York State (and environmental issues in general) and more than two-thirds considered themselves at least somewhat knowledgeable about invasive species. Regional differences in perspectives and behaviors were apparent with residents of New York City-Long Island less likely to be concerned and knowledgeable about invasive species according to a variety of measures.

Many members of each stakeholder group we considered (boaters, anglers, campers, hikers, and gardeners) took actions that could help prevent the spread of invasive species, but there also appeared to be opportunities to increase compliance with certain recommended behaviors for each stakeholder group.

Boaters seemed particularly aware of the role that their behavior could play in the spread of invasive species. Indeed, even non-boaters were often aware of the role that boats could play. These results suggest that outreach about boating has reached many New Yorkers.

The vast majority of respondents said they would be willing or very willing to change their behaviors if they found out they were contributing to the spread of invasive species in New York State. The arguments that respondents thought were most important for changing their behaviors had to do with the practicality of making those changes – how much it would cost, how much time it would take, and how difficult it would be.

Based on these results, we make the following recommendations:

- For each stakeholder group of interest, outreach may be able to focus on some recommended behaviors more than others given that compliance with some recommended behaviors is already quite high.
- Given that many New Yorkers are already aware of invasive species, concerned about them, and willing to change their behavior, convincing people that behavior change is important may not be the most important outreach objective. Instead, emphasizing the practicality of important behaviors or revising recommended actions in a way that makes them easier or less costly to carry out may have a bigger influence on stakeholder behavior.
- Because the evidence suggests that outreach about boating's contribution to the spread of invasive species has been particularly effective, outreach programs may be able to turn to these programs for insights into how to reach other key stakeholder groups effectively.

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APPENDIX A: FOLLOW-UP SURVEY INSTRUMENT

**A Survey about
Invasive Species in
New York State**



Cornell University
Human Dimensions Research Unit

A Survey about Invasive Species in New York State

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

This survey is about “invasive species” in New York State. Invasive species are non-native plants and animals that can cause harm to the environment, the economy, and society.

Earlier this year, we contacted you and asked about your interests in wildlife and plants, your outdoor activities, and your awareness of invasive species. You provided your mailing address so we could contact you again to ask some more detailed questions about invasive species.

We would like to know about your concerns and beliefs about invasive species and about some of the things you do that could be affected by invasive species. Even if you know very little about invasive species your answers are still very important – you can simply check “Don’t Know” to some of the questions, if needed. The information you provide will help us to protect New Yorkers from the negative effects of invasive species in the future.

Please complete this questionnaire as soon as you can, seal it with the white re-sealable label provided, and drop it in any mailbox; return postage has been paid. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. Your identity will be kept confidential and the information you give us will never be associated with your name.

THANK YOU FOR YOUR HELP!

1. How much would you say you know about invasive species (which are non-native plants and animals that can cause harm to the environment, the economy, and society)?

- Very little
- Something
- A lot

2. How concerned are you about having invasive species in New York State?

- Not at all concerned
- Slightly concerned
- Moderately concerned
- Very concerned

3. Besides invasive species, New Yorkers may be concerned about a wide variety of problems and some are more important than others. How important are each of the following problems to you? (Check one box for each statement.)

	Not at all important	Slightly important	Moderately important	Very important
Defending U.S. against terrorism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dealing with problems of poor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving the job situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing middle class taxes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strengthening the military	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dealing with global warming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strengthening nation's economy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing budget deficit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing health care costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing crime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. **New Yorkers have different beliefs about the impacts of invasive species. Before you received this questionnaire, how strongly would you have agreed or disagreed with each of the following statements?** (Check one box for each statement.)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know
Invasive species can harm <i>wildlife, fish, and ecosystems</i> .	<input type="checkbox"/>					
Invasive species have negative effects on <i>the economy</i> .	<input type="checkbox"/>					
Invasive species can harm <i>people's health</i> .	<input type="checkbox"/>					
Invasive species can interfere with <i>people's ability to make a living</i> .	<input type="checkbox"/>					
Invasive species can interfere with <i>people's recreational activities</i> .	<input type="checkbox"/>					
Invasive species can harm <i>domestic animals</i> .	<input type="checkbox"/>					

5. **How concerned are you personally about the negative effects of invasive species on each of the following?** (Check one box for each statement.)

	Not at all concerned	Slightly concerned	Moderately concerned	Very concerned
Wildlife	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ecosystems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The economy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People's health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People's ability to make a living	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People's recreational activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Domestic animals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. How much of a contribution do you believe each of the following activities makes to the spread of invasive species in New York State? (Check one box for each statement.)

	No contribution	Slight contribution	Moderate contribution	Large contribution	Don't know
Recreational boating	<input type="checkbox"/>				
Decorative plantings	<input type="checkbox"/>				
Hiking	<input type="checkbox"/>				
Fishing	<input type="checkbox"/>				
Camping	<input type="checkbox"/>				
Use of ATVs	<input type="checkbox"/>				

7. Do you own a boat that you have used in the past year?

- No (Skip to Question 8.)
- Yes (Please continue with Question 7a.)

7a. How often do you do each of the following when you use your boat? (Check one box for each statement.)

	Never	Some of the time	Most of the time	Always
Drain all water-holding compartments in your boat when taking it out of a water body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash your boat with a hose when you get home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean off vegetation that is caught on the boat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dry boats, trailers and all boating equipment before use in another water body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Have you gone fishing in the past year?

- No (*Skip to Question 9.*)
- Yes (*Please continue with Question 8a.*)

8a. How often do you do each of the following when you go fishing? (Check one box for each statement.)

	Never	Some of the time	Most of the time	Always
Buy baitfish that are “certified” disease free.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Take leftover bait from one body of water to another.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dump unused bait on dry land or in the trash.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean your <i>fishing</i> equipment (e.g., rods, reels, lures) when you are done fishing in a body of water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Have you gone camping in the past year?

- No (*Skip to Question 10.*)
- Yes (*Please continue with Question 9a.*)

9a. How often do you do each of the following when you go camping? (Check one box for each statement.)

	Never	Some of the time	Most of the time	Always
Bring firewood with you from home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Take leftover firewood home with you from your campsite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean your camping equipment before going home or do a different area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Have you gone hiking in the past year?

- No (*Skip to Question 11.*)
- Yes (*Please continue with Question 10a.*)

10a. How often do you do each of the following when you go hiking? (*Check one box for each statement.*)

	Never	Some of the time	Most of the time	Always
Take plants you find when you are hiking and plant them at home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean off your clothes and hiking gear before going home or to a different hiking area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Have you gardened with flowers and vegetables in the past year?

- No (*Skip to Question 12.*)
- Yes (*Please continue with Question 11a.*)

11a. Which of the following have you done in your garden? (*Check all that apply.*)

- Removed invasive garden plants
- Replaced invasive garden plants with native or noninvasive plants
- Found out whether a plant was invasive before planting it

12. Before you received this questionnaire, how strongly would you have agreed or disagreed with the following statements? (Check one box for each statement.)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know
Trading or transporting some invasive plants is illegal.	<input type="checkbox"/>					
Many fish used in aquariums are not native and may be invasive.	<input type="checkbox"/>					
Some common garden and landscaping plants are invasive species.	<input type="checkbox"/>					
Invasive species can be transported on trailered boats	<input type="checkbox"/>					
Invasive species can be transported on fishing gear.	<input type="checkbox"/>					
Some plants that people encounter when hiking are invasive species.	<input type="checkbox"/>					
There are native substitutes for many invasive garden plants.	<input type="checkbox"/>					
Invasive species can be transported in firewood.	<input type="checkbox"/>					
Some fish used in aquariums might be able to survive in the wild and invade natural waters.	<input type="checkbox"/>					
Some of the things I like to do outside are negatively affected by invasive species.	<input type="checkbox"/>					

13. If you found out that some of the things you were doing were contributing to the spread of invasive species in New York State, how willing would you be to change your behavior?

- Not at all willing
- Possibly willing
- Willing
- Very willing

14. If you found out that some of the things you were doing were contributing to the spread of invasive species in New York State, how important do you think each of the following reasons would be for changing your behavior? (Check one box for each statement.)

	Not at all important	Slightly important	Moderately important	Very important
Invasive species cost New Yorkers money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species hurt the New York economy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species interfere with things you like to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species interfere with things other New Yorkers like to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your behavior could be changed without much difficulty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your behavior could be changed without costing you more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your behavior could be changed without you having to spend more time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. From which of the following sources (if any) have you gotten information about invasive species? (Check all that apply.)

- TV
- Internet
- Radio
- Newspapers or other print materials
- Friends and family

BACKGROUND INFORMATION

16. In what year were you born? 19_____

17. What is the highest level of 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 or professional degree (e.g., M.S., Ph.D., M.D., J.D.)

18. What was the total income of your household before taxes last year? (Check one.)

- Less than \$25,000
- \$25,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 or more

19. Are you of Hispanic, Latino, or Spanish origin?

- No Yes

20. What is your race? (Check all that apply.)

- White
- Black or African-American
- Asian or Pacific Islander
- Native American Indian
- Other

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 paid).