

**New York City Department of Environmental Protection
Bureau of Water Supply**

**Watershed Forestry Program
Conservation Awareness Index (CAI) Evaluation Report**

December 2021

*Prepared in accordance with Section 4.5 of the NYSDOH
2017 Filtration Avoidance Determination*



Prepared by: DEP, Bureau of Water Supply

Introduction

The 2017 Filtration Avoidance Determination (FAD) requires the New York City Department of Environmental Protections (DEP) to contract with the Watershed Agricultural Council (WAC) to implement the Watershed Forestry Program. The objectives of the WAC Forestry Program are to encourage long-term management of privately-owned forests and to promote good forest stewardship through forest management planning; implementation of best management practices (BMPs); professional training for loggers and foresters; and educational programs for watershed landowners and other target audiences.

The 2017 FAD requires the WAC Forestry Program to evaluate the effectiveness of the watershed forest management planning program and landowner education programs once every five years using the Conservation Awareness Index (CAI); the first CAI evaluation report is due December 31, 2021 and the second is due December 21, 2026. This report fulfills the first FAD deliverable and is a condensed version of a much longer research and evaluation report that was prepared by WAC and submitted to DEP as a contract deliverable. DEP acknowledges the work of Kristopher Brown, WAC Forest Program Research and Evaluation Specialist, who authored the WAC report, conducted all statistical analyses, and produced all charts and tables.

Background

The Conservation Awareness Index (CAI) is a survey tool developed by a team at the Family Forest Research Center at the University of Massachusetts/Amherst¹. CAI estimates landowner preparedness to make informed conservation decisions about their forest as big decisions arise related to harvesting timber, paying taxes, or planning for generational transfers. Modeled after the Consumer Confidence Index, CAI estimates knowledge and awareness of conservation options and landowner experiences with them. CAI helps identify gaps in landowner understanding, thus enabling targeted outreach and education programs. CAI can also be used to estimate awareness change over time or following education/outreach efforts. Survey responses represent the likelihood that forest landowners will have the necessary awareness to make informed pro-conservation decisions to keep their forests as forests.

Clean water is one important reason to keep forests as forests. Heavily forested watersheds produce high quality water, and the decisions that forest landowners make about their land will impact the benefits they and others ultimately receive from the forest. However, it can be difficult for family forest owners to keep their land intact when faced with high property taxes and other big or sudden financial needs; when those needs arise, subdividing and selling land can be a critical way to stay afloat (Stone and Tyrrell 2012). Experiencing a death in the family is another major event that forces relatives to decide what to do with a forested property. Markowski-Lindsay et al. (2017) found that being older, female, having more wooded land, and being offered a reasonable price for the land were all associated with a higher likelihood that landowners would sell or give away portions of their land in the next five years. Landowners were more likely to keep their properties intact in the next five years if they were highly

¹ One of the original team members who developed the CAI survey tool at the Family Forest Research Center is now a staff member with the WAC Forestry Program.

educated, lived within a mile of their woodland, or aspired to keep their forest as forest.

The more landowners know about programs or opportunities that help to reduce property taxes, generate forest-based income, or conserve forest land for future generations, the more likely that forests will continue to remain a prominent land cover in the New York City watershed. The WAC Forestry Program is using the CAI survey results to better understand what watershed landowners know about options to keep forests as forests. For example, WAC subsidizes the development of forest management plans that are enrolled in the New York State Forest Tax Law (480-a program), which reduces property taxes on eligible forested properties. WAC also offers a conservation easement program, the interactive MyWoodlot.com website, and landowner education programs including support of the Master Forest Owner Program.

CAI Survey

The CAI survey has four subject areas that each represent conservation decisions that many landowners will likely face: (1) property tax reduction programs, (2) conservation easements, (3) timber harvesting, and (4) estate planning. Landowners answer four types of questions that gauge their familiarity, knowledge, experience, and acquaintance with professional contacts for each subject area/conservation decision. A copy of the CAI survey is attached to the end of this report (see “Woodland Owner Questionnaire”).

Familiarity is measured by asking how much landowners know about each subject area on a Likert scale ranging from “0” (“Not heard of”) to “4” (“A great deal”). Knowledge is measured by answering a series of True or False statements. Experience is measured by asking landowners if they or someone they know have completed or considered completing a 480-a enrollment, conservation easement, timber harvest, or estate plan. Professional contact is ascertained by asking landowners to name a specific forester, land trust, or estate planner familiar with land conservation; if landowners cannot identify a specific contact, they are asked to explain how they would find out about one.

The CAI survey concludes with a series of questions aimed at characterizing landowner demographics such as age, education, gender, woodlot size, ownership tenure, and distance landowners live from their woodlots. Finally, landowners are asked to describe how much they know about the WAC Forestry Program’s educational website MyWoodlot.com on a Likert scale ranging from “0” (“Not heard of”) to “4” (“A great deal”). Each of these variables is important for understanding the characteristics of family forest ownerships in the New York City watershed and examining trends in the CAI score data.

In terms of CAI scoring, each of the four subject areas is worth 16 points, but scores can range from -5 to 16. Thus, overall CAI scores can range from -20 to 64 when all four subject areas are totaled. A respondent would get the lowest possible score (-5) on a given subject area if they had not heard of a specific conservation option (0 points), answered each true/false question incorrectly (-4 points), indicated no experience with a conservation option (0 points), and provided an incorrect name for a conservation professional (-1 point).

The team that developed the CAI survey found that 37 benchmark landowners –

graduates of Massachusetts's Keystone Project, which is similar to New York's Master Forest Owner Program – had an average CAI total score of 47, versus an average CAI total score of 20 for 267 randomly selected western Massachusetts landowners (Van Fleet et al. 2012). Landowners knew the most about timber harvesting and property tax reduction programs; random landowners knew the least about estate planning and conservation easements. CAI scores were related to education level, ownership size, location, and distance from woodlots.

In New York State, Schnur et al. (2013) found that 79 Master Forest Owner volunteers in the southcentral Highlands region had an average CAI total score of 38, versus a score of 15 for 271 random landowners from six contiguous towns in Schuyler and Chemung counties. New York landowners knew less about forest conservation options than Massachusetts landowners, and random landowners knew the least about property tax reduction programs and conservation easements.

Kittredge et al. (2015) surveyed forest landowners in Massachusetts across a range of rural to urban communities. CAI scores differed by town, suggesting hotspots of awareness. Towns with higher CAI scores were associated with greater conservation social capital and relative wealth. Conservation social capital means having access to informed peers and professionals through groups or programs. In the New York City watershed, prominent examples include the WAC Forestry Program, Catskill Forest Association, Cornell Cooperative Extension, Master Forest Owner Program, MyWoodlot.com, and others.

NYC Watershed CAI Study

In 2015 and 2020, the WAC Forestry Program mailed CAI surveys to 3,000 owners of more than 10 acres of woodland in both the West of Hudson (WOH) and East of Hudson (EOH) portions of the New York City watershed. WAC used county tax parcel information to randomly select family forest owners and exclude public and industrial landowners.

The 2015 deployment established baseline CAI scores, allowing WAC to compare scores between the two periods and evaluate results based on landowner demographics. This was a novel research project in that no prior study had repeated such a large-scale CAI deployment to evaluate awareness change over time and identify landowner knowledge gaps. These findings will help the WAC Forestry Program to better promote 480-a enrollment, conservation easements, sustainable forest management, estate planning, and to improve landowner education programs and continue refining the MyWoodlot.com website.

In both deployments, WAC used a modified Tailored Design Method (Dillman et al. 2009) to mail a pre-survey postcard, followed by a survey with a cover letter and stamped return envelope. All recipients were then sent a combination thank you/reminder postcard. Three weeks after the first round of surveys, non-respondents received a second follow-up survey, also with a cover letter and stamped return envelope. Table 1 shows that WAC tried to keep the timing of CAI surveys the same for both the 2015 and 2020 deployments.

Table 1. Timing of WAC mailings for the 2015 and 2020 CAI survey deployments.

Survey item	Mailing Date 2015	Mailing Date 2020
Pre-survey postcard	Mid-Jan.	Mid-Jan.
Survey 1	Jan. 21	Jan. 29
Thank you/reminder postcard	Feb. 4	Feb. 19
Survey 2 (for non-respondents)	Late-Feb.	Mar. 4

In 2015, 396 of the 3,000 mailed CAI surveys were either undeliverable or disqualified because owners had passed away or no longer owned their land (13%). That left 2,604 successfully delivered surveys, of which 920 were returned for an effective response rate of 35%. This rate is comparable to other CAI efforts (Van Fleet et al. 2012, Schnur et al. 2013, Kittredge et al. 2015). There were 738 early responders (80%) and 182 late responders (20%). Early responders had a slightly higher median CAI total score (14) compared to late responders (13), but this result was not statistically significant ($W=70236$, $p\text{-value}=0.3$).

In 2020, 411 of the 3,000 mailed CAI surveys were returned undeliverable (14%). Landowners returned 844 surveys and 793 were used for analysis, which resulted in an effective response rate of 31%. Unusable surveys included those returned blank or instances where the landowner no longer owned the property or did not own any woodland acres. Early responders were considered to be anyone returning a survey on or before March 6. Surveys received after March 6 were considered late responders. There were 506 early responders (64%) and 287 late responders (36%). Median CAI total score was 15 and 13, respectively, as depicted in Table 2; this result was statistically significant ($W=82386$, $p\text{-value}=0.002$), likely because late responders represented a larger proportion of the sample population, and given the greater difference in 2020 CAI scores between early and late responders.

Table 2. Summary statistics for CAI 2020 total scores based on response times.

	Early Responders	Late Responders
Minimum	0	0
25th Percentile	9	8
Median	15	13
Mean	17.5	14.7
75th Percentile	24	19
Maximum	61	46

There are several possible explanations for why late responders might have lower CAI scores than early responders. For example, landowners who aren't engaged with their land or who feel they know little about the CAI subject areas might delay or decline completing a survey. In addition, landowners having fewer than 50 woodland acres could perceive the survey as irrelevant because they are not eligible for the Forest Tax Law (480-a program), which is the first subject area on the CAI survey.

Statistical Analyses

WAC used a Shapiro-Wilk test to determine if the CAI scores from 2015 and 2020

followed anormal (Gaussian) distribution; the data were not normal ($W=0.93$, $p<0.001$ for 2015 data and $W=0.94$, $p<0.001$ for 2020), so nonparametric tests were used for all statistical analyses. WAC used a Wilcoxon rank-sum test to evaluate differences in median CAI total score and CAI score by subject category between the two analysis periods; this test was also used to compare median 2020 CAI scores by geographic location and again for landowner familiarity with MyWoodlot.com. WAC used a Kruskal-Wallis test to examine 2020 CAI scores by demographic characteristics having more than two groups. These characteristics included landowner age, education, gender, and the distance that landowners live from their woodlots; when this test indicated that a significant difference existed between age classes, WAC used Dunn's post-hoc test for pairwise comparisons to determine which age classes were significantly different from one another. Finally, WAC used Spearman's rho test to for a significant correlation between CAI total score and woodland acres owned (log transformed). All statistical tests were performed in R (R Core Team, 2017).

Results

The average 2020 CAI total score was 16.5, which is slightly higher than the 15.8 average score in 2015. This suggests that relatively little has changed in terms of landowner conservation awareness, with the exception of 480-a scores increasing in 2020. CAI scores by subject area were highest for estate planning and timber harvesting and lowest for the 480-a program and conservation easements. The findings related to second-hand experience suggest that a focus on fostering peer-to-peer relationships may help increase CAI scores in the watershed. Specifically, when landowners knew someone that had considered or completed a forest conservation option, it improved their familiarity, knowledge, first-hand experience and ability to connect with forest conservation professionals related to those subject areas.

The percentage of survey respondents that knew anything at all about MyWoodlot.com increased by 6.6% in 2020, suggesting that awareness of WAC's forest landowner education and outreach website is growing. Landowners who knew something about MyWoodlot appear to be conservation-oriented; they had higher CAI scores across all subject areas and could more readily name forest conservation professionals.

Total CAI scores and CAI scores by subject area

Total CAI scores can range from -20 to 64 and CAI scores for each of the four subject areas (forest conservation options) can range from -5 to 16. In 2020, total CAI scores among watershed landowners ranged from 0 to 61 and averaged 16.5. Table 3 shows how this result is lower than published CAI research from Massachusetts (Van Fleet et al. 2012, Kittredge et al. 2015) and higher than the Schnur et al. (2013) study of western New York forest landowners. Possible reasons for the higher CAI scores in Massachusetts include the success of the Keystone Project – a program where forest landowners complete trainings related to CAI subject areas and share their knowledge and experiences with other forest landowners – as well as the state's required timber harvest notification system and lower acreage requirement to participate in its property tax reduction program (minimum of 10 forested acres in Massachusetts versus 50 forested acres in New York).

Table 3. Average CAI scores for the New York City watershed and other studies.

Study	Location	Average CAI Score
Kittredge et al. (2015)	Rural-to-urban transect in MA	23.5
Van Fleet et al. (2012)	Western MA	20.4
Brown (2020)	NYC Watershed	16.5
VanBrakle (2015)	NYC Watershed	15.8
Schnur et al. (2013)	Western NY	14.5

For individual subject areas, 2020 CAI scores ranged from a low of -2 for timber harvesting to a high of 16 for each of the conservation options (Table 4). Average CAI scores were highest for estate planning (EP), followed by timber harvesting (TH), conservation easements (CE) and the Forest Tax Law (480-a). While these scores are relatively low, they indicate landowners know more about estate planning and timber harvesting and less about conservation easements and the Forest Tax Law. Total CAI scores were not significantly different from 2015 to 2020 ($W=351290$, $p\text{-value}=0.19$). For individual subject areas, CAI scores for the Forest Tax Law were significantly higher in 2020 ($W=339890$, $p\text{-value}=0.01$) but not significantly different between analysis periods for the other subject areas.

Table 4. Summary statistics for the 2015 and 2020 CAI deployments in the NYC watershed.

CAI Scores	Total		480-a		CE		TH		EP	
	2015	2020	2015	2020	2015	2020	2015	2020	2015	2020
Mean	15.8	16.5	2.5	2.9	3.4	3.5	4.8	5.0	5.1	5.1
Median	13	14	1	1	2	2	4	4	5	5
Maximum	55	61	16	16	16	16	16	16	16	16
Minimum	-1	0	-4	-1	-3	-1	-2	-2	-1	0

Familiarity

For the CAI familiarity questions, landowners were asked to self-report how much they know about each conservation option, with the following scores assigned to each response: “Not heard of” (0 points), “Nothing at all” (1 point), “Some” (2 points), “Quite a lot” (3 points), and “A great deal” (4 points). The 2020 median familiarity score was 1 for the Forest Tax Law, conservation easements, and estate planning, and 2 for timber harvesting; landowners typically felt they knew “Nothing at all” about the topics, and “Some” about timber harvesting.

Only 8-10% of landowners in 2020 reported knowing “Quite a lot” or “A great deal” with any of the conservation options (Figure 1). Landowners felt most familiar with timber harvesting, with 49% of respondents knowing “some” about logging. Landowners felt least familiar with the Forest Tax Law, with 68% reporting they had “Not heard of” or knew “Nothing at all” about the 480-a program. Respectively, 55%, 53%, and 40% were unfamiliar with conservation easements, estate planning, and timber harvesting. By comparison, only 6-9% of landowners in 2015 reported being quite familiar with any of the conservation options. Nearly half (49%) were somewhat familiar with timber harvesting. Many landowners were unfamiliar with the Forest Tax Law (73%), estate planning (58%) and conservation easements (55%).

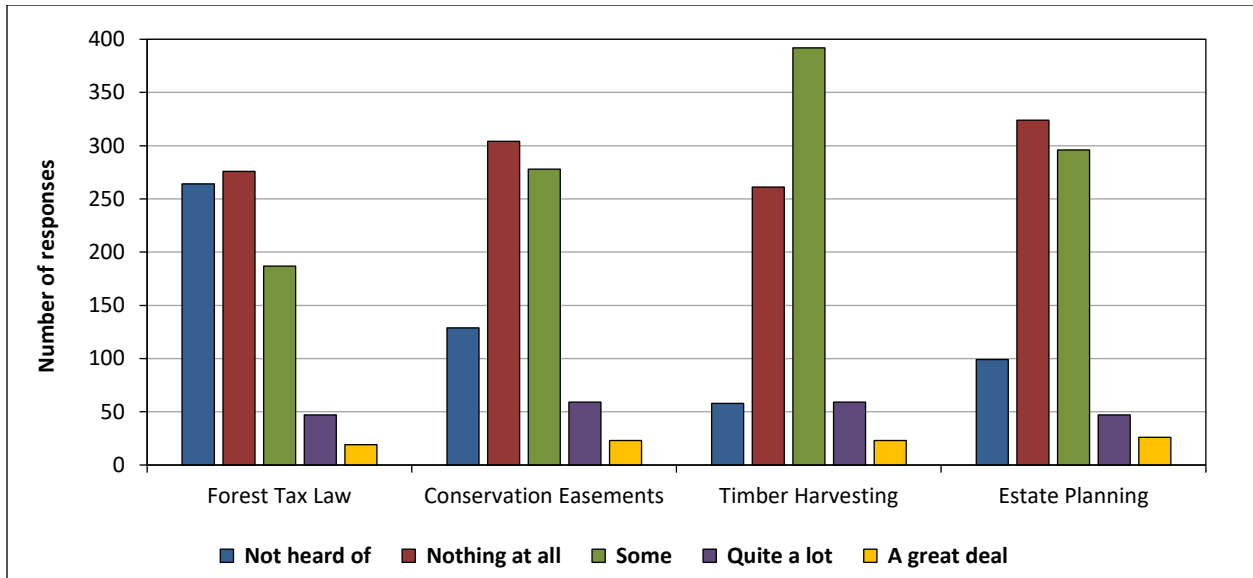


Figure 1. CAI 2020 results for landowner familiarity with four conservation options.

Results from 2015 and 2020 are largely similar, with slight increases in familiarity for each subject area when comparing mean familiarity scores, which increased by 0.18 points for the Forest Tax Law, 0.06 points for conservation easements, 0.08 points for timber harvesting, and 0.08 points for estate planning. Median CAI scores for individual subject areas were exactly the same between analysis periods. CAI familiarity scores were quite low across all forest conservation options, indicating that landowners typically knew “Nothing at all” for all options except timber harvesting, for which they typically knew “Some”.

Knowledge

Points for the CAI knowledge questions (True/False/Don’t Know) are scored -1, 0, and 1, respectively, for incorrect, unknown, and correct answers. There are four knowledge questions per subject area, so the total score per subject area ranges from -4 (all incorrect answers) to 4 (all correct answers). In 2020, median CAI knowledge scores ranged from 0 for the Forest Tax Law, conservation easements, and timber harvesting, to 3 for estate planning; these results are identical to the 2015 CAI deployment.

In 2020, landowners answered “Don’t know” for two-thirds of the questions associated with the Forest Tax Law and conservation easements. Incorrect responses were rare across all subject areas, with the exception of timber harvesting, where landowners answered 17% of the questions incorrectly. Conversely, landowners correctly answered 59% of the estate planning questions correctly (Figure 2). Landowner responses to the knowledge questions were similar in 2015, when landowners answered “Don’t know” for 73%, 66%, 49%, and 38% of the respective questions related to the Forest Tax Law, conservation easements, timber harvesting, and estate planning. Again, incorrect answers were relatively rare in 2015 with the exception of timber harvesting questions, which were answered incorrectly 17% of the time. Conversely, landowners in 2015 correctly answered the estate planning questions 61% of the time.

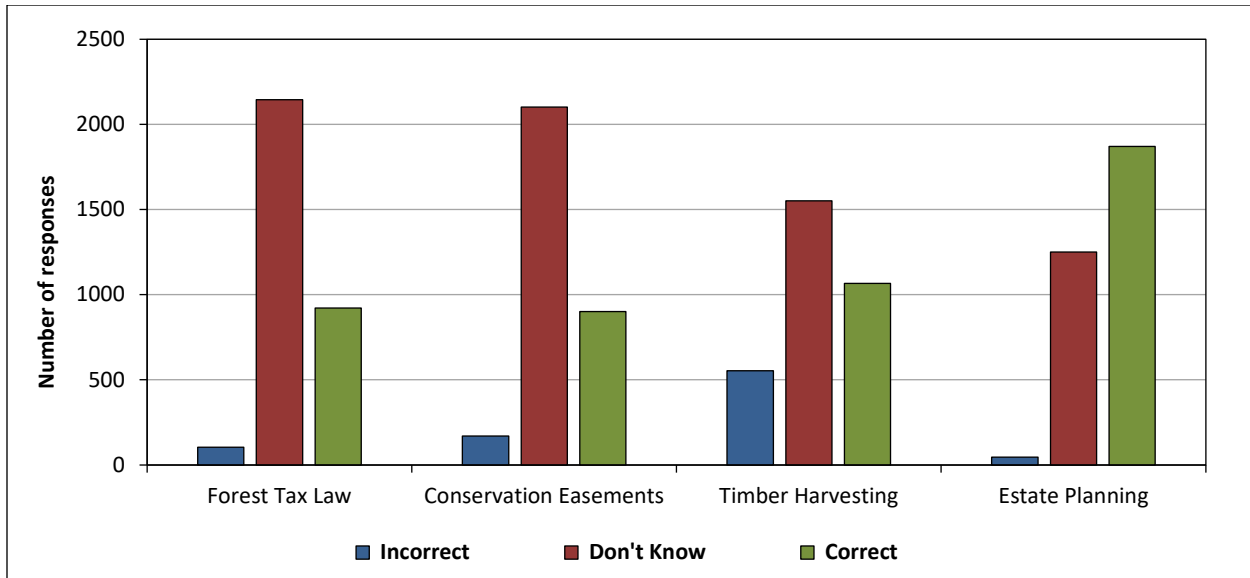


Figure 2. CAI 2020 results for landowner knowledge of four conservation options.

The abundance of “Don't know” responses for the Forest Tax Law and conservation easements indicates that landowners really don't know much about these topics. On average, 29% of Forest Tax Law and conservation easements questions were correctly answered. For timber harvesting, WAC hypothesizes that landowners felt more comfortable wagering guesses for the knowledge questions based on their relatively high familiarity scores for timber harvesting; however, they answered just 34% of the questions correctly, indicating there was some misunderstanding about these questions. For example, 25% of respondents incorrectly thought that a forester cuts trees and brings them out of the woods, while 32% incorrectly thought that a logger needs a license to harvest timber in New York State.

WAC's comparison of correct responses for both the 2015 and 2020 CAI knowledge questions revealed that Forest Tax Law knowledge increased in 2020, and correct answers were more common for estate planning and less common for the Forest Tax Law and conservation easements. Several questions gave landowners trouble in both years, including Question 6D (“Land trusts hold conservation easements on private land”) and Question 10C (“Loggers are required to have a license to harvest timber in New York State”). When compared to 2015, the mean 2020 CAI knowledge scores increased 0.2 points for the Forest Tax Law and 0.02 points for conservation easements, but decreased 0.05 points for timber harvesting and 0.07 points for estate planning. Knowledge scores are largely unchanged between 2015 and 2020; the scores are quite low for the Forest Tax Law, conservation easements, and timber harvesting. Estate planning knowledge scores are relatively high, but these questions are also more intuitive.

Experience

For each conservation option, there are two questions related to first-hand experience (“I have considered selling timber from my land” and “I have sold timber from my land”) and two questions related to second-hand experience (“Someone I know has considered selling timber from their land” and “Someone I know has sold timber from their land”). In this example, a

maximum score of 4 would be awarded to a landowner that had sold timber from their own land (2 points) and knew someone that had considered (1 point) and completed (1 point) a timber harvest on their land. A minimum score of 0 would be awarded to a respondent that answered “No” or “Don’t Know” for each of the experience questions.

In 2020, median CAI scores related to experience ranged from 0 for the Forest Tax Law, conservation easements, and estate planning to 2 for timber harvesting. This indicates that many landowners had no first- or second-hand experience with these topics, but the opposite was true in that many landowners had some experience with timber harvesting. These results are identical to the CAI 2015 deployment.

First-hand experience

In 2020, most landowners had no first-hand experience with the Forest Tax Law (80%) or conservation easements (76%) (Figure 3). More than half (55%) had no first-hand experience with estate planning, whereas 39% had completed a timber harvest, 21% had completed an estate plan, 12% had enrolled in the Forest Tax Law, and 10% held a conservation easement. First-hand experience increased slightly in 2020 versus 2015, when 35%, 19%, 8%, and 6% of landowners, respectively had completed a timber harvest, estate plan, 480-a enrollment, and conservation easement.

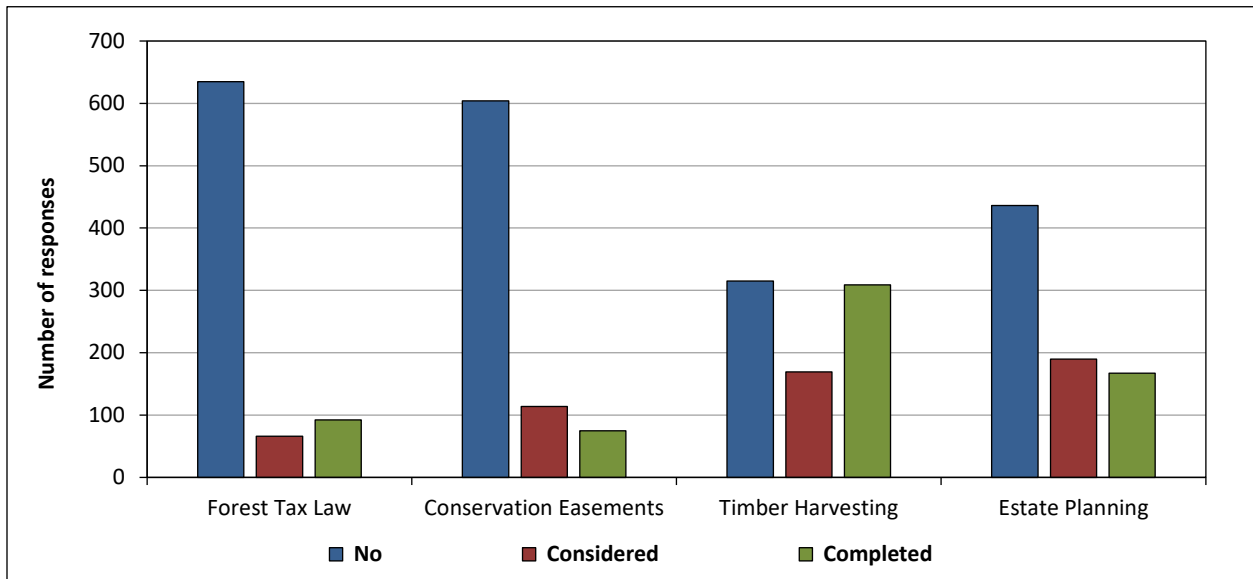


Figure 3. CAI 2020 results for first-hand experience with four conservation options.

The fact that relatively few respondents had experience with the Forest Tax Law and conservation easements makes sense given that both favor larger parcels. In 2020, 44% of respondents met the 480-a eligibility requirement of owning 50 or more woodland acres, and 27% of these respondents reported they had been enrolled in the Forest Tax Law at some point. Furthermore, 18% of eligible landowners knew someone else enrolled in the Forest Tax Law. In 2015, 25% of survey respondents were eligible for the 480-a program and 23% of those eligible landowners reported they had enrolled (VanBrakle 2016).

Second-hand experience

Second-hand experience, defined as knowing someone else who had considered or completed a forest conservation option, was associated with improved CAI familiarity (Figure 4), knowledge (Figure 5), and first-hand experience (Figures 6-9). Figure 4 shows that when landowners knew a peer who had completed a forest conservation option, their average CAI familiarity scores were about twice that of landowners who didn't know someone who had completed a forest conservation option. Figure 5 shows that second-hand experience had a similar effect on CAI knowledge scores. Figure 6 illustrates that 5% of landowners enrolled in the Forest Tax Law without knowing anyone else who had considered or completed enrollment; however, when landowners knew someone else was enrolled, 46% were enrolled themselves. Similar findings held true for conservation easements (Figure 7), timber harvesting (Figure 8), and estate planning (Figure 9). Such findings provide justification for peer-to-peer education and outreach pathways such as the Master Forest Owner Program or MyWoodlot.com.

The 2020 CAI deployment found modest increases in the proportion of respondents that had completed 480-a enrollments (4%), conservation easements (4%), timber harvests (4%), or estate plans (2%). Mean CAI experience scores increased by 0.15 points for the Forest Tax Law, 0.06 points for conservation easements, 0.1 points for timber harvesting, and 0.05 points for estate planning. CAI experience scores were largely unchanged; most landowners had little to no first-hand experience with the Forest Tax Law and conservation easements, while 39% and 21%, respectively, had completed a timber harvest and estate plan. Second-hand experience increased landowner familiarity, knowledge, and first-hand experience with forest conservation options.

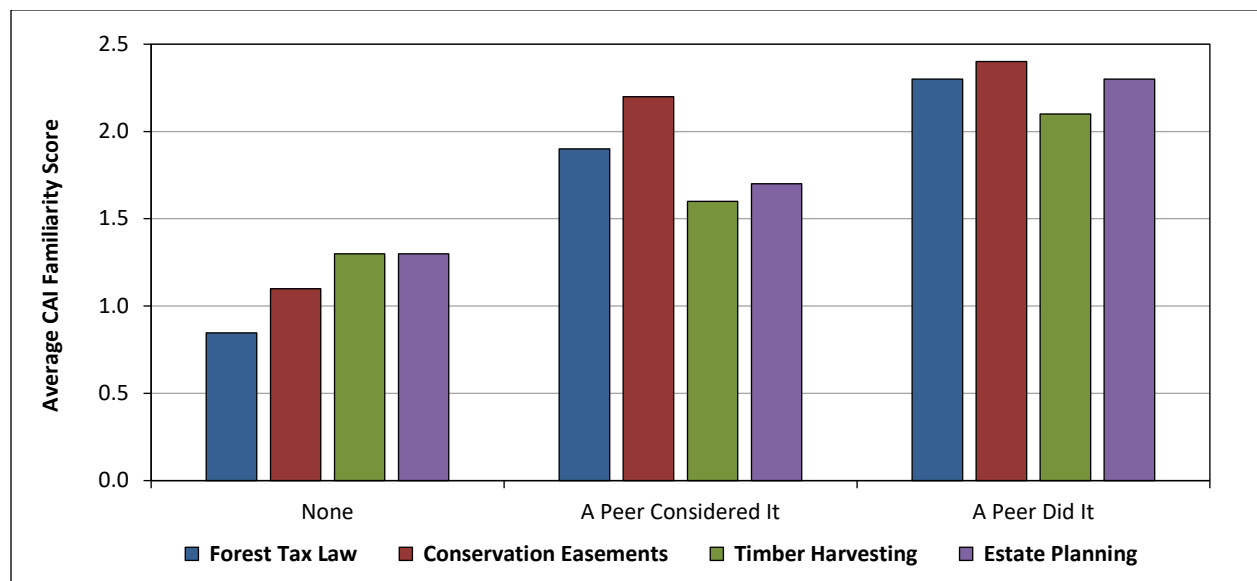


Figure 4. Influence of second-hand experience on 2020 CAI familiarity scores for four conservation options.

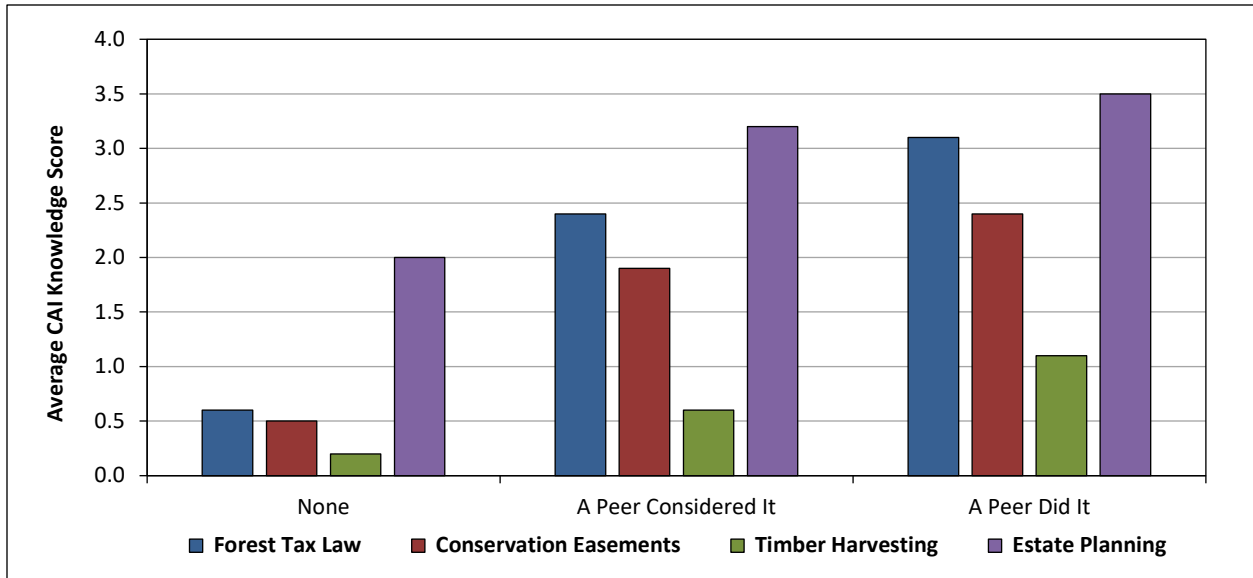


Figure 5. Influence of second-hand experience on 2020 CAI knowledge scores for four conservation options.

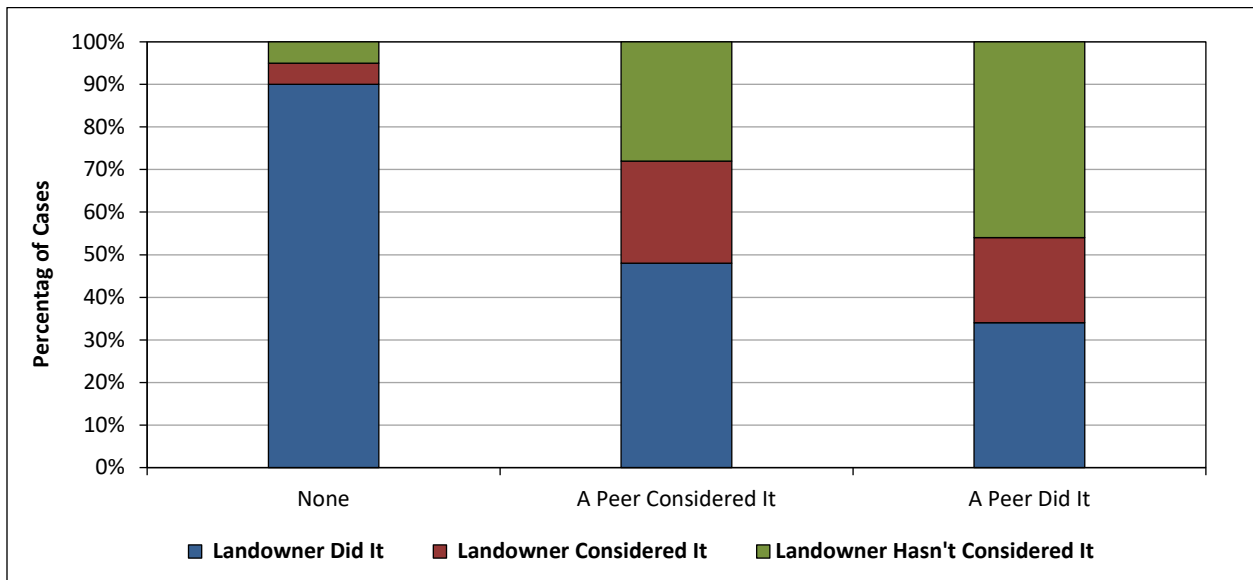


Figure 6. Second-hand experience with the Forest Tax Law was associated with first-hand experience based on 2020 CAI scores.

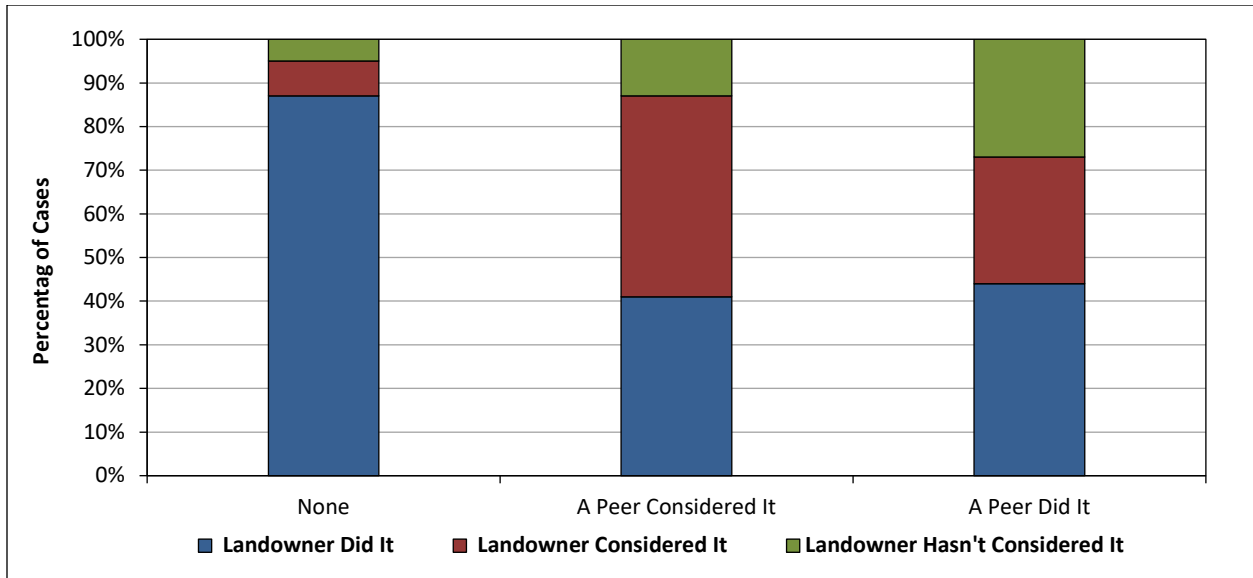


Figure 7. Second-hand experience with conservation easements was associated with first-hand experience based on 2020 CAI scores.

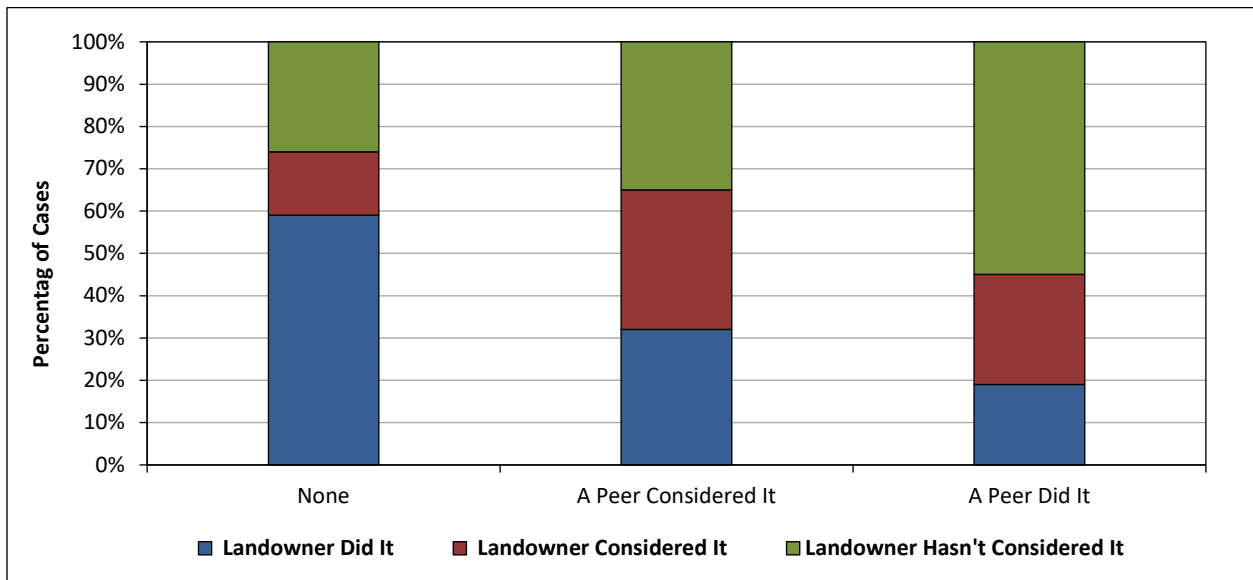


Figure 8. Second-hand experience with timber harvesting was associated with first-hand experience based on 2020 CAI scores.

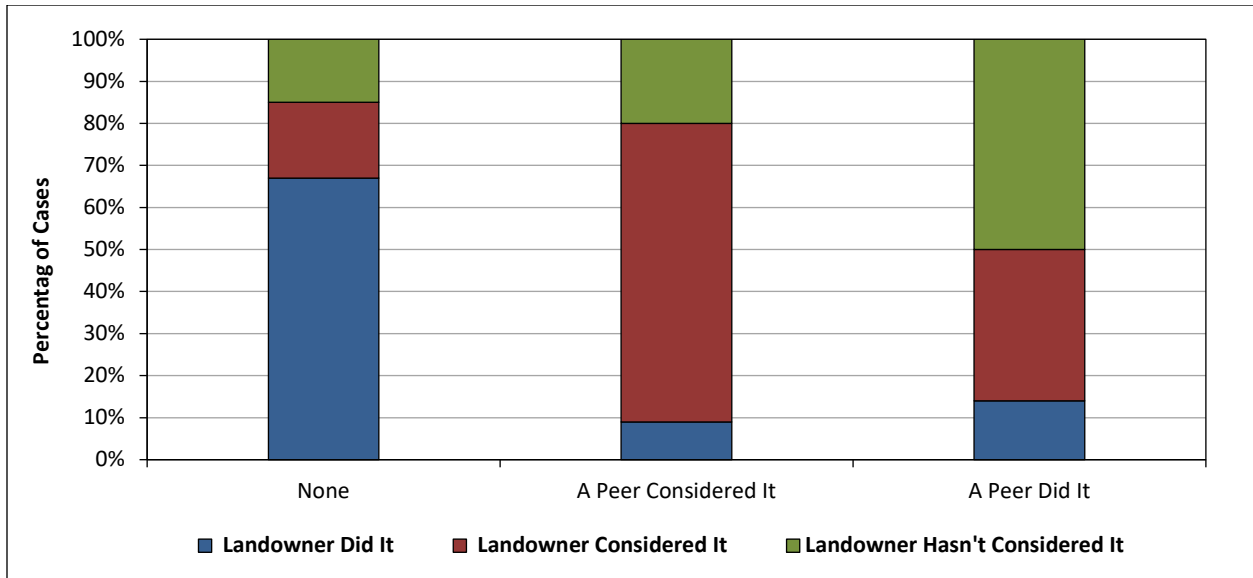


Figure 9. Second-hand experience with estate planning was associated with first-hand experience based on 2020 CAI scores.

Professional Contacts

The CAI survey asked participants if they knew a State forester (related to the Forest Tax Law), private forester (related to timber harvesting), land trust (related to conservation easements), or an estate planning professional. An incorrect response yielded a score of -1. Blank responses or “No” answers (“I don’t know a professional”) yielded a score of 0. Answering “No” but providing a reliable source of information yielded a score of 1. Answering “Yes” without providing a name or answering “Yes” with a correct place to find information yielded a score of 2. Answering “Yes” and providing an approximate name yielded a score of 3. Answering “Yes” and providing a correct name yielded a maximum score of 4 for each conservation option.

The median CAI score across all subject areas was 0, suggesting that respondents often had no professional contacts and didn’t know where to find information; this finding was also true for the 2015 CAI deployment. For example, more than 80% of landowners did not know or have information for a State forester, land trust, or estate planning professional. Seventy-three percent of respondents did not know or have information for a private forester (Figure 10). These findings were somewhat worse than in 2015, where 70-79% of landowners could not name a professional or answer how to find one, depending on the subject area. MyWoodlot.com is a useful resource for finding information for forest conservation professionals, yet only one landowner listed the website as an information source. In 2020, however, 15%, 8%, 3%, and 2% of landowners correctly named a private forester, land trust, estate planner, and State forester, respectively; these results are largely similar to the 2015 CAI deployment.

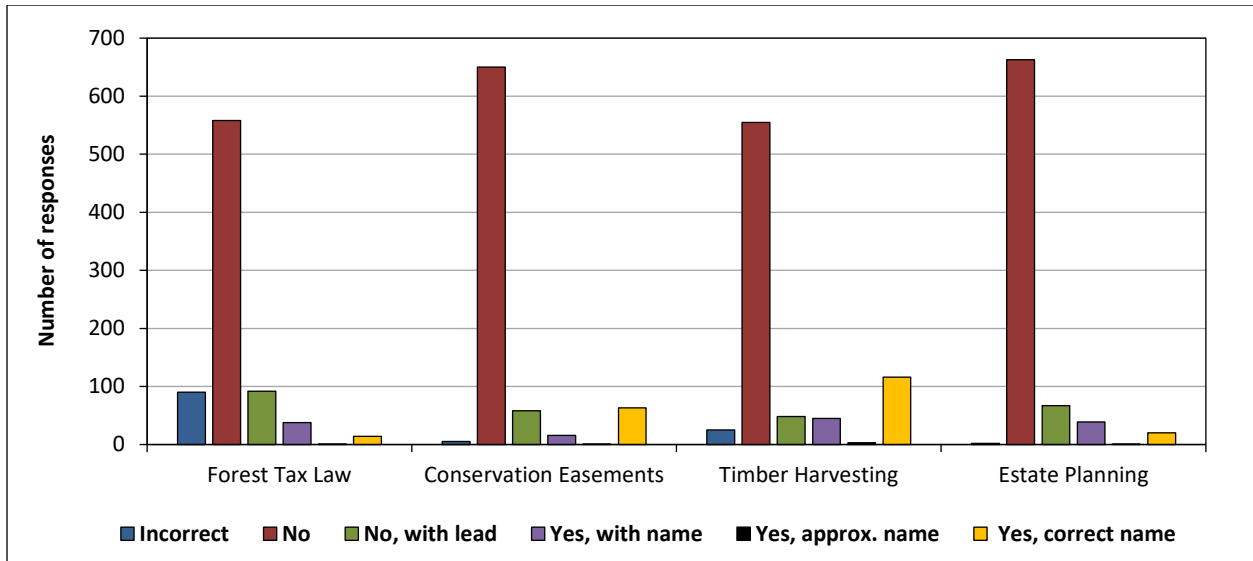


Figure 10. Landowner ability to name a professional contact for each of four conservation options based on 2020 CAI scores.

While scores for professional contacts questions were low for all subject areas, especially the Forest Tax Law, landowners that knew someone else who had considered or completed a forest conservation option scored better on the professional contacts questions (Figure 11). For example, landowners with a peer that had completed a conservation easement or timber harvest had an average score greater than 1 (equivalent to having a lead) for the associated professional contacts questions, while those with no second-hand experience related to these topics scored under 0.5 (equivalent to having no lead). In effect, landowners with more second-hand experience knew how to find out about a forest conservation professional, whereas those with no second-hand experience did not.

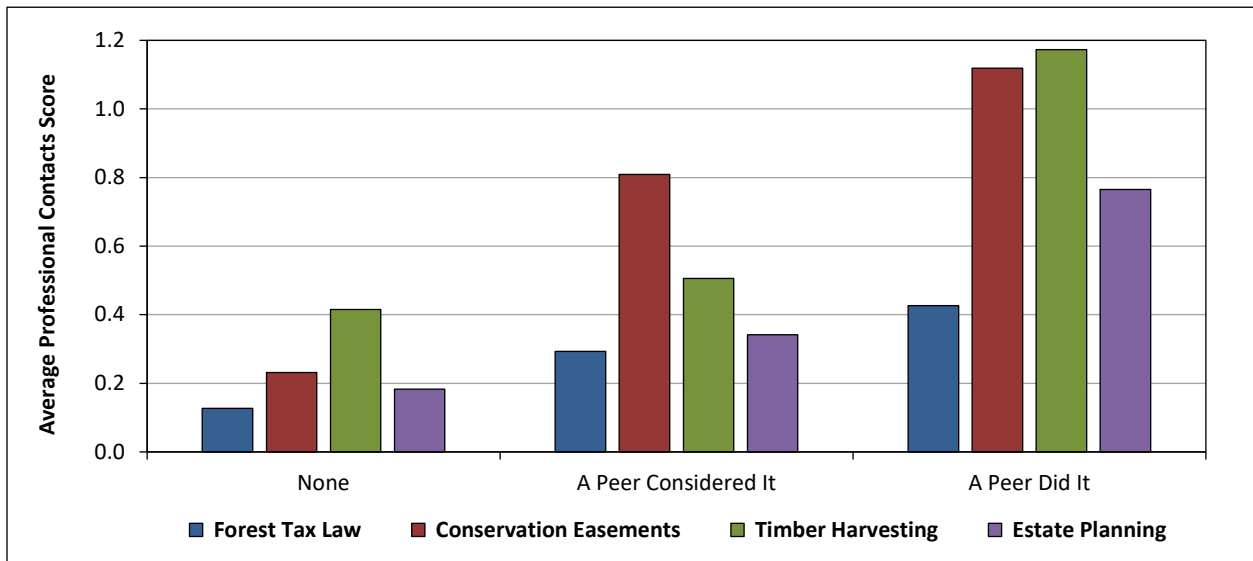


Figure 11. Second-hand experience with CAI subject areas (conservation options) was associated with improved access to forestry professionals based on 2020 CAI scores.

While second-hand experience improved CAI scores related to professional contacts, landowners scored the lowest for this question type (Figure 12). This further suggests that the WAC Forestry Program should foster and promote peer-to-peer connections between landowners and forest conservation professionals.

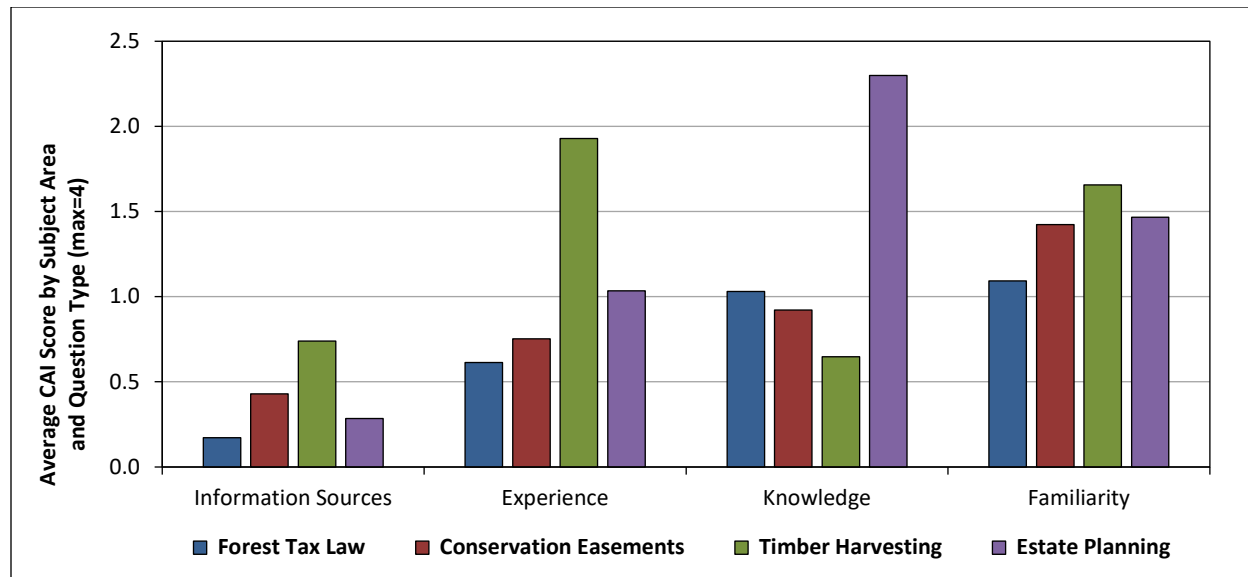


Figure 12. A comparison of average CAI 2020 scores by question type and subject area.

When comparing 2020 and 2015 CAI surveys, mean scores for professional contacts were similar to slightly lower across subject areas in 2020. The mean CAI score decreased 0.1 points for the Forest Tax Law Program, 0.04 points for conservation easements, and 0.04 points for estate planning, while increasing 0.06 points for timber harvesting. The 2020 CAI survey found that many landowners still don't know forest conservation professionals or how to find out more about them, especially for the Forest Tax Law, conservation easements, and estate planning. In fact, there was a slight increase in the proportion of landowners that didn't know where to turn for more information. Conversely, there was a slight increase in the proportion of landowners that could correctly name a private forester (+3%).

Familiarity with MyWoodlot.com

The 2015 CAI survey deployment occurred just before the MyWoodlot.com website was launched. At that time, only 2.8% of respondents knew anything about MyWoodlot. Surveyed landowners that were aware of MyWoodlot's development before it went live may have included those who participated in website usability tests, attended landowner education programs, or participated in WAC Forestry Program opportunities. Results from the 2020 CAI deployment showed that 9.4% of respondents knew something about MyWoodlot. Specifically, 73 landowners reported they knew at least "Something" about the website, whereas 706 landowners reported they knew "Nothing at all" or had "Not heard of" MyWoodlot.com (Figure 13).

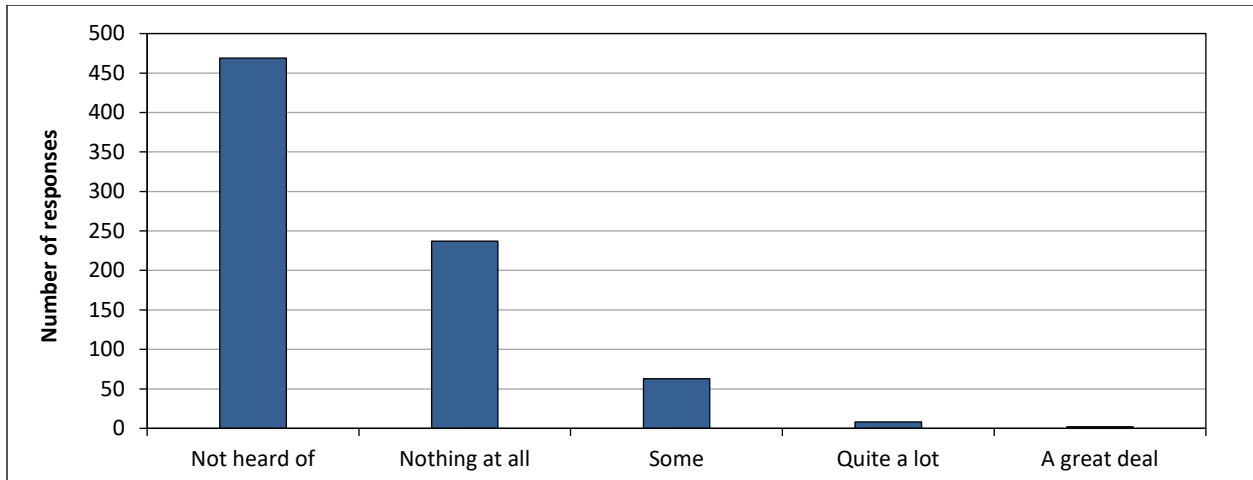


Figure 13. Landowner familiarity with MyWoodlot.com, based on 779 CAI responses in 2020.

Landowners that knew something about MyWoodlot had higher CAI scores than those that knew nothing at all about this website ($W=9746.5$, $p\text{-value}<0.001$). The median CAI score for landowners that knew something about MyWoodlot was 28 (out of a total possible score of 64), versus 13 for those unfamiliar with the website. MyWoodlot “knowers” scored higher across all subject areas and this was most pronounced for the Forest Tax Law and conservation easements (Figure 14).

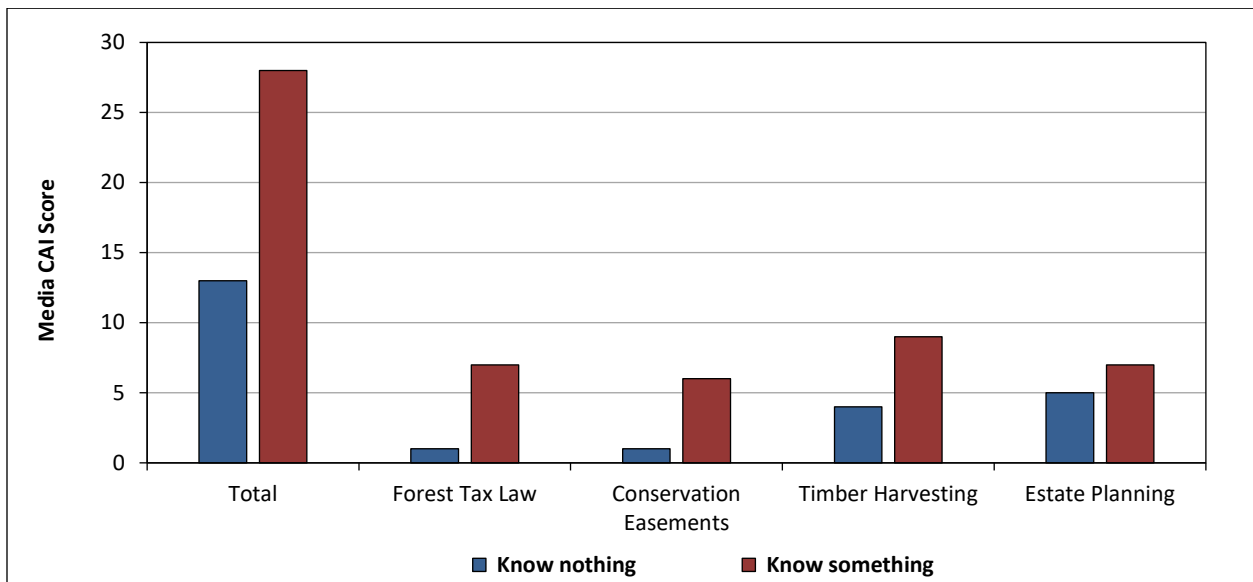


Figure 14. Median CAI total score and by subject area based on landowner familiarity with MyWoodlot.com.

Landowners that knew something about MyWoodlot could more readily name forest conservation professionals compared with those that knew nothing of the website. Fifty-eight percent of landowners that knew something about MyWoodlot could correctly name a local private forester, 18% could correctly name a local land trust, 11% could correctly name a State forester, and 7% could correctly name a local estate planning professional.

Without claiming that MyWoodlot.com was directly responsible for increasing CAI scores and knowledge of professional contacts, it is worth noting this website offers contact information for the following resources: Watershed Qualified Foresters, Master Forest Owners, Trained Logger Certified (TLC) timber harvesters, WAC Forestry Program staff and partners, accountants, estate planning attorneys, and land trusts.

CAI Scores – Landowner Demographics

In 2015, the average respondent was a male who owned 72 acres of land (median=32 acres) for 24 years, lived on his land, was 51-65 years old, and graduated from college. In 2020, the average respondent was a male who owned 107 acres of land (median=40 acres) for 27 years, lived on his land, was 66-80 year old, and graduated from college. In summary, parcel size was slightly larger, landowners got a little older, and they owned their land for a little longer in 2020. By comparison, Schnur et al. (2013) found that the average respondent in their study of New York landowners was a male who owned 59 acres of land (median=42 acres) for 25 years, lived on his land, was 51-65 years old, and graduated from high school.

CAI scores as a function of education and acres owned

In 2020, landowners with more education tended to own more woodland acres. WAC hypothesizes that higher levels of education are associated with greater wealth and thus a greater means to own larger tracts of land. A majority of landowners had a college degree (n=267), followed by landowners with a graduate or professional degree (n=219), some college (n=130), high school (n=122), and some high school (n=9).

As in 2015, landowners with larger woodlots had higher CAI scores in 2020 ($S=42499000$, $p\text{-value}<0.001$, $\rho=0.43$). The positive relationship between ownership size and CAI score is likely related to several factors, including a greater tax burden for larger acreages and the fact that landowners with larger acreages are eligible for more programs that could reduce property taxes, like 480-a and conservation easements. The economics of woodlot harvesting increases with larger acreages as well. A majority of landowners (56%) in the 2020 CAI survey owned less than 50 woodland acres (n=428), followed by landowners with more than 100 woodland acres (n=176), and those with 50-99 woodland acres (n=162).

In 2020, 480-a eligible landowners (those who owned 50 or more woodland acres) had higher CAI scores across all subject areas than landowners with less than 50 woodland acres ($W=41363$ to 52038 , $p<0.001$). These findings are identical to the 2015 CAI deployment (VanBrakle 2016). Schnur et al. (2013) found no significant difference in CAI scores for the Forest Tax Law subject area between 480-a eligible and ineligible landowners. VanBrakle (2016) argues that a significant difference in CAI scores based on 480-a eligibility exists in the watershed because landowner outreach historically focused on larger properties. For example, 70% of watershed forest management plans covered 480-a eligible properties. Similarly, consideration for DEP conservation easements under the City's Land Acquisition Program generally focuses on larger properties as well.

In the 2020 CAI deployment, landowners with more education tended to have higher CAI total scores. More education (and more wealth) is associated with owning more acres, and larger ownerships are associated with higher CAI scores. In 2020, only nine respondents indicated they had “some high school” education, so they were lumped with those having a “high school degree” for statistical analysis. There was a significant difference in CAI total scores by level of education (Kruskal-Wallis chi-squared =31.7, df=3, p<0.001). Landowners with a college degree had higher CAI total scores than those with a high school degree or some college education, which is similar to the 2015 deployment and other CAI studies.

CAI scores as a function of ownership tenure

In 2020, ownership tenure averaged 27 years and ranged from one to 74 years. There was no relationship between ownership tenure and total CAI score. This finding was similar to the 2015 CAI deployment and other CAI studies.

CAI scores as a function of distance lived from woodlot

A majority of respondents in 2020 live on their land for at least part of the year (n=345), followed by those who live over 100 miles from their woodlots (n=283). Relatively fewer landowners live less than 10 miles (n=51) or between 10-100 miles from their woodlot (n=85). In general, there is an inverse relationship between CAI total score and the distance landowners live from their woodlots (Kruskal-Wallis chi-squared = 19.7, df=3, p-value=0). Landowners living on or within 10 miles of their woodlot had higher CAI total scores than landowners living more than 100 miles away. In 2015, resident landowners had higher CAI scores than absentee landowners. Van Fleet et al (2012) found that residents had significantly greater awareness of conservation easements and timber harvesting than owners who lived 10–100 miles away.

CAI scores as a function of geographic location

Although the 2020 CAI sample size for EOH watershed landowners is small (n=80) compared with WOH landowners (n=710), it is still informative to compare CAI scores between regions. Median CAI total scores was 14 for WOH landowners and 13 for EOH landowners. Average CAI total score was 16.8 for WOH landowners and 14.2 for EOH landowners. There was no significant difference in total CAI scores between regions (W=24334, p-value=0.053). With regards to the four components of the CAI survey:

- Forest Tax Law. Median CAI score was 1 for both WOH and EOH landowners. WOH landowners had a higher average score (3.1) versus EOH landowners (1.6), which was statistically significant (W=21082, p-value<0.001).
- Conservation Easements. Median CAI score was 3 for EOH landowners versus 2 for WOH landowners. Average CAI score was also higher for EOH landowners (4.4) versus WOH landowners (3.4). This result was not statistically significant at the p=0.05 level (W=30551, p-value=0.18).
- Timber Harvesting. Median CAI score was much higher for WOH landowners (5) versus EOH landowners (1). Average CAI score was also higher for WOH landowners (5.2) versus EOH landowners (2.8). This result was statistically significant (W=16544, p-

value<0.001).

- Estate Planning. Median CAI score was 5 for both EOH and WOH landowners. Average CAI score was 5.4 for EOH landowners and 5.1 for WOH landowners. This result was not statistically significant at the $p=0.05$ level ($W=29154$, $p\text{-value}=0.56$).

In summary, WOH landowners scored quite a bit higher than EOH landowners on timber harvesting and slightly higher for the Forest Tax Law. This makes sense because parcel size is typically smaller for EOH landowners. Based on the 2020 CAI deployment, median woodland acres owned by EOH landowners was 15.5 versus 40 acres owned by WOH landowners. Average parcel size was 32 acres for EOH landowners versus 114 acres for WOH landowners. Larger parcel sizes means that WOH landowners are more likely to be eligible for the Forest Tax Law and the economics of timber harvesting are more favorable.

At the county level, median CAI total score was highest for Ulster County (16, $n=99$), followed by Westchester County (15, $n=27$), Delaware County (14, $n=440$), Greene County (14, $n=98$), Sullivan County (13, $n=28$), Putnam County (12, $n=42$), Schoharie County (10, $n=45$), and Dutchess County (8.5, $n=10$). A Kruskal-Wallis test showed that CAI total scores differed at the county level (Kruskal-Wallis chi-squared = 18.1, $df=7$, $p\text{-value}=0.01$). However, pairwise comparisons of CAI total score by county showed no statistically significant differences at the $\alpha/2$ level with α set to 0.05. The closest one to significance was the comparison in CAI total score between Ulster and Schoharie ($p=0.03$).

WAC concludes there were no statistically significant differences at the county level; those results are similar (though not identical) to the CAI 2015 deployment, in which mean Westchester County had the highest mean CAI score (18.7, $n=30$), followed by Sullivan (17.7, $n=37$), Ulster (16.4, $n=87$), Putnam (16.2, $n=37$), Delaware (16, $n=522$), Greene (14.4, $n=152$), Dutchess (13, $n=13$), and Schoharie (12.7, $n=38$).

CAI scores as a function of age

In the 2020 CAI deployment, 42% of landowners were 66-80 years old, 38% were 51-65 years old, and 13% were over 80 years old. Seven percent were 30-50 years old and 0.4% of respondents were under 30 years old. Landowners under 30 years old were excluded from statistical analysis due to a small sample size ($n=3$). CAI total scores were significantly different by age category (Kruskal-Wallis chi-squared = 25.3, $df=3$, $p\text{-value}=0$). CAI scores for landowners aged 51-65 were significantly higher than all other age categories. There were no other significant differences between age groups. WAC's 2015 CAI deployment found significantly lower total scores for those above age 80. Previous CAI studies found no age effect on total CAI scores.

CAI scores as a function of gender

In the 2020 CAI deployment, 70% of landowners that returned a survey were men, 19% were women, and 11% preferred not to say. The median CAI total was 15 for men, 14 for women, and 12 for those who didn't say. A Kruskal-Wallis rank sum test found that CAI total scores were different by gender (Kruskal-Wallis chi-squared = 10.9, $df=2$, $p\text{-value}=0$). Men had

higher CAI total scores than landowners who preferred not to say. CAI total scores were not significantly different between men and women. The 2015 CAI deployment found that men had higher scores than women. Previous CAI studies found no effect of gender on CAI total scores.

Summary and Conclusions

CAI estimates landowner preparedness to make informed conservation decisions about their land related to harvesting timber, paying taxes, and planning for the long-term future. In 2015 and 2020, the WAC Forestry Program mailed CAI surveys to 3,000 landowners owning more than 10 woodland acres in the New York City watershed. WAC compared CAI scores between the two periods and evaluated CAI scores based on landowner demographics.

The average CAI total score in 2020 was slightly higher than in 2015, which suggests that relatively little has changed in terms of conservation awareness. The exception was an increase in Forest Tax Law scores in 2020 compared to 2015. CAI subject area scores were highest for estate planning and timber harvesting, and lowest for the Forest Tax Law and conservation easements. The findings related to second-hand experience suggest that peer-to-peer relationships may help increase CAI scores; when landowners knew someone else who had considered or completed a forest conservation option, it improved their familiarity, knowledge, first-hand experience, and ability to connect with forest conservation professionals related to those subject areas.

The percentage of survey respondents that knew anything at all about MyWoodlot.com increased by 6.6% in 2020, suggesting that awareness of WAC's forest landowner education/outreach website is growing. Landowners who knew something about MyWoodlot appear to be conservation-oriented as they had higher CAI scores across all subject areas and could more readily name forest conservation professionals. WAC has used this information to mail Forestry Program brochures and MyWoodlot resources to survey respondents, and to publish new blog posts on MyWoodlot.com that address CAI subject areas. Future blog posts should highlight landowner stewardship stories related to their participation and first-hand experience with WAC's forest management planning program, BMP implementation programs, Management Assistance Program (MAP), and landowner education programs. On the MyWoodlot home page, WAC could frame CAI's core subject areas as the "Big Decisions" faced by many forest landowners, while incorporating contact information for estate planners and land trusts into existing resource directories.

The WAC Forestry Program continues to discuss how to facilitate peer-to-peer interactions among landowners to increase conservation awareness. Key examples include promoting the Master Forest Owner Program and rekindling webinars that allow forest landowners to share their experiences related to land ownership, dealing with high property taxes, getting started with legacy planning, and practicing sustainable forest management. WAC will conduct another CAI deployment in 2025 to further evaluate landowner preparedness to make informed conservation decisions about their land and to assess changes over time. DEP will work with WAC to ensure the 2025 evaluation is more focused on differentiating WAC participants from non-participants to better gauge effectiveness of WAC programming.

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Woodland Owner Questionnaire

SECTION 1: Forest Tax Law

1. How much would you say you know about the New York State Forest Tax Law (480-a) Program? Circle a number from the scale below:

<i>Not heard of</i>	<i>Nothing at all</i>	<i>Some</i>	<i>Quite a lot</i>	<i>A great deal</i>
1	2	3	4	5

2. Please indicate whether the following statements are true or false by circling *T* or *F*. If you do not know, circle *Don't know*:

A. The Forest Tax Law (480-a) Program permanently limits development on my land.	T	F	Don't know
B. Land in the Forest Tax Law (480-a) Program cannot be sold.	T	F	Don't know
C. The Forest Tax Law (480-a) Program prohibits commercial harvesting of trees on my land.	T	F	Don't know
D. The Forest Tax Law (480-a) Program reduces my property taxes.	T	F	Don't know

3. Have you or someone you know had experience with the Forest Tax Law (480-a) Program? Circle *Yes* or *No* in the boxes below. If you do not know, circle *Don't know*:

A. I have considered enrolling in the Forest Tax Law (480-a) Program.	Yes	No	Don't know
B. I am or have been enrolled in the Forest Tax Law (480-a) Program.	Yes	No	Don't know
C. Someone I know has considered enrolling in the Forest Tax Law (480-a) Program.	Yes	No	Don't know
D. Someone I know is or has been enrolled in the Forest Tax Law (480-a) Program.	Yes	No	Don't know

4. Do you know a local state Forester? Check *Yes* or *No* and provide any additional information that you can:

___ *Yes*: Specify their name(s): _____

___ *No*: How would you find out about one: _____

SECTION 2: Conservation Easements

5. How much would you say you know about Conservation Easements? Circle a number from the scale below:

<i>Not heard of</i>	<i>Nothing at all</i>	<i>Some</i>	<i>Quite a lot</i>	<i>A great deal</i>
1	2	3	4	5

6. Please indicate whether the following statements are true or false by circling *T* or *F*. If you do not know, circle *Don't know*:

A. Conservation Easements permanently limit development on my land.	T	F	Don't know
B. Conservation Easements must apply to my entire property.	T	F	Don't know
C. Conservation Easements require public access to my land.	T	F	Don't know
D. Land trusts hold Conservation Easements on private land.	T	F	Don't know

7. Have you or someone you know had experience with Conservation Easements? Circle *Yes* or *No* in the boxes below. If you do not know, circle *Don't know*:

A. I have considered a Conservation Easement for my land.	Yes	No	Don't know
B. I have a Conservation Easement on my land.	Yes	No	Don't know
C. Someone I know has considered a Conservation Easement for their land.	Yes	No	Don't know
D. Someone I know has a Conservation Easement on their land.	Yes	No	Don't know

8. Do you know a local land trust? Check *Yes* or *No* and provide any additional information that you can:

___ *Yes*: Specify their name(s): _____

___ *No*: How would you find out about one: _____

SECTION 3: Timber Harvesting

9. How much would you say you know about the process of selling timber? Circle a number from the scale below:

<i>Not heard of</i>	<i>Nothing at all</i>	<i>Some</i>	<i>Quite a lot</i>	<i>A great deal</i>
1	2	3	4	5

10. Please indicate whether the following statements are true or false by circling *T* or *F*. If you do not know, circle *Don't know*:

A. A forester cuts trees and brings them out of the woods.	T	F	Don't know
B. It's my legal responsibility that timber harvests on my land meet all environmental regulations.	T	F	Don't know
C. Loggers are required to have a license to harvest timber in New York State.	T	F	Don't know
D. A state Forester will give me free advice about my forestland.	T	F	Don't know

11. Have you or someone you know had experience with selling timber? Circle *Yes* or *No* in the boxes below. If you do not know, circle *Don't know*:

A. I have considered selling timber from my land.	Yes	No	Don't know
B. I have sold timber from my land.	Yes	No	Don't know
C. Someone I know has considered selling timber from their land.	Yes	No	Don't know
D. Someone I know has sold timber from their land.	Yes	No	Don't know

12. Do you know a private forester? Check *Yes* or *No* and provide any additional information you can:

Yes: Specify their name(s): _____
 No: How would you find out about one: _____

SECTION 4: Estate Planning

13. How much would you say you know about the process of developing an estate plan to decide the future of your land after your death? Circle a number from the scale below:

Not heard of *Nothing at all* *Some* *Quite a lot* *A great deal*
 1 2 3 4 5

14. Please indicate whether the following statements are true or false by circling *T* or *F*. If you do not know, circle *Don't know*:

A. An estate plan consists of a will and other planning documents.	T	F	Don't know
B. Estate planning can help either avoid or reduce the taxes for which an estate may be responsible.	T	F	Don't know
C. Only wealthy land owners benefit from estate planning.	T	F	Don't know
D. All estate planning professionals are knowledgeable about land conservation.	T	F	Don't know

15. Have you or someone you know had experience with estate planning? Circle *Yes* or *No* in the boxes below. If you do not know, circle *Don't know*:

A. I have considered developing an estate plan to decide the future of my land after my death.	Yes	No	Don't know
B. I have developed an estate plan to decide the future of my land after my death.	Yes	No	Don't know
C. Someone I know has considered developing an estate plan to decide the future of their land after their death.	Yes	No	Don't know
D. Someone I know has developed an estate plan to decide the future of their land after their death.	Yes	No	Don't know

16. Do you know an estate planning professional who is familiar with land conservation? Check *Yes* or *No* and provide any additional information that you can:

Yes: Specify their name(s) and profession(s): _____
 No: How would you find out about one: _____

SECTION 5: Background Information

17. How many acres of woodland do you own in New York? _____

18. In what year did you personally get/buy/inherit your woodland in New York? _____

19. How far do you live from your New York woodland? Please circle an option below:

A. I live on it. B. Less than 10 miles away. C. 10-100 miles away. D. More than 100 miles away.

20. How much would you say you know about the MyWoodlot.com website? Circle a number from the scale below:

Not heard of *Nothing at all* *Some* *Quite a lot* *A great deal*
 1 2 3 4 5

21. Please indicate your age by circling an option below:

A. Under 30 B. 30-50 C. 51-65 D. 66-80 E. Over 80

22. Please indicate the highest level of education you have completed by circling an option below:

A. Some high school B. High school C. Some college D. College graduate (associate or bachelor's degree)
 E. Graduate or professional degree (MBA, PhD, MD, JD, etc.)

23. Please indicate your gender:

~ Thank you for your participation ~