
Foresters' and Loggers' Views on Woody Biofuels in New York



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ABSTRACT

The objective of our research was to identify and understand the motivations and barriers of a variety of stakeholders for participating in the woody biofuel supply system in New York State. In this report, we focus on the views and actions of foresters and loggers. (A companion report [Connelly et al. 2011] discusses the results from our survey of private woodland owners.) A survey of foresters active in New York State was conducted by web and mail. We found that most foresters included the harvesting of wood for commercial woody biofuels production in recommendations they made to their clients or employers at least some of the time. We also found that most foresters think the trend is toward increasing commercial woody biofuels production, both in their region and in their own business. For foresters, the primary benefits of developing woody biofuels markets were to provide a market for low grade wood and to provide landowners with more options for achieving their land ownership objectives. The most frequently cited barriers to recommending the harvest of wood for use as biofuels were: high trucking costs, lack of markets for woody biofuels, no processing facility close enough to landowners, and landowners not getting sufficient financial return for the harvest of woody biofuels. Personal interviews were conducted with loggers living in New York State (n=11). They thought demand was currently high for firewood, but not for large volumes of low grade material. Loggers do not see supply, per se, as a barrier to utilization of woody biofuels. However, one of the most commonly mentioned barriers was the cost of transportation for both wood and equipment. In general, they think the future looks bright for small scale firewood production. Some also see strong demand for specific markets, such as for uses associated with gas drilling. Development of a larger scale facility that uses woody biofuels to produce energy brings up more concerns among interviewees. These included the need for year-round demand, sufficient supply within a reasonable area to cover the transportation costs, the difficulty of obtaining financing, and the volatility of other energy markets and their influence on the value of woody biofuels. Recommendations are made at the end of the report for educational programs that might address some of these barriers.

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INTRODUCTION

Although woodlands dominate more than 60% of the New York landscape, the contribution of those woodlands to renewable energy production as woody biofuel is potentially constrained by markets, resource access, and the logistical and industrial infrastructure for harvesting and transportation. Potential constraints on woody biofuel production include woodland owner attitudes about biomass harvesting and the willingness and availability of loggers and foresters to redirect their time and equipment from potentially more profitable harvests. In an attempt to better understand those constraints, Human Dimension Research Unit (HDRU) researchers teamed with Cornell Cooperative Extension personnel to study three audiences involved in supplying and processing woody biofuels – landowners, foresters, and loggers. Knowledge of these constraints will guide the development of educational programs that support decision making among owners and producers in sustainable and renewable energy enterprises.

This report focuses on foresters and loggers. (A companion report [Connelly et al. 2011] discusses the results from our survey of private woodland owners.) The majority of foresters and loggers in New York operate on a business model that emphasizes the harvest of high value sawtimber (Munsell and Germain 2007). Thus, to the extent that foresters are necessary for access to low-value products, their willingness to modify their business model to shift from high-value to low-value products will impact the availability of woody biofuel harvest. This is similar for loggers, who in essence are becoming a scare commodity because many are retiring, there is limited recruitment of new loggers, and they face profitability challenges (Egan and Taggart 2004; Broussard Allred 2009).

The overarching objective of this research project is to identify and understand the motivations and barriers faced by various stakeholders within the woody biofuel supply system in New York State. Specifically for foresters, we want to determine factors that influence foresters' willingness to include woody biofuels from private land in their client's management plans, and their willingness to incorporate low-grade wood products into their own business plan. For loggers we are focused primarily on identifying barriers to increasing the production and mobilization of woody biofuels. Additionally for loggers, many of them are already involved at some level in woody biofuels processing or production. This covers a range of activities from delivering cut and split firewood to running a wood pellet production facility. Therefore our examination of loggers also includes barriers to increasing woody biofuels processing.

We will discuss the results starting with foresters, followed by loggers. The report concludes with recommendations that are relevant for foresters, loggers, educators, and policy makers.

FORESTERS' SURVEY

Methods

We conducted a mail survey of foresters practicing in New York State. Our target survey population was all foresters practicing in New York State who had some interest in woody biofuels. Since no single source exists listing all professional foresters in New York, we gathered lists from several sources. We obtained lists of foresters from the New York State

Department of Environmental Conservation, the New York Chapter of the Society of American Foresters, the Empire State Forest Products Association, and the New York Sustainable Forestry Initiative Implementation Committee. We removed duplicates and those we knew were not actively working in forests in New York. A total of 402 potentially practicing foresters with email addresses were identified. The letter announcing the survey indicated that we expected some people who we contacted might not be active field foresters or ever expect to have an interest in woody biofuels. We asked those people to call or email us so we could get a count of them and avoid recontacting them in the future.

The questionnaire was developed in conjunction with a landowner survey on the same general topic of woody biofuels. Input on questions of interest was obtained from a team of Cooperative Extension educators and people involved in woody biofuels production in New York. The questionnaire asked about: 1) current level of awareness, interest, and use/recommendation of harvest for woody biofuels, 2) benefits and barriers that foresters perceive to the increase in the production and mobilization of woody biofuels, and 3) forester educational needs. See Appendix A for exact content and wording of the questionnaire.

In the questionnaire, woody biofuels were defined as: “any woody material that is used to produce energy. They can come from a variety of sources including mill residues, logging residues, and standing timber and can be obtained through timber stand improvement (TSI), thinning, and timber harvests. Woody biofuels could be firewood, pellets, chips, etc. and can be used for a variety of applications including residential heating, industrial heating, and processing energy.”

A letter preceding and announcing the survey was sent by regular U.S. Mail in early September 2010. One week later an email invitation to participate was sent along with a link to complete the survey on-line. The link was unique to the respondent such that once the survey was completed no reminder emails were sent. Up to two reminder emails were sent to non-respondents over the next two week period. A final letter and a hard copy of the questionnaire was sent to non-respondents one week later via regular U.S. Mail. A telephone follow-up survey was conducted with a sample of 50 people who did not respond to the on-line or mail survey to determine whether their answers to key questions differed from respondents.

Data were entered on the computer and analyzed using SPSS v.19 (a statistical package for the social sciences). Data were analyzed for the entire population of foresters and, for questions with a geographic component, for the three subpopulations defined according to where in the state they spent most of their work time. Statistical comparisons between groups were done using chi-square tests.

Results and Discussion

Mail Survey Response and Non-respondent Comparisons

Of the 402 foresters who received an email invitation to participate in the survey, 219 responded and an additional 13 told us they were not actively engaged in forestry or never expected to have an interest in woody biofuels. The response rate for the on-line survey was 56% (219/ [402-13]). The mail questionnaire yielded an additional 31 responses and one person who told us they were not actively engaged in forestry. This gives us an overall response rate for the survey of 64% ((219+31) / [402-13-1]).

As expected, when non-respondents were contacted by telephone, more of them said they were not currently working as foresters or didn't expect to ever have interest in woody biofuels compared to respondents (34% of non-respondents versus 5% of respondents). Among those who were working as foresters and had some interest in woody biofuels, respondents differed from non-respondents based on their employment sector but not their job function. Over 40% of respondents worked for government agencies compared with 27% of non-respondents. Conversely, only 25% of respondents were private consulting foresters compared with 48% of non-respondents. As we'll see later in the report, among respondents there were no significant differences based on employment sector for either the benefits or barriers to woody biofuels production questions, so this difference between respondents and non-respondents likely has no impact on the key questions in the survey. Respondents were much more likely to at least sometimes recommend harvesting of wood for commercial woody biofuels production compared with non-respondents (80% vs. 55%). This finding is not related to employment sector, either. For responding and non-responding foresters, the percentage of their clients interested in woody biofuels was similar, as was their impressions of the benefits and barriers to harvesting wood for use as biofuels.

Characteristics of Foresters

The majority of responding foresters work for either the government, including federal, state, and city/county governments, or as private consulting foresters (Table 1). Thirteen percent work for industry and 5% work for nongovernmental organizations. The remaining 14% indicated they worked in other employment sectors, primarily in educational settings.

The majority of responding foresters have field work or landowner assistance as their primary job functions (Table 1). Fewer were involved in procurement, education, research, or policy. Very few had mill management as their primary job function. Other job functions written in by a few respondents included administration and general land management.

Respondents indicated that they worked most frequently during the last 12 months in either the Adirondacks or the Southern Highlands regions of New York (Table 1 and Figure 1). Fewer respondents worked in the other three ecological regions. Because of the small number of respondents in these regions, they are combined into an "Other" group in subsequent analysis.

Table 1. Responding forester characteristics

<i>Employment sector</i>	Percent
Government (e.g., federal, state, city/county)	43.1
Private consulting forester	25.0
Industry	12.9
Nongovernmental organization (NGO)	5.2
Other	13.7
<i>Primary job function</i>	
Field work	35.4
Landowner assistance	21.4
Procurement	9.1
Education	6.2
Research	4.9
Policy	2.9
Mill management	0.8
Other	19.3
<i>Region worked most frequently in last 12 months</i>	
Adirondacks	35.1
Southern Highlands	31.0
Other	33.9
Mohawk Valley/Capital District	12.0
Lake Plain	11.2
Catskill/Lower Hudson/Long Island	10.7

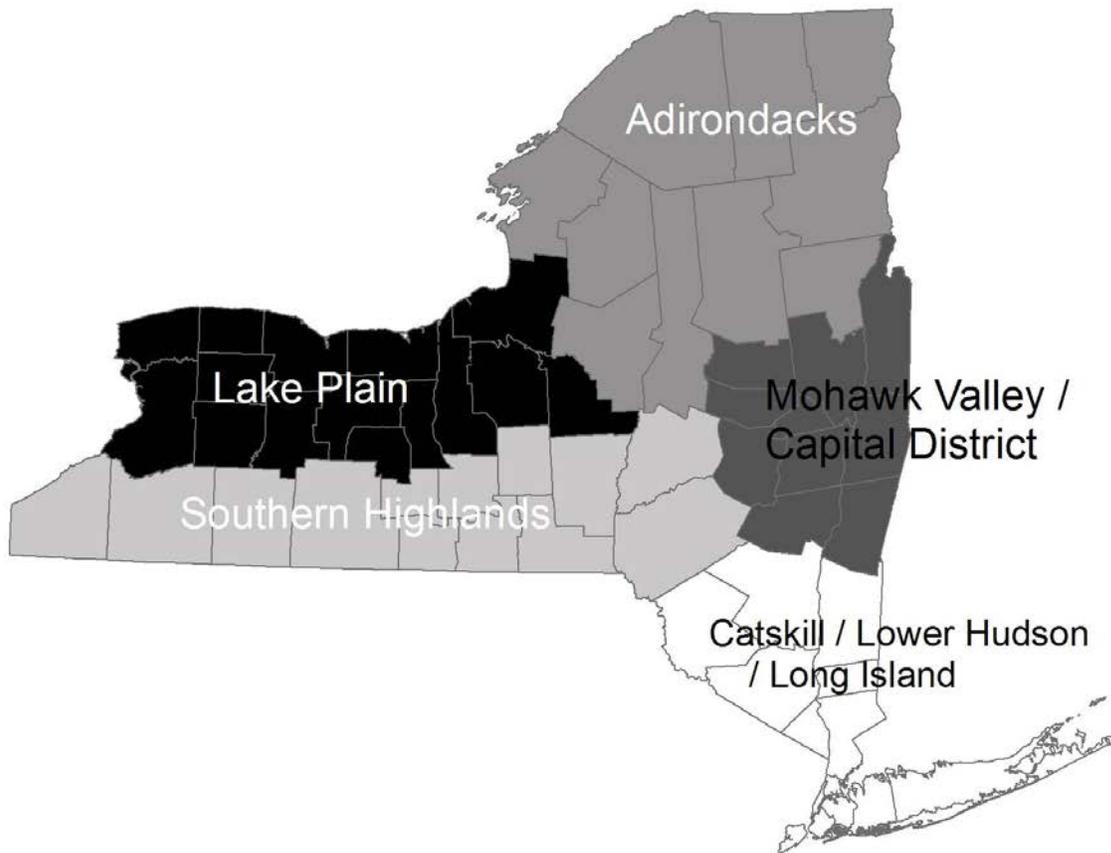


Figure 1. Map of New York State ecological regions.

Foresters' Experiences with Woody Biofuels

Foresters indicated that on average almost half (44%) of their clients had harvested woody biofuels in the past 5 years, and 15% were interested in harvesting woody biofuels, but had not yet done so. Very few foresters reported clients who were not interested (11%) in harvesting woody biofuels. Foresters did report that they didn't know the interest level of about one-third (30%) of their clients on average.

Eighty percent of foresters included the harvesting of wood for commercial woody biofuels production in recommendations they made to their clients or employers. About two-fifths of these foresters (42%) always made the recommendation, while the others (58%) made the recommendation sometimes.

We asked foresters what types of woody biofuels are commercially produced or proposed in the region where they work most frequently. Almost all foresters statewide thought firewood, both log length and processed, was being currently produced in their region (Table 2). About half of the foresters statewide thought mill residues were being used for woody biofuels in their area.

Few thought post-harvest slash removal was occurring or proposed in their area. In the Adirondacks, almost all foresters reported wood chips were being produced and most reported wood pellets were being produced or proposed to be produced in their area. In the other regions, about half of the foresters reported wood chips and pellets were being produced. Foresters in the “Other Regions” were more likely than those in the Adirondacks or Southern Highlands to indicate that they don’t know what is actively being produced or proposed.

Most foresters think the trend is toward increasing commercial woody biofuels production, both in their region and in their own business (Table 3). The majority think the trend will increase somewhat throughout the state. Very few think the trend will decrease.

Table 2. Foresters’ perceptions of the types of woody biofuels being commercially produced or proposed in the region where the forester works most frequently.

<i>Woody biofuel type</i>	Adirondacks		Southern Highlands		Other region	
	Active	Proposed	Active	Proposed	Active	Proposed
	Percent					
Firewood, log length	95.1	1.2	95.9	2.7	95.7	1.5
Firewood, processed	90.2	0.0	89.2	2.7	85.7	0.0
Wood pellets ^a	69.5	13.4	51.4	15.1	30.0	13.8
Wood chips ^a	91.5	4.9	56.8	15.1	54.3	9.2
Post harvest slash removal	24.4	4.9	12.2	11.0	14.3	4.6
Mill residues	53.7	1.2	64.9	6.8	52.9	3.1
Don’t know ^{a,b}	16.7	2.9	7.7	5.2	55.0	22.9
^a Statistically significant differences between regions for active commercial woody biofuels production at P = 0.05 using chi-square test.						
^b Statistically significant differences between regions for proposed commercial woody biofuels production at P = 0.05 using chi-square test.						

Table 3. What foresters think will be the trend in commercial woody biofuels production in their business and in their region in the next 5 years.

<i>Trend in commercial woody biofuel production</i>	Adirondacks		Southern Highlands		Other region	
	In my business	In region	In my business	In region	In my business	In region
	Percent					
Increase greatly	19.7	22.4	13.6	17.1	15.0	12.7
Increase somewhat	60.6	67.1	59.1	57.1	65.0	67.6
Remain the same	19.7	9.2	25.8	22.9	18.3	18.3
Decrease somewhat	0.0	1.3	0.0	2.9	0.0	1.4
Decrease greatly	0.0	0.0	1.5	0.0	1.7	0.0

Foresters see a number of benefits to the development of woody biofuels' markets in their region, primary among them the provision of a market for low grade wood (Table 4). Three-quarters of respondents saw markets for low-grade wood as a significant benefit. Half of the respondents also saw the development of woody biofuels' markets as a significant benefit to landowners by providing them with more options for achieving their land ownership objectives. Other benefits that most foresters saw as moderate or significant included benefits to the local economy, providing jobs, contributing to green energy production, serving as an income source for landowners, and by providing a use for wood that would otherwise be left in the forest. All benefits were identified by 50% or more of the foresters as at least moderate. Several respondents wrote in other benefits such as improving post-harvest aesthetics.

Table 4. Benefits to woody biofuels market development in region forester works most frequently.

	A significant benefit	A moderate benefit	Somewhat of a benefit	Not a benefit	Unsure/ Don't know
	Percent				
Provides a market for low grade wood	75.0	18.5	3.9	2.2	0.4
Increase options for woodland owners to achieve other ownership objectives (e.g., improve wildlife habitat)	54.3	28.0	12.9	3.0	1.7
Contribute to green energy production	43.1	34.1	16.8	4.3	1.7
Income source for woodland owners	35.8	33.2	27.2	3.0	0.9
Benefits to the local economy	32.9	34.2	25.5	6.1	1.3
Using wood that would otherwise be left in the forest	31.2	33.3	24.2	10.4	0.9
Provide jobs	30.7	35.9	24.2	6.5	2.6

Foresters saw a number of significant barriers to their recommending the harvest of wood for use as biofuels (Table 5). The four mentioned most frequently included high trucking costs, lack of markets for woody biofuels, no processing facility close enough to landowners, and insufficient financial return to landowners for the harvest of woody biofuels. Of those, lack of markets and “no close processing facility,” were seen by more non-Adirondack foresters as being a significant barrier than Adirondack foresters (lack of markets - 44-57% vs. 20%, no close processing facility - 49-51% vs. 18%). Similarly, lack of knowledge about who can harvest (21-23% vs. 6%) and buy (25-27% vs. 6%) woody biofuels was more of a barrier for non-Adirondack foresters than Adirondack foresters. Slightly more than half of the foresters did not feel the impacts on wildlife or wildlife habitat were a barrier to recommending harvest of woody biofuel. The majority of foresters did not think of their ability to explain woody biofuels management to landowners as a barrier.

Table 5. Barriers to recommending harvest of wood for use as biofuels.

	A significant barrier	A moderate barrier	Somewhat of a barrier	Not a barrier	Unsure/ Don't know
	Percent				
Trucking costs too high	46.0	22.3	13.8	8.0	9.8
Lack of markets for woody biofuels	41.2	20.4	20.8	12.2	5.4
No processing facility close enough to landowners	39.1	20.4	17.8	15.6	7.1
Landowners do not get sufficient financial return for harvest of woody biofuels	36.3	26.9	19.3	9.0	8.5
Landowners unwilling to pay for biofuels management	30.2	22.5	18.0	15.3	14.0
Loggers don't have the necessary equipment to harvest wood for biofuels	21.6	21.2	27.9	19.8	9.5
Don't know who is buying woody biofuels	18.4	13.5	29.1	34.1	4.9
Don't know loggers who can efficiently harvest woody biofuels	16.3	22.6	27.6	29.0	4.5
Regulations limiting transport distance prevent wood from reaching closest processor	15.7	16.1	20.2	29.1	18.8
Landowners unwilling to have this type of harvest on their land	14.5	21.7	36.2	16.7	10.9
Not enough trucks or drivers to haul woody biofuels	13.9	22.0	24.2	25.6	14.3
Loggers resistant to biofuels harvest	9.4	12.1	30.9	34.5	13.0
Landowners unaware of the possibility of woody biofuel harvest	6.7	22.8	29.9	34.4	6.3
Negative impact of harvesting on wildlife or wildlife habitat	7.2	7.2	24.8	51.8	9.0
Don't know how to explain woody biofuels management to landowners	1.8	8.1	18.9	66.2	5.0

Foresters' Educational Needs Related to Woody Biofuels

Foresters expressed interest in learning more about all of the topics we mentioned in the questionnaire (Table 6). Topics foresters were most interested in learning more about were: who is buying woody biofuels in their area, silvicultural strategies for combined woody biofuel and sawtimber management, tax benefits/implications for clients, low impact harvesting options, and how to make low-grade wood products profitable. Very few suggested other topics not suggested on the survey.

Table 6. Topics foresters would be interested in learning more about.

<i>Topics of interest</i>	Percent checking*
Who is buying woody biofuels in my area	69.8
Silvicultural strategies for combined woody biofuel and sawtimber management	66.4
Tax benefits/implications for clients	63.4
Low impact harvesting options	61.6
How to make low-grade wood products profitable in my business	52.6
Rules and regulations regarding the transport of wood to be used in woody biofuels production	51.7
How to integrate woody biofuels with other landowner objectives	47.4
Other topics	4.3
*Percentages can add to more than 100% because more than one topic could be checked.	

The three most preferred educational tools and the ones most likely to be used by foresters in the future to get information on the above topics included brochures or fact-sheets, classes or workshops, and websites (Table 7). Over half of the foresters would also be interested in visits to demonstration areas, periodic newsletters, and presentations at professional meetings.

Table 7. Educational tools foresters prefer to use and the one they are most likely to use in the future.

<i>Educational tools preferred</i>	Percent checking*	Most likely to use
Brochures or fact-sheets	65.3	14.4
Classes or workshops	62.7	18.6
Website	60.2	16.7
Visits to demonstration areas	55.5	6.5
Periodic newsletters	54.2	9.3
Presentations at professional meetings	52.1	8.4
Webinar available from Internet	36.9	7.0
Networking with peers	32.6	1.9
Special mailing to my workplace	30.1	3.3
Cooperative research	28.4	1.4
E-mail listserv	27.5	7.4
DVD	27.1	1.9
On-line video clips	20.8	1.9
Books	14.0	0.0
Podcast available from Internet	10.6	0.9
Other	0.4	0.5
*Percentages can add to more than 100% because more than one tool could be checked.		

LOGGERS' INTERVIEWS

Methods

Semi-structured, open-ended interviews were conducted with loggers and logger/woody biofuels producers in several areas of New York State. Cornell Cooperative Extension educators were trained to conduct the interviews and asked to recruit as diverse a set of interviewees as possible based on geographic area and level of involvement in woody biofuels harvest. Only loggers with prior experience with woody biofuel harvesting or production participated. Thus, the selection of loggers as participants was not random, but represents a diverse set of opinions from among the logger population. The results and conclusions indicate the range of the types of concerns and barriers that facilitate or limit logger involvement in woody biofuel production.

For the interviews, woody biofuels were defined as any woody material that is used to produce energy. They can come from a variety of sources including mill residues, logging residues, and standing timber and can be obtained through TSI, thinning, and timber harvests. Woody biofuels could be firewood, pellets, chips, etc. and can be used for a variety of applications including residential heating, industrial heating, and processing energy.

The purpose of the interviews was to determine the desire to expand woody biofuel production, and what, if any, barriers are limiting the ability or willingness of loggers and woody biofuels producers to increase the production and mobilization of woody biofuels. The questions guiding the interviews focused on: 1) the type and volume of business, 2) motivations and barriers to business development, 3) outlook for the future of woody biofuels production, and 4) suggestions for future educational materials and Cooperative Extension involvement. (The complete set of questions can be found in the interview guide in Appendix B.)

When the interviewer received the respondents' permission, the interview was recorded and transcribed. Content analysis of the interview transcripts was done using ATLAS.ti (Version 6.2.23). This qualitative data analysis program allowed us to mark/code segments of interviews that described different barriers to woody biofuels production, outlooks for the future of woody biofuels production, and suggestions for future educational programs. The segments could then be organized by code, allowing us to more easily see commonalities and synthesize the results.

Results and Discussion

Characteristics of Loggers and Their Businesses

Interviews were conducted with 11 loggers. Most of them had been in business for more than 20 years, but the range extended from 5 years to over 40 years. Their businesses were located in the Catskill region, the Southern Tier (Central and Western New York), and Northern New York. Most worked within a range of 20 to 40 miles of their home base of operations, thus covering a several county area. Several had traveled more than 100 miles from their home base last year to harvest wood. The activities they were involved in varied widely. This was expected because we purposefully selected interviewees who were involved in diverse activities. Some harvested only softwoods, others only hardwoods, but many harvested both. Not all interviewees currently produced woody biofuels. Of those that did, most were involved in sawtimber harvests and

viewed low-grade harvest as a by-product of their sawtimber business. They gathered wood for woody biofuels primarily from TSI or clean-up after a sawtimber harvest. Some cut and split the wood into firewood; others sold only log length firewood. Some of the wood they harvested went to wood pellet facilities or was processed into wood chips for various uses, not always biofuels.

Most of the loggers we interviewed worked full-time in the industry. Many took time off during “mud season,” but worked the rest of the year. They tended to work by themselves or employ a few people, generally part-time or full-time for part of the year. A few interviewees owned substantially larger businesses, including wood processing facilities. All owned their own harvesting equipment, averaging approximately 5 different pieces of equipment. Some of the larger businesses had more, usually multiples of the same pieces of equipment. No one leased equipment for their own use, and very rarely subcontracted out their own equipment or personnel.

Loggers’ Views on Barriers to Increasing Woody Biofuels Production

A number of barriers were mentioned by interviewees. The barriers mentioned varied by the type of business (primarily firewood versus other) and somewhat by the location of the business. We have grouped them by general topics below.

Transportation Issues. One of the most commonly mentioned barriers to increasing woody biofuels production was the cost of transportation. Several interviewees mentioned the need for a local market to remain profitable.

Unless you cut a super huge quantity of pulp wood here, it kills you to truck it. (P-1)¹

They also mentioned the cost of production and transportation in relation to the value of the wood being transported.

It’s a lot easier shipping value added product long distance than just product. (P-8)

The cost to move harvesting equipment is also high, so if loggers are working with small tracts they are not getting a high enough price for low grade products to make it worth transporting the equipment.

Another transportation issue was the availability of equipment to transport woody biofuels. Some interviewees said they did not have any trouble finding truckers, while others did.

Because of the unavailability of trucks, it forced me to buy my own trucks. (P-11)

¹Letters and numbers in parentheses at the end of each direct quote are unique identifiers allowing the authors to identify the source of the quote.

Regulations regarding transportation were also seen as a barrier. Several mentioned those put in place to prevent the spread of invasive species, such as the emerald ash borer. Others talked about those related to the weight of trucks.

I don't believe we should have weight laws that are different from state to state. (P-8)

Respondent: The problem is that because we are running the same weight class as the well drillers, ...² we are being thrown in that group too, making it harder and harder to do business and to be able to get our wood out of the woods and use the roads that we've always used before.

Interviewer: So the regulations that either have been passed or will be passed to regulate the well drilling, the gas industry, carry over to you and you get caught up in this?

Respondent: Big time, yeah. (P-11)

Demand issues. Interviewees saw demand as both a barrier and a motivation. Some felt there was an increased demand for firewood because of the economic downturn.

It's actually the demand of oil that's triggering them to go to firewood, because they can't afford it. (P-9)

I would be considered a small firewood processor. There aren't any barriers, there's a wide open market for it, wide open local market for it... I can sell more firewood than I can cut. (P-1)

While on the other hand, some interviewees saw a lack of demand related to consumer perceptions or the abundance of supply.

We have no market whatsoever in the Catskill region for low grade. ... New England Pellet down in Deposit ... they're not buying any, ... they're getting enough from surplus from the mills ... (P-4)

I'm concerned I won't have demand because of people's reactions to smoke. You know burning wood is: "Oh it's so bad" (P-4)

I see more and more product [pellets] coming on the market without the demand. (P-8)

My problem always... is selling it [low-grade wood]. (P-8)

Supply Issues. Supply involves both the actual amount of wood available and the willingness of landowners to sell it. For those cutting and selling firewood on a smaller scale, the supply seemed to be available, with landowners willing to sell because they want an aesthetically-pleasing (to them) woodlot. Interviewees perceived that landowners want a clean site when the harvest is done, so removing the low grade makes landowners satisfied, which is important for the logger's reputation and future work.

² Ellipses indicate that material has been deleted to eliminate extraneous material and improve readability.

A lot of times I do it [remove low-grade wood after harvest] because of aesthetics. The landowner wants it cleaned up. ... They don't want it to look like a mess, so that's why a lot of it comes out. (P-4)

People clean up our jobs a lot better being able to sell the firewood. (P-3)

On a larger scale, the supply also seems to be available. So supply, per se, is not perceived as much of a barrier.

What we have here in the Northeast. We have a high percentage of low-value timber (P-8)

Other barriers. Several interviewees mentioned other barriers such as the fact that they did not have the equipment or manpower for increasing woody biofuels harvest, and they did not seem interested in pursuing it.

The biggest problem I see is it's a totally different type of equipment. We're looking at more feller bunchers, we're looking at chippers, we're looking at grapple skidders, equipment that we presently do not own. (P-6)

The bigger you get the more manpower you have to have and you cannot rely on help. (P-3)

I'm a very cautious business owner ... We just don't have the income to step out to afford the equipment. (P-1)

Related to this may also be the aging of the logger population.

Most of us are in our 50's plus, and we don't have the ambition to do it anymore. (P-6)

They also mentioned regulations, beyond those associated specifically with transportation, as a barrier.

The biggest barrier that just popped up is the state regulations on the outside wood burners. (P-9)

The Clean Water Act, being the Chesapeake Bay partly, we've got to deal with that. (P-11)

Loggers' Views on the Future of Woody Biofuels Production

Interviewees were first asked about the changes that have occurred in their business over the last five years. The answers covered the full range from a significant decrease attributed to the general downturn in the economy, to no change, to an increase in business also attributed to the

general downturn in the economy. Several interviewees noted a shift in their business from sawtimber being primary to firewood being primary, which corresponded to the demand in the general economy. Some also felt their business increased as other loggers retired or otherwise left the business. However, many worried about the aging population of loggers and the potential for demand to exceed the number of loggers in the future, as discussed earlier.

The future of woody biofuels production, as discussed by respondents, focused on two primary areas— small scale firewood production and the possibility of a larger scale facility that would convert woody biofuels to heat or electricity. Respondents thought the future looked bright for small scale firewood production.

I can sell more firewood than I can cut. (P-1)

Firewood I think is going to be a pretty good commodity... A lot of these people with outdoor wood furnaces, they got to burn wood. Wood is always going to be there. (P-3)

Some also see strong demand for specific markets.

Things look good this year for the export market. The export market has grown considerably since the recession. Used to be 15% of the logs, raw logs and lumber were export. Now the United States is shipping 40% of its wood volume overseas. Because there's a big growing middle class in China and India so they're building houses and they like our wood. (P-6)

It would get stronger if they started gas drilling in New York...Because they need all the chips.(P-10)

The future for a larger scale facility brings up more concerns among respondents, including the need for year-round demand,

We need some kind of facility that'll use this low grade wood year-round, it can't just be schools for heating... making electric energy would be ideal ... you'd have something that's using the product year-round and then you supplement it more in the winter with the heating of these bigger buildings. (P-4)

sufficient supply within a reasonable area to cover the transportation costs,

I don't think the quantity of the low-grade material is going to be here for large scale operation. (P-1)

Some place close by, where you don't have a lot of trucking involved ... the nicest thing would be is to have a facility that would take your chip wood or whatever in a close area. (P-7)

In order to get the amount of low grade to supply a biomass plant, you're going to have to reach out and get into different areas. Right around within a 25 mile radius of Watkins

Glen where one of the biomass places are, they cannot, it's not feasible. They're not going to get the wood. They're going to have to reach out probably minimal 100 miles. (P-11)

the difficulty of obtaining financing,

The credit issue is a major one. (P-11)

and the volatility of other energy markets and their influence on the value of woody biofuels.

If the price of natural gas and the other products increase and make biomass more suitable okay, so that it's either going to cost them the same or save them money then they'll do it. (P-11)

Some would consider switching from sawlogs to woody biofuels, if their concerns could be addressed.

I was considering it [switching from sawlogs to woody biofuels] but the volatility of the market and the amount that they want to pay for biomass down here in the Southern Tier wasn't financially feasible. (P-11)

Several respondents offered ideas for increasing the demand for woody biofuels and better utilizing the current supply.

Start using, like Syracuse did, some experiment with woody mass for ethanol. It's more efficient. (P-6)

These are the kind of things that I believe government needs to do if they're going to be subsidizing anything... They need to be subsidizing the end user. Put that money in the hands of the end user... the person that was actually gonna put the furnace or stove in his house. And the end user will create the demand for the market on the other end. I can't believe subsidizing the factory will ever pass down to the bottom person. (P-8)

We are using what I feel is the clean part of the tree as a biomass source that could either be used for paper or board. But that's what we're burning. I feel we should be trying to market ourselves so that we're burning the worst part of the tree, utilizing the rest of it for other products. (P-8)

Loggers' Views on Educational Opportunities

Respondents were interested in educational opportunities that focused on information about current markets and possible areas of growth in the markets. They also saw a role for Cooperative Extension in continuing to offer workshops and other educational programs with Society of American Foresters Continuing Education credits needed to maintain Certified Forester status.

I think you're doing a good job [offering workshops] and I think you ought to keep it up. (P-9)

Help keep us certified. (P-5)

Respondents suggested reaching out to legislators to help them understand the industry.

Reach out to the legislators and help make it more accessible to and more feasible for these industries to start up. Right now with the regulations and everything else it makes it very tough for people to even want to start the venture. (P-4)

A focus of Cornell's past forestry educational efforts have been on the subject of sustainability and increasing the use of sustainable harvesting practices on private lands. When asked about sustainability, respondents defined it as harvesting such that there would be regeneration and future harvests.

We're trying to do cuts for regeneration, future timber sales... gun clubs and stuff like that, they're actually interested in the wildlife habitat that's sprung from the harvests. (P-4)

That it's in your interest to make sure you have some other material to harvest in the future ... TSI work ... 65% of loggers do this. (P-1)

I think most of the loggers like to work every day and as a result want to see the woods there forever and keep growing. (P-11)

As far as defining sustainable harvesting practices, respondents said:

You want to do a harvest that is heavy enough to do regeneration but also light enough that it's not hindering the fact of regeneration. (P-4)

Where there is going to be a harvest down the road. (P-10)

Some thought that others did not use sustainable practices.

There's some that's very conscious about it and do the right thing, but I would say it's probably more that don't. (P-4)

Other respondents thought more than half of the loggers they knew used sustainable harvesting practices. Most said the price paid would influence their willingness to use sustainable harvest practices, but one person said:

I've got to say most of the time it [the price paid] doesn't [influence my willingness to use sustainable harvest practices]. (P-9)

Respondents also saw value in Cooperative Extension educating landowners about the uses of lower grade wood, and the possible benefits of a woody biofuels processing facility.

Educate the people out there that have the resources. (P-2)

Cornell could educate the public that's against having this in their backyard. You know everybody's got this "not in my backyard" mentality and you know people need to realize that this is a good thing. (P-4)

An education for me and I think the public about, and I don't know if you can do this, about emissions control. How much does smoke put out as far as in the atmosphere and all we see is pictures of it belching and you know what is it really doing? (P-9)

They also perceived that landowners would be interested in sustainability and sustainable harvesting practices.

Some people out there that do care about their wood but then there is people that say no I just want to cut the timber and sell the land. (P-3)

Others that keep the land are interested in the regeneration. (P-5)

I would say 30-40% of people that I run into, they're concerned. They want a good job, they want something for their grandkids and things like that, to show their grandchildren. (P-9)

CONCLUSIONS AND RECOMMENDATIONS FOR EDUCATIONAL PROGRAMS

Foresters

1. Most foresters included the harvesting of wood for commercial woody biofuels production in recommendations they made to their clients or employers at least some of the time.
2. Most foresters think the trend is toward increasing commercial woody biofuels production, both in their region and in their own business.
3. The primary benefits of developing woody biofuels markets were provision of a market for low grade wood, and benefit to landowners by providing them with more options for achieving their land ownership objectives.
4. The main barriers to recommending the harvest of wood for use as biofuels were trucking costs being too high, lack of markets for woody biofuels, no processing facility close enough to landowners, and landowners not getting sufficient financial return for the harvest of woody biofuels.

5. The most popular educational topics were learning more about who is buying woody biofuels in my area, silvicultural strategies for combined woody biofuel and sawtimber management, learning about the tax benefits/implications for clients, and low impact harvesting options. The three most preferred educational tools and the ones most likely to be used by foresters in the future to get information on the above topics included brochures or fact-sheets, classes or workshops, and websites.

Loggers

1. As far as motivations and barriers to increasing woody biofuels production, one of the most commonly mentioned barriers was the cost of transportation. Also interviewees do not currently own the equipment for a larger scale operation. Demand is high for firewood, but not for large volumes of low grade material. Loggers do not see supply, per se, as a barrier to utilization of woody biofuels.
2. Respondents think the future looks bright for small scale firewood production. Some also see strong demand for specific markets, such as for uses associated with gas drilling. Development of a larger scale facility that uses woody biofuels to produce energy brings up more concerns among interviewees. These included the need for year-round demand, sufficient supply within a reasonable area to cover the transportation costs, the difficulty of obtaining financing, and the volatility of other energy markets and their influence on the value of woody biofuels.
3. Respondents were interested in educational opportunities that focused on information about current markets and possible areas of growth in the markets. They also saw a role for Cooperative Extension in continuing to offer forestry education programs and reaching out to legislators to educate them about the industry. They suggested programs for landowners about the uses of lower grade wood, the possible benefits of a woody biofuels processing facility, and sustainable harvesting practices.

Educational Program Recommendations

1. Help woodland owners learn how harvesting low-grade wood impacts timber production, aesthetics, habitat for different types of wildlife, and recreational access.
2. Develop fact sheets that foresters and loggers can use to explain advantages and disadvantages of low-grade harvesting to landowners. Identify circumstances when low-grade harvesting is more desirable than retaining those stems.
3. The two previous educational recommendations would contribute to a white paper to help policy makers understand the ecological and economic value to owners, foresters, loggers, and firewood/woody biofuel consumers for local production and use.
4. Develop an on-line business network that connects foresters, loggers and firewood processors so they can find others providing services. Landowners could access the

network to identify firewood processors. Provide links for consumers to understand the firewood production process.

5. Encourage silviculturalists to develop fact sheets and workshops that document the process of sustainable integrated (e.g., sawlogs plus low-grade) harvests.
6. Develop materials that firewood consumers can use to understand sustainable harvests and the use of locally produced firewood.

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Foresters' Views on Woody Biofuels in New York



Cornell University
Department of Natural Resources
Human Dimensions Research Unit

APPENDIX A: Study Questionnaire

Foresters' Views on Woody Biofuels in New York

Research conducted by the Human Dimensions Research Unit in
the Department of Natural Resources, College of Agriculture and
Life Sciences, Cornell University

Conducted in cooperation with Cornell University Cooperative
Extension

The purpose of this survey is to learn more about your perceptions of woody biofuels and their future use in New York State. When we say "woody biofuels" we mean any woody material that is used to produce energy. They can come from a variety of sources including mill residues, logging residues, and standing timber and can be obtained through TSI, thinning, and timber harvests. Woody biofuels could be firewood, pellets, chips, etc. and can be used for a variety of applications including residential heating, industrial heating, and processing energy. Information from this survey will help clarify the involvement foresters have with recommending harvest of wood for energy production and what information they would like to have regarding the production of woody biofuels.

Your name was selected for this survey because we thought you might be actively engaged in forestry in New York State, and potentially have some interest in woody biofuels. If we have contacted you in error, or if you feel that you will never have an interest in woody biofuels, please write a note to that effect on the questionnaire and return it to us, so that we don't bother you with reminder notices.

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

THANK YOU FOR YOUR ASSISTANCE!

GENERAL EXPERIENCE IN NEW YORK STATE

1. What employment sector do you work in? (Check one.)

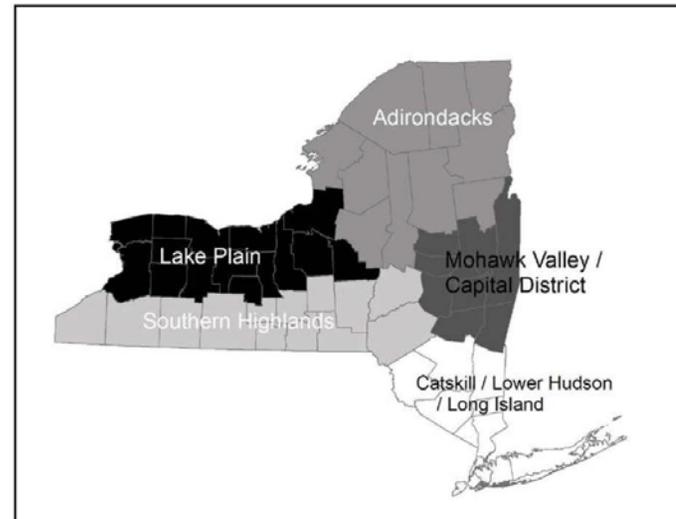
- Government (e.g., federal, state, city/county)
- Industry
- Nongovernmental organization (NGO)
- Private consulting forester
- Other (Please describe: _____)

2. What is your primary job function? (Check ONE box.)

- | | |
|-----------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> Field work | <input type="checkbox"/> Policy |
| <input type="checkbox"/> Mill management | <input type="checkbox"/> Education |
| <input type="checkbox"/> Procurement | <input type="checkbox"/> Research |
| <input type="checkbox"/> Landowner assistance | <input type="checkbox"/> Other (please specify: _____) |

3. Referring to the map below, which region of New York State have you worked in most frequently during the last 12 months? (Check only one.)

- Adirondacks
- Mohawk Valley/Capital District
- Catskill/Lower Hudson/Long Island
- Lake Plain
- Southern Highlands



4. Which types of woody biofuels are **commercially** produced or proposed in the region where you work most frequently? (Check all that apply.)

- | <u>Active</u> | <u>Proposed</u> | |
|--------------------------|--------------------------|----------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Firewood, log length |
| <input type="checkbox"/> | <input type="checkbox"/> | Firewood, processed |
| <input type="checkbox"/> | <input type="checkbox"/> | Wood pellets |
| <input type="checkbox"/> | <input type="checkbox"/> | Wood chips |
| <input type="checkbox"/> | <input type="checkbox"/> | Post harvest slash removal |
| <input type="checkbox"/> | <input type="checkbox"/> | Mill residues |
| <input type="checkbox"/> | <input type="checkbox"/> | Don't know |

5. What percent of your clients/employers have expressed an interest in or have harvested wood in the past 5 years to sell for woody biofuels production? It could be a woody biofuels only harvest or integrated with a sawlog harvest.

Percent of clients/employers

- _____ have harvested woody biofuels in past 5 years
- _____ interested in harvesting woody biofuels
- _____ not interested in harvesting woody biofuels
- _____ don't know their interest in woody biofuels

(Your responses should total 100%)

6. Have you included the harvesting of wood for commercial woody biofuels production in recommendations you have made to your clients/employers? (Check one.)

- Yes, always
- Yes, sometimes
- No

7. What do you anticipate the trend in commercial woody biofuels production to be in your business and also in your region in the next 5 years? (Check one box in each column.)

- | <u>In your business</u> | <u>In your region</u> | |
|--------------------------|--------------------------|-------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | increase greatly |
| <input type="checkbox"/> | <input type="checkbox"/> | increase somewhat |
| <input type="checkbox"/> | <input type="checkbox"/> | remain the same |
| <input type="checkbox"/> | <input type="checkbox"/> | decrease somewhat |
| <input type="checkbox"/> | <input type="checkbox"/> | decrease greatly |

8. Do you see any of the following as benefits to woody biofuels market development in your region? (Check one box for each benefit.)

Benefits	Not a benefit	Somewhat of a benefit	A moderate benefit	A significant benefit	Unsure \ Don't know
Using wood that would otherwise be left in the forest	<input type="checkbox"/>				
Provides a market for low grade wood	<input type="checkbox"/>				
Income source for woodland owners	<input type="checkbox"/>				
Increase options for woodland owners to achieve other ownership objectives (e.g., improve wildlife habitat)	<input type="checkbox"/>				
Provide jobs	<input type="checkbox"/>				
Benefits to the local economy	<input type="checkbox"/>				
Contribute to green energy production	<input type="checkbox"/>				
Other (please specify): _____ _____	<input type="checkbox"/>				

9. How much of a barrier are each of the following to your recommending harvest of wood for use as biofuels? (Check one box for each barrier.)

Barriers	Not a barrier	Somewhat of a barrier	A moderate barrier	A significant barrier	Unsure \ Don't know
Landowners unaware of the possibility of woody biofuel harvest	<input type="checkbox"/>				
Don't know how to explain woody biofuels management to landowners	<input type="checkbox"/>				
Landowners unwilling to pay for biofuels management	<input type="checkbox"/>				
Landowners unwilling to have this type of harvest on their land	<input type="checkbox"/>				
Landowners do not get sufficient financial return for harvest of woody biofuels	<input type="checkbox"/>				
Don't know loggers who can efficiently harvest woody biofuels	<input type="checkbox"/>				
No processing facility close enough to landowners	<input type="checkbox"/>				
Trucking costs too high	<input type="checkbox"/>				
Not enough trucks or drivers to haul woody biofuels	<input type="checkbox"/>				
Regulations limiting transport distance prevent wood from reaching closest processor	<input type="checkbox"/>				
Loggers resistant to biofuels harvest	<input type="checkbox"/>				
Loggers don't have the necessary equipment to harvest wood for biofuels	<input type="checkbox"/>				
Lack of markets for woody biofuels	<input type="checkbox"/>				
Don't know who is buying woody biofuels	<input type="checkbox"/>				
Negative impact of harvesting on wildlife or wildlife habitat	<input type="checkbox"/>				
Other (please specify): _____	<input type="checkbox"/>				

10. Which of the following topics would you be interested in learning more about? (Check ALL that apply.)

- Who is buying woody biofuels in my area
- Rules and regulations regarding the transport of wood to be used in woody biofuels production
- Tax benefits / implications for clients
- How to make low-grade wood products profitable in my business
- How to integrate woody biofuels with other landowner objectives
- Silvicultural strategies for combined woody biofuel and sawtimber management
- Low impact harvesting options
- Other topics (Please describe: _____)

11a. Which of the following educational tools would you prefer to use to get information on the topics you checked above. (Check ALL that apply.)

Educational Tools	Prefer to use in the future?
Brochures or fact-sheets	<input type="checkbox"/>
Periodic newsletters	<input type="checkbox"/>
Special mailing to my workplace	<input type="checkbox"/>
Classes or workshops	<input type="checkbox"/>
Visits to demonstration areas	<input type="checkbox"/>
Books	<input type="checkbox"/>
Website	<input type="checkbox"/>
Podcast available from Internet	<input type="checkbox"/>
Webinar available from Internet	<input type="checkbox"/>
E-mail listserv	<input type="checkbox"/>
On-line video clips	<input type="checkbox"/>
DVD	<input type="checkbox"/>
Presentations at professional meetings	<input type="checkbox"/>
Networking with peers	<input type="checkbox"/>
Cooperative research	<input type="checkbox"/>
Other (Please specify: _____)	<input type="checkbox"/>

11b. Please circle the 1 method above that you would be most likely to use in the future.

Please use the space below for any additional comments you may wish to make. The results of this survey will be posted on ForestConnect.info.

Thank you for your time and effort!

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

APPENDIX B:

Logger and Woody Biofuels Producer Interview Guide

Interview Protocol

We plan to conduct semi-structured, open-ended interviews with **loggers and woody biofuel producers** in New York State. CCE educators will conduct the majority of the interviews. Interviewees should be as diverse as possible, coming from different geographic areas of the state and different levels of involvement in woody biofuel harvest/use. The majority of their work time will be spent in the logging and/or woody biofuels production business. The sample will be identified based on personal knowledge of the CCE educators and from lists provided by the research team (e.g., New York logger training course participants).

Interview objective: Determine what, if any, barriers are limiting the ability or willingness of loggers and woody biofuel producers to increase the production and mobilization of woody biofuels. Woody biofuels are any woody material that is used to produce energy. They can come from a variety of sources including mill residues, logging residues, and standing timber and can be obtained through TSI, thinning, and timber harvests. Woody biofuels could be firewood, pellets, chips, etc. and can be used for a variety of applications including residential heating, industrial heating, and processing energy.

We will conduct the interviews using the questions below. Because a number of people will be conducting interviews, we hope that the questions will be read verbatim. But the interviews are intended to be semi-structured allowing the questions to be covered in not exactly this order and allowing for follow-up/probing questions. These questions describe the content we will cover during the interviews.

Prior to conducting interviews, CCE educators will set-up interviews using the scripts below. They will describe the interview process and what we are asking of interview respondents, including the Informed Consent form (attached).

INTRODUCTION SCRIPT (setting up interview):

Cornell University Cooperative Extension is leading a project focusing on woody biofuel production in New York. (Woody biofuels are any woody material that is used to produce energy, including things like firewood, pellets, and chips.) We would like to ask for your participation in a conversation regarding what, if any, barriers are limiting your ability or willingness to produce woody biofuels. We hope that discussions like this, that we are having with people all over the state, will help us get a handle on the challenges being faced by people in your profession and how Cooperative Extension can help you in the future. Can we set up a time for us to meet for an interview? *(When making arrangements for the interview establish if the business is logging only, woody biofuel producer only [for example, a firewood producer], or both, so you can ask relevant sections of the interview below. Make sure the majority of their work time is spent in the logging and/or woody biofuels production business.)*

INTERVIEW SCRIPT (at the actual start of the interview):

Cornell University Cooperative Extension is leading a project focusing on woody biofuel production in New York. Thanks for agreeing to speak with me today. In the process of today's interview, I will be asking you some open-ended questions. I would like to use a tape recorder, with your permission, so that I can fully participate in the conversation during the interview and transcribe your responses accurately later. Participation in this interview is voluntary and confidential. Your name will not be linked with any specific identifying characteristics provided as part of this study such that you could be identified individually. Here is an informed consent form for you to keep that describes the study in a bit more detail and gives information on who you can contact if you have any questions or concerns after the interview. Is it OK to proceed with the interview? Is it OK for me to record the interview?

Interview Questions

LOGGERS

Introductory business questions

1. First, I would like to learn about your logging business. How long have you been in the logging business?
2. What geographic area do you cover in your work? What is the maximum distance you have had to travel in the past year?
3. How many months of the year do you work as a logger? Are you working full-time during those months? How many people do you employ? About how many months of the year do they work?
4. What type of equipment do you own? What type of equipment do you lease?
5. What type of work or equipment do you subcontract?
6. What have you harvested in the past year? (Please describe the types of wood you harvest). What is your volume in each type of wood? How has that changed over the past 5 years?
 - a. PROBES: *Make sure to find out if they have harvested woody biofuels in the past year. Woody biofuels are any woody material that is used to produce energy, including things like firewood, pellets, and chips.*
7. If they harvested woody biofuels ask: Where do you get the woody material – is it from private landowners, state land, industrial land, or some combination of those? And where do you deliver the woody material – for what type of processing (e.g., pellet processor)?

Woody biofuels questions

8. If THEY DO NOT currently work in the biofuels area:
 - a. What have you heard about woody biofuels? Anything local happening? Have you had requests from clients to get into biofuels?
 - b. Do you think it might become a part of your business in the next 5-10 years?
 1. a. If no, what do you see as the barriers to getting involved?
 - a. PROBES: *After interviewee lists barriers that come to mind, ask about the following topics if they haven't already been*

discussed: Is lack of demand for woody biofuels a barrier? Is lack of supply of woody biofuels a barrier? Is financing a barrier? Is lack of equipment a barrier? Do you need more staff? Do you need training in low grade harvesting techniques?

- b. What would it take for you to become involved?
2. If yes, what would you like to produce or sell? What needs to be done to make this a part of your business?
 3. PROBES: *After interviewee lists things to be done that come to mind, ask about the following topics if they haven't already been discussed: Will you utilize existing equipment or need new? Will you divert personnel or hire new employees? Will you need training in low grade harvesting techniques? Will you need help with marketing? Will there need to be development of supplies (e.g., establishing relationships with landowners, is landowner suspicion of logger practices a concern)? Will you subcontract to others? Will processing facilities need to be developed?*
9. If they **DO WORK** in biofuels area:
- a. Are you using equipment and personnel you had before or has this required getting new equipment and people?
 - b. If you added on, what have you added?
 - c. Do you want to increase this part of your business? If no, why not? If yes, what barriers do you see to increasing this part of your business?
 - a. PROBES: *After interviewee lists barriers that come to mind, ask about the following topics if they haven't already been discussed: Is there limited supply (is landowner suspicion of logger practices a concern)? Is financing a barrier? Are uncertain markets a concern? Are regulations a barrier? Is there a lack of necessary equipment? Do you need more training in low grade harvesting techniques? Is trucking distance a concern?*
 - d. What do you see for the future of biofuels in your area in the near term? What do you consider to be the near term? What about the future of woody biofuels in your area over the long term?
 - e. Are landowners who sell woody biofuels concerned about regeneration for sawtimber? How about for more woody biofuels?
 - f. Could you tell us about price paid for woody biofuels? What about markets for low grade products? Are markets reliable?
 - a. How willing would you be to invest in low-impact equipment that would results in higher productivity?
 - b. How familiar are you with sustainability related harvesting practices?
 - i. Does price paid influence your willingness to implement sustainable harvesting practices?
 - ii. Would you be interested in learning more about sustainable harvesting practices? Have you ever participated in any

educational courses/workshops on sustainable harvesting practices?

10. If logger is **NOT** currently a woody biofuels producer, ask: Would they like to get into the woody biofuels production business?
 - a. If yes: What would they like to produce/sell? What will need to be done to make it a part of the business?
 - a. *PROBES: After interviewee lists things to be done that come to mind, ask about the following topics if they haven't already been discussed: Will you utilize existing equipment or need new? Will you divert personnel or hire new employees? Will you need training? Will you need help with marketing? Will there need to be development of supplies? Will there need to be an expansion of the radius of allowable suppliers?*
11. Would you consider working with others to help build a local shared woody biomass processing facility that would convert your low grade harvest into fuel pellets and other value-added products?
 - a. Would you like to learn more about how this kind of facility can improve your bottom line?

WOODY BIOFUEL PRODUCERS

Introductory business questions

1. I'd like to learn a little bit about your woody biofuels business. How long have you been in the business?
2. What do you sell? What has been your approximate volume in the past year? How has what or the volume of what you sell changed over the past 5 years? What about prices paid for woody biofuels? How would you describe the markets for woody biofuel?
3. How do you currently market your products?
4. What geographic area do you cover in your work? How many miles to sources? And miles to delivery locations?
5. How many months of the year do you work in the business? How many people do you employ? About how many months of the year do they work?
6. What type of equipment do you own? What type of equipment do you lease?
7. What type of work or equipment do you subcontract?
8. How do you find sources of wood?

Woody biofuels questions

9. Do you want to increase this part of your business? If no, why not? If yes, in what ways?
 - a. *PROBES: Increase volume? Expand into new areas? Expand into new products?*
 - b. What barriers do you see to increasing this part of your business?

- i. PROBES: After interviewee lists barriers that come to mind, ask about the following topics if they haven't already been discussed: Is there limited supply? Is financing a barrier? Are uncertain markets a concern? Are regulations a barrier? Is there a lack of necessary equipment? Do you need more training? Is trucking distance a concern?*
10. What do you see for the future of biofuels in your area in the near term? What do you consider to be the near term? What about the future of woody biofuels in your area over the long term?

ALL

1. Is there anything else you would like to add?
2. Would you be willing to be recontacted by me or one of the Cornell researchers involved in this project if we have further follow-up questions?
3. What do you think Cooperative Extension could do to help you in the area of woody biofuels in the future?
4. Are you interested in receiving a copy of our final report? How about other Extension materials such as fact-sheets or other materials?
5. Do you have any questions for me before we finish?

Thank you very much for taking the time to talk with me today.