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Using a Natural Disaster to Understand the Educational and Technical Assistance Needs of Small-scale Forest Landowners¹

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Natural disasters occur in all forests, and may provide an opportunity for forestry extension educators and natural resource professionals to reach landowners with education and technical assistance. The 1998 ice storm that hit northern New York State, USA in January 1998, was used to assess the educational and technical assistance needs of forest owners. The degree of commonality among private forest landowners and maple syrup producers in their preferred delivery methods and messengers for educational materials was explored as a result of this natural disaster. Most respondents surveyed indicated that newsletters or special mailings were the best way to reach them. However, some evidence was found that small-scale forest landowners find personal contacts more useful than written materials when considering adopting a new practice. Evidence exists that some people likely sought information for the first time as a result of the storm and many think about the possibility of future ice storms when making management decisions. Responding effectively to a teachable moment created by a natural disaster requires the ability to disperse quickly relevant educational materials through a knowledgeable and trusted human network and into the hands of affected individuals before they begin making resource management decisions.

Keywords: educational needs, ice storm, maple syrup production, PFLs, teachable moment

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INTRODUCTION

Foresters, natural resource professionals, and extension educators benefit by understanding the educational needs of their client base. Being cognizant of landowner needs helps service providers market their technical and educational expertise and improve the quality and specificity of the assistance they provide. While an awareness of educational needs holds greater opportunity for some forestry professionals (e.g. extension foresters, state agency foresters), all foresters have opportunities to educate and indeed need to provide that education to expand the number of informed natural resource consumers. Understanding the needs of private forest landowners –formerly called NIPF owners, now called PFLs (Harrison *et al.* 2002) – is particularly important because they control 59% of US timberland (Powell *et al.* 1993) and the number of owners with smaller parcels is growing (DeCoster 1998). Collectively they control a substantial amount of natural resources that can be important to larger ecosystem management objectives (Creighton *et al.* 2002). Private forest lands have long been vital to the nation's aesthetic and recreational values and are increasingly important to forest industries.

Forest resources in New York and the Northeast represent an even greater significance than apparent through national averages. Private forest lands in New York and regionally constitute 70% of forest lands. PFLs control sawtimber volumes that are eight times as great as industrial sawtimber volumes and almost 75% of the total regional hardwood sawtimber (Smith *et al.* 2001). In New York, the forest products industry accounts for almost 7% of the state's manufacturing jobs, more than \$1.5 billion in salary, and \$10 billion in sales (Karp 1998). Because most timber comes from private lands, many private forest owners interact with loggers, yet only 6% of owners, representing 20% of private forest land, have written management plans (Birch and Butler 2001). Not quite 20% of forest owners sought professional assistance on topics such as forestry, forest management, tax planning, and tree planting (Birch and Butler 2001). A recent survey of harvests in New York documented that fewer than 40% likely used silvicultural prescriptions, about 10% were quite poor, and about half of the harvests would need carefully designed rehabilitation cutting to restore the stands to productive and healthy conditions. These assessments of harvesting were based on residual stocking, changes in residual diameter, and shifts in species composition and stem quality (Nyland 2003).

New York and the New England states are the dominant US players in maple syrup production (NYS Ag and Markets 2001), with Vermont and NY ranked 2nd and 3rd behind Quebec in North American production. The New York maple industry, while a small proportion of PFLs, includes about 1500 producers with more than 100 taps (Campbell 2003) and an average state-wide producer-based revenue of \$5.7 million (NYS Ag and Markets 2001). However, with value-adding strategies, the actual revenue potential for maple producers may be almost twice as much as that reported from averaging prices (Campbell 2003). These indicators illustrate the regional importance of forest resources and the value in characterizing the process to address technical and educational responses to natural disasters.

Past research has focused on the educational needs of various small-scale forest landowner audiences. For example, Demchik *et al.* (2000) surveyed maple syrup producers in Pennsylvania to characterize the maple industry there and understand how Cooperative Extension could best meet the needs of maple producers. Kuhns *et al.*

(1998) studied PFLs in Utah and Indiana and found that they preferred to receive educational information via newsletters and personal contact rather than workshops and computer bulletin boards.

Forestry extension in New York occurs through county-based and state-wide initiatives. At the county level, Cornell Cooperative Extension (CCE) educators, the New York Forest Owners Association (NYFOA), and their partner organizations conduct a variety of program activities including workshops, seminars and field days. These events help landowners develop awareness for opportunities and consequences associated with stewardship activities that support landowner goals for wildlife habitat, timber and maple syrup production, agroforestry products and amenity values. At the state level, two programs relevant to research reported here have generated significant impact. Since 1991, the Master Forest Owner/COVERTS volunteer program of Cornell University and Cornell Cooperative Extension has trained landowners to serve as peer-counsellors and enabled them to provide non-technical assistance to other landowners (Broderick *et al.* 1999). Another program focused on increasing private forest owner awareness of stewardship opportunities was the 'Call Before You Cut' brochure (available at www.dnr.cornell.edu/ext/forestrypage). Direct mail recipients included 5,000 PFLs in the ice storm region in 1999 (described below) and an additional 30,000 PFLs state-wide in 2001. Further, 50,000 brochures reached PFLs through passive dispersal at state forestry offices, CCE offices, by MFO volunteers, and at NYFOA field days. Some state forest agency service foresters reported as much as a 25% increase in private forest owner requests for assistance in the six months after the mailing. In other cases, private forest owners retained the brochure for as long as four years before asking for assistance.

The purpose of this paper is twofold. The first is to explore the degree of commonality among PFLs and maple producers, as a related subset of PFLs, in their preferred delivery methods and messengers for technical assistance and educational materials. These comparisons are possible because the audiences were surveyed at about the same time and have a common geographic reference (northern New York State). The surveys were precipitated by and to some extent focused on educational needs after the January 1998 ice storm. The ice storm hit northern New York, three northern New England states, and adjacent Canadian provinces and created a situation of potentially heightened awareness for management. The second objective for the paper is to examine the idea that the natural disaster itself provided a 'teachable moment' for PFLs and maple producers. Educational theorists recognize the importance of taking advantage of the 'teachable moment' when people's minds are open and there is motivation to learn (Hill 1981). Similarly, educators must be able to deliver useful educational materials to the correct audience while their minds are open.

The ice storm affected 6.9 M ha of forestland in New York, Vermont, New Hampshire and Maine (Miller-Weeks and Eagar 1999). Portions of eastern Canada also were affected. The weight of accumulated ice caused tree limbs and utility lines to break, leaving many people without power (Essman 1998). In New York State, six northern counties (Lewis, Jefferson, St. Lawrence, Franklin, Clinton and Essex) were declared federal disaster areas making them eligible to receive federal financial assistance (DeGaetano 2000) and 1.9 M ha of forestland were affected, e.g. through crown loss, broken limbs, lack of safe access to the woods (Essman 1998).

The 1998 ice storm was dramatic, but ice events of various types are not infrequent in the eastern forest and Smith cautioned that 'ice-storm damage should be recognized for the important, recurrent, and expansive forest disturbance force that it is' (Smith 2000, p.19). Thus, educating people about how to prepare for and deal with ice events has potential long-term benefits. In this paper the ice storm is referred to as a 'disaster' because that is certainly how people living in the area perceived it.

METHODOLOGICAL ASPECTS

Two audiences were surveyed by mail in 1999. The first audience was all 501 maple syrup producers that could be identified who lived in the six-county ice storm-damaged area of New York. Maple syrup producers were identified from databases of state and federal agencies and the New York State Maple Producers Association. The second audience was a sample of 1,200 property owners who, based on their property tax classification code, were likely to own woodlands in the six-county area. The sample was a subset of forest owners of parcels between 10 and 200 acres (4 to 81 ha) within the ice storm region, regardless of their place of residence, and who had received an educational flyer, 'Call Before You Cut' within eight months of the storm.

Mail questionnaires were designed for each audience and contained similar questions on: (1) sources of information used after the ice storm; (2) usefulness of information; (3) effect of ice storm on management decisions; (4) preferred communication methods; and (5) sources respondents would turn to for future advice. To increase response rates, up to three follow-up letters were sent to non-respondents during the month following the initial mailing, containing reminders and a further questionnaire, using the general methodology laid out by Dillman (1978).

The utilization of a natural disaster as a teachable moment developed as a working hypothesis as extension personnel from Cornell University and other agencies prepared for and responded to client needs. Retrospective and qualitative discussions among colleagues within the educational system coupled with data from the two surveys provided insights to guide responses for future natural resource disasters.

ANALYSIS OF MAIL QUESTIONNAIRES

Mail Questionnaire Response

Of the 501 questionnaires mailed to maple syrup producers, one was undeliverable and 227 completed questionnaires were returned, yielding a response rate of 45%. Of the 1,200 questionnaires mailed to owners of property who were likely to contain woodlands, 144 were undeliverable and 557 completed questionnaires were returned, yielding a response rate of 53%. Of the 557 questionnaires returned, 86 indicated they did not own woodlands, and were not included in any further analysis.

Survey Audience Characteristics

Responding PFLs owned an average of 51 wooded hectares in northern New York. Roughly one-third (29%) lived on their wooded property, and one-third (33%) lived away from their wooded property but within the six-county ice storm damaged area. Few (16%) said they depended on income from their woodlands to offset a portion of

their ownership costs, but half of the respondents said they would be interested in generating additional income from their woodland. Almost half the respondents (46%) said they did not have any damage on their wooded property from the January 1998 ice storm, but of those with damage, half said their entire wooded property was damaged.

Maple syrup producers who responded to the survey owned or leased an average of 30 ha of sugar bush. There were a few large operations, but half of the respondents owned or leased less than 12 ha. Maple syrup production is often thought of as a traditional family activity passed down through the generations. Respondents averaged 41 years of family involvement in maple syrup production and thus seemed to fit that description. Respondents averaged only 9% of household income from maple syrup production before the ice storm. Most used a tubing collection system and wood evaporators to boil down the sap, but over half also collected some sap in buckets.

Evaluation of Educational Programs Following the Ice Storm

Most maple syrup producers (73%) had received information from at least one source after the ice storm. Only 30% of PFLs with damage from the ice storm indicated they had received any information. (PFLs without damage were not asked about information received.) Only 9% of households receiving the questionnaire correctly recalled that they had received the 'Call Before You Cut' brochure sent the previous year. The majority of all audiences who received information after the ice storm listed Cooperative Extension as a source of information (Table 1). Other popular sources of information varied by audience. Consulting foresters, loggers and sawmill operators were cited by almost 40% of PFLs. Farm Service Agency (FSA) personnel were cited by 60% of maple syrup producers. FSA administered several programs that provided financial assistance to maple syrup producers with tree damage and loss of production. Producer associations were more popular among maple syrup producers than were associations for woodland owners as a source of information for PFLs.

Table 1. Information sources used by respondents who had received some information after the ice storm, by audience type

Sources of information after the ice storm	Fraction indicating source (%) ^a	
	PFLs with ice storm damage (n=75)	Maple syrup producers (n=158)
Cornell Cooperative Extension	58.7	70.9
NYS Dept. of Environmental Conservation	22.7	33.5
Foresters		
Farm Service Agency Personnel	8.0	60.1
Consulting Foresters, Loggers, Sawmill Operators	38.7	19.6
Forest Owner/Maple Producer Associations	2.7	44.9
Friends/Neighbours/Family Members	20.0	25.9

^a Percentages add to more than 100% because more than one source could be indicated.

Respondents rated most information they accessed as useful (Table 2). It appears, particularly for PFLs, that information involving personal contact was more useful than

written material. Personal contacts of PFLs with state agency foresters were rated highest for usefulness of information, followed by contact with private sector foresters and cooperative extension educators. Tests for statistically significant differences between information sources could not be undertaken because not everyone used each source and thus did not rate the usefulness of each source, resulting in too few paired cases for comparison.

Table 2. Usefulness of information from various sources as rated by respondents, by audience type^a

Sources of information after the ice storm	Mean usefulness rating ^b	
	PFLs	Maple syrup producers
<i>Personal contacts</i>		4.1
with Cooperative Extension	3.9	
with NYS Dept. of Environmental Conservation forester	4.2	
with consulting forester	4.1	
<i>Workshop-type settings</i>		
workshops	4.0	3.9
Cornell maple production school – satellite conference		4.0
<i>Written materials</i>		
‘Trees & Ice – After the Storm of 1998’	3.6	4.0
‘Call Before You Cut’ brochure	3.5	
Mailings/newsletters		4.0

^a Results are reported only for sources an audience was asked about.

^b Usefulness of information was rated on a 5-point scale where 1 = not useful and 5 = very useful.

Educational Opportunity Provided by Ice Storm

Three pieces of data suggest that the ice storm was valuable as a ‘teachable moment.’ First, 51% of maple producers who indicated they had not received educational information on maple production prior to the storm, obtained information from some source after the storm. These people (13% of all responding maple producers) are ‘new’ to the educational system, likely as a result of the ice storm. Second, the majority of PFLs (61%) were interested in learning more about managing their woodland. While what the percentage was before the ice storm is not known, there is considerable interest among this audience after the ice storm. Third, almost half (46%) of the maple syrup producers said they thought about the possibility of future ice storms when they made changes to their current maple syrup operation.

Preferred Delivery Methods and Messengers

Most respondents in both audiences indicated that newsletters or special mailings were the best way to reach them (Table 3). (Only those PFLs with an interest in learning more were asked about communication methods. All maple producers were asked about communication methods.) Local workshops or meetings also were a popular choice. Interest in using computer-related forms of communication was somewhat higher among PFLs than maple syrup producers. Additionally, almost half (48%) of PFLs indicated they had access to the Internet either at work or at home. Preferred methods

of communication tended to favour mechanisms that were common to the audience (e.g. local workshops) or which came directly to the audience (e.g. web site or CD-ROM).

Most maple syrup producers whose management goals had changed as a result of the ice storm (35% of producers) said they would contact Cooperative Extension (including the Cornell Maple Program) if they wanted advice on new management strategies (Table 4). All other sources were mentioned by approximately one-third of respondents. No one source of advice dominated for PFLs with an interest in learning more, as Cooperative Extension did for maple syrup producers. PFLs would be most likely to contact the state forestry agency, Cooperative Extension, or someone in the forest industry.

Table 3. Communication methods preferred by respondents, by audience type

Preferred Communication Method	Fraction indicating method (%) ^a	
	PFLs with interest in learning more (n=260)	Maple syrup producers (n=200)
Newsletter/special mailing	88.5	88.5
Local workshops/meeting	23.5	32.0
Visits to demonstration areas	17.3	18.5
Lending library with videos and books	11.2	14.5
Web site on the Internet	25.8	15.5
CD-ROM disk that can be used on your computer	20.8	17.0
Notices on a listserv that comes to you as an e-mail	12.7	6.5

^a Percentages sum to more than 100% because respondents could choose more than one method of communication.

Table 4. Sources respondents would approach for advice, by audience type

Sources for Advice	Fraction indicating source (%) ^a	
	PFLs with interest in learning more (n=261)	Maple syrup producers whose management goals had changed as a result of ice storm (n=71)
NYS Dept. of Environmental Conservation	40.6	33.8
Cooperative Extension (including Cornell Maple Program)	37.5	74.6
Someone in the forest industry, such as a logger, sawmill operator, or timber buyer	33.3	na
Consulting forester	26.4	42.3
NYS Maple Producers Association	na	31.0
Cornell Master Forest Owner volunteer	16.1	na
Friends/neighbours/family members	29.9	36.6

^a Percentages sum to more than 100% because respondents could seek advice from more than one source.

DISCUSSION

Forest owners want to learn more about managing their woodlands; almost two-thirds of PFLs responding indicated this desire. However based on the survey, the commitment or ability of PFLs to act on this desire can be questioned because only 30% with ice-storm damage obtained information after the ice storm. On the other hand, maple syrup producers were twice as likely as PFLs to have received information after the ice storm. It may be the regular personal and financial contact with the sugar bush and syrup production system, not shared by all PFLs, that explains this discrepancy. Because most PFLs own forest land for personal reasons, such as aesthetic enjoyment and recreation, rather than commercial reasons (Birch and Butler 2001), their culture and responsiveness to educational opportunities may be less than for maple producers. Engaging PFLs to seek assistance may therefore require a more sustained awareness campaign than a single direct mailing. Although Cooperative Extension is prominent in its educational role with these audiences (Table 1), other agencies, such as the state forestry agency and United States Forest Service, contribute significantly to forestry education and should invest in partnership and direct roles that support education. Foresters need to consciously apply educational principles during interactions with forestry stakeholders. The large number of PFLs and the variation in their receptivity reinforces the need to aggressively seek and seize the 'teachable moment.'

Focusing on the ice storm as a 'teachable moment,' evidence exists that some people likely sought out information for the first time as a result of the storm. A state-wide survey in 1994 (Birch and Butler 2001) indicated that 19% of owners, representing 42% of forest area, sought professional assistance. The ice storm resulted in 30% of PFLs aware of receiving information and 61% interested in learning about forest management. While a direct comparison of percentage change is not possible, the ice storm generated considerable interest in understanding more about forest resources. Educators can take advantage of the interest generated by natural phenomena to involve people in additional educational opportunities. Also, they can use these events to further the educational message that ice storms are routine, but severe events that are important to the natural cycle of the larger ecosystem. Natural disasters draw attention from major media outlets, and educational and technical assistance programs should be prepared to utilize them to market current and future resources and initiatives. Also, many maple syrup producers indicated they think about the possibility of future ice storms when making management decisions. This information could be used to help give context to future educational programs.

Equal in importance to audience receptivity for a teachable moment is the capacity of the educational system to respond. The ice storm provided an opportunity to deliver materials to audiences with a heightened awareness, but also allowed a retrospective assessment of responsiveness and recognition of institutional and partnership needs necessary for responses to future disasters. These needs take the form of multi-agency networks, regular communication, and an institutional philosophy for service. A pivotal feature to responsiveness is a network of people, institutions, and agencies with the human and resource capacity to develop useful educational materials and deliver them to the correct audience in a timely fashion. Using New York as an example, Cooperative Extension educators, state agency foresters, and others who interact with clients will need sufficient training to anticipate or recognize client needs and how to

find and deliver the necessary assistance through internal and external sources. Regular communication and in-service training within the network prior to the disaster, for example between campus and county locations and with partner organizations, builds personal relationships that facilitate effective interaction following a natural disaster. Similarly, communication at a regional and national scale among natural resource program leaders provides awareness for strategies used in other locations in response to other natural disasters. Finally, seizing the teachable moment requires an institutional culture for responsiveness, ability for solicitation and anticipation of client need, and a philosophy that supports rapid and sustained refocusing of program resources.

Some evidence was found that small-scale forest landowners find personal contacts more useful than written materials. This is similar to findings in agricultural extension education (Petrzelka *et al.* 1999) and is likely because one-on-one advice can be personalized to their situation. However, most PFLs wanted communication via newsletters and special mailings; a finding reported in other studies as well (e.g., Kuhns *et al.* 1998). Interestingly, all households in the PFL sample had been sent written material, the 'Call Before You Cut' brochure, approximately one year prior to the survey, but only 9% of those with damage from the ice storm (the only people asked this question) recalled receiving the brochure. Although this may be a relatively large percentage response when compared to non-targeted mass media campaigns, was this the best way to capture the 'teachable moment?' While people may prefer written communication, the duration of its effectiveness should be questioned, at least as a sole and distinguishable method of communication. Others have suggested that a variety of methods are needed and that written messages or mass media communication are effective for generating interest and awareness, but personal contact is needed for real change to occur (Tyson *et al.* 1998). For example, trained volunteers such as the Master Forest Owner/COVERTS volunteers in New York provide an opportunity to match personal contact with written materials in a peer-counselling framework (Goff 1993, Broderick *et al.* 1999).

Cooperative Extension was a source of information for many people after the ice storm. People generally found the information they provided useful, and maple syrup producers were especially likely to turn to Cooperative Extension in the future for advice. The recognition of an organization or entity as a source of information may in part reflect the historic role played by that group and their reputation as a valued source. In fact, a survey of NY PFLs documented Cooperative Extension as the most recognized single source of forestry assistance among landowners (Birch and Butler 2001).

Following the ice storm, it was found that an equal or greater percentage of PFLs would seek advice from someone in the forest industry (e.g., logger or timber buyer) or friends and family members rather than from professional foresters. Loggers, timber buyers and family members likely have greater visibility to PFLs than do professional foresters because of the activity, service and opinions they provide at the local level. It is possible that respondents didn't distinguish between industrial and consulting foresters of the private sector. These foresters might want to examine the degree of awareness landowners have for their services and the perceptions of those landowners who are aware of consulting foresters. The findings of this study support concerns within the forestry profession (Heissenbuttel 2000) that foresters need to be more proactive in generating community awareness of services provided by these professionals. Participation in newspaper editorials, town meetings, and local

governance will build awareness and credibility within the community and may encourage PFL solicitation of professional advice before taking a management action.

Surveys like those used here are important tools for all foresters to help them understand the needs of the audiences they serve. It is important to know, rather than assume, what audiences are thinking or want. It is also important as professionals to recognize the possibility of 'teachable moments' and be prepared to provide assistance and information when the opportunity arises.

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