

Assessment of Logger Education Programs and Programming across the United States

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ABSTRACT

Professional loggers occupy key positions within sustainable forestry, requiring enhanced knowledge of the principles and specific techniques associated with forest management and operational considerations such as safety, business management, harvesting productivity and cost calculation, and employee supervision. An expert opinion survey of logger education programs (LEP) across the United States was conducted to assess the status of those programs and associated programming. Results indicate that LEPs vary considerably between states, evidenced by the large variance in program responses. The financial success of LEPs, while maintaining reduced fees and tuition, may depend on diversity of funding sources, reorganization of training services, and use of volunteer and retired professionals. Creating successful training experiences depends on qualified instructors, subject relevance, small groups, discussion opportunities, program evaluation, and field practice. Formats that are rarely used by LEPs are classroom computers (9%), independent study paper- (9%) and computer-based (6%) programming. Eighty-seven percent of the programs expressed strong support for an increase in collaboration, with the largest interest indicated for regional curriculum exchanges. The Forest Resources Association (FRA) was cited most often as the appropriate lead organization to initiate those exchanges.

Keywords: adult education principles, logger certification, logger training requirements, sustainable forestry

The current paradigm of sustainable forestry is a strategy for ensuring the health and growth of our forests for future generations. This model balances social, economic, and environmental requirements and determines how to best achieve the continued vitality and productivity of

forestlands. Professional loggers occupy a key position within sustainable forestry because they provide the raw material for wood and paper products, and in so doing directly impact the landscape through implementation of harvest practices. A well-trained and experienced logger with a broad vision of

forestry can play a key role in providing family forest landowners with sustainable forest management information.

Effective application of sustainable harvest methods requires knowledge of the principles and specific techniques involved. This requires cutting-edge logger education programs (LEP) offering appropriate training to logging professionals and all concerned parties. The Forest Resources Association, Inc. (FRA) is one national trade association promoting the education and interests of forest products industry members in the sustainable use of forest resources. The Sustainable Forestry Initiative (SFI) also has helped spur a national increase in logger training (Edwards 2002).

Training and certification of professional loggers is increasing across the US, driven by legislative and market forces which affect the wood products industry. Today, loggers in most states receive training in areas such as forest management, business management and safety. Various studies have reported the benefits of logger training in modifying harvest activities to incorporate current sustainable practices and

Received October 20, 2006; accepted July 18, 2007.

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Table 1. Average percentage of annual LEP budget by type of program and funding source.

Funding source (<i>n</i> = number of programs)	Overall average percent of budget (<i>n</i> = 32)	Type of LEP ^a				
		Membership (<i>n</i> = 3)	Registration (<i>n</i> = 4)	Certification (<i>n</i> = 18)	Master Logger Certification (<i>n</i> = 3)	Other (<i>n</i> = 4)
Grants (<i>n</i> = 11)	9	0	5	8	54	6
Legislative appropriations (<i>n</i> = 2)	4	0	25	0	17	0
SFI Implementation Committee (<i>n</i> = 18)	23	75	8	21	0	33
Training fees/tuition (<i>n</i> = 22)	38	25	23	43	30	38
Logger membership application fees and/or dues (<i>n</i> = 9)	15	0	30	17	0	8
Industry membership application fees and/or dues (<i>n</i> = 7)	6	0	10	7	0	1
Associate membership application fees and/or dues (<i>n</i> = 2)	1	0	0	1	0	0
Other financial contributions (<i>n</i> = 7)	3	0	0	2	0	13

^a Totals within a type of LEP may not equal 100 due to rounding.

updated techniques (Egan et al. 1997, Shaffer and Meade 1997, Edwards 2002, Davis and Clatterbuck 2003).

This paper presents a summary of current LEPs across the US and offers recommendations for further enhancing those efforts. Our goal is to contribute to the continuing development of effective LEPs and programming wherever it is implemented.

Methods

An expert opinion survey was conducted by mail using Dillman's (2000) Total Design Method. The FRA's (2004) "Tenth Report on the Status of Statewide Logger Training and Education Programs in Thirty-two Forested States" was reviewed. Then, survey questions were designed with the assistance of the Minnesota LEP staff. Some of the information contained in the FRA report is repeated in our survey; however, our survey was designed for a different purpose. Our questions gathered additional details that allowed synthesis of information identifying national trends, practices, and gaps in training, as well as open-ended comments and suggestions.

The survey and cover letter were reviewed by the FRA staff, approved by the Institutional Review Board at the University of Minnesota, and mailed in February 2005 to 63 state LEPs and SFI Implementation Committees in 34 states. The list was compiled from the FRA's annual report on logger training and education (FRA 2004) as well as a mailing list of SFI State Implementation Committees and Master Logger Certification programs. To the authors' knowledge, the list included all organizations that might provide logger education.

The survey contained 20 questions in 9 sections addressing program structure and

design, funding mechanisms, cost to members, class requirements, class format and size, innovative programming, training evaluation, collaboration with other LEPs, and additional thoughts. A combination of question formats was used including multiple choice, fill-in-the-blank, Likert ratings, and open-ended comments.

A reminder postcard was sent 1 week after the initial mailing. Approximately 4 weeks later a second mailing of the survey was sent to nonrespondents with a reminder letter. SFI program coordinators who had not responded were contacted via e-mail and urged to participate. After the second mailing, the remaining outstanding nonrespondents were contacted by telephone and a personal request was made for their participation.

Survey responses were entered into a spreadsheet to assist with data analysis and reporting. Percentages appearing in the results were calculated by dividing the number of responses to an item by the number of respondents to a particular question. Where a respondent provided a range of numbers in response to a question, we used the average within that range to be able to include the response within the analysis.

Results

Forty-seven of the 63 surveys were returned, for an overall response rate of 75%. Twelve respondents reported that their organization did not provide logger education programming. One additional respondent answered that although their organization did provide programming, they did not want to answer the survey. This left 34 usable responses (54%) from which data were collected. Because two LEPs each had two usable responses, one response per program was created by contacting those individuals.

This resulted in usable responses from 32 programs (13 from the North, 13 from the South, 4 from the Rocky Mountains, and 2 from the Pacific Coast). The following results are generalized across those 32 programs.

Categorization of LEPs. Eighteen of the 32 programs (56%) indicated that they had a certification program. Registration and Master Logger Certification programs comprised 12.5% each, and membership programs were 9%. "Other" program types cited (9%) were training (two programs) and accreditation (one program). No programs claimed to have a licensure program.

Membership Eligibility. All 32 programs granted membership eligibility to logging business owners, reflecting the primary placement of responsibility for logging knowledge on that position. Most programs also granted membership eligibility to field supervisors (94%), managers (91%), and logging workers (91%). The final category of "other" was reported by 50% of the programs. It included industry and professional personnel, silvicultural contractors, associate members, and other involved or interested parties.

Funding Sources. Course training fees/tuition were the most frequently reported funding source for program administration and delivery (Table 1). That source was cited by 22 programs and contributed 38% of the overall budget. The second most often reported funding source was the SFI Implementation Committee, reported by 18 programs. It accounted for 23% of the overall budget. Variation around the average values was almost as large as the values themselves. On average, certification programs received 43% of their budget from training fees and

Table 2. Average annual LEP budget (\$1,000) by type of program.

Annual budget ^a	Overall average annual budget (\$1,000)	Type of LEP				
		Membership (n = 3)	Registration (n = 2)	Certification (n = 16)	Master Logger Certification (n = 2)	Other (n = 3)
Overall (n = 26)	96.2	82.5	45.8	104.7	146.0	119.0
Administration (n = 20)	42.4	27.5	40.0	39.1	45.0	69.0
Delivery (n = 20)	72.1	57.5	23.5	77.4	100.0	51.8

^a Some programs provided only overall budget figures.

21% from SFI Implementation Committees.

Annual Budget for Program Administration and Delivery. Although 19 programs funded both administration and delivery, one only funded administration. The average annual administration budget was approximately \$42,400 (Table 2). The average annual delivery budget was approximately \$72,100. An additional six programs reported their overall annual budgets without providing a breakdown of administration versus delivery. In all cases, the range of reported values was relatively large, with a standard deviation (SD) nearly as large as the average value reported. That program-to-program variation may be caused by a variety of factors such as the size of the forest products industry, number of logging businesses, financial resources that are available to support logger education, and leadership's ability to secure funds.

Overall, the average annual total budget for all 26 programs was approximately \$96,200 (Table 2). Registration programs had the lowest average annual overall budget at \$45,800 and Master Logger programs had the highest at \$146,000. The overall annual average for certification programs was \$104,700.

Although Table 2 shows that registration and "other" programs reported administration costs that exceeded delivery costs, only one registration program and two other programs broke out their expenses. Because the survey did not inquire about the amount of program delivery accomplished (e.g., registration programs may not require much educational programming) and did not ask who was providing the programming (e.g., an administrator who is involved with program delivery may not have apportioned their salary into the two component areas), it is not possible to assess the implications of that trend.

Annual Class Requirements. In general, there was little difference in educational

Table 3. Average annual class requirements for members of LEPs (n = 29).

Type of member	Annual class requirements		
	Number of classes	Number of contact hours	None required
Logging business owner	2.2	10.3	4
Logging manager	2.1	9.9	5
Logging supervisor	2.2	9.6	3
Logging worker	1.9	9.9	7

requirements among the individuals who were eligible for membership (i.e., logging business owners, logging managers, logging supervisors, and logging workers). Sixteen programs (55%) reported requirements that were the same for all members. Overall, annual average requirements for business owners, managers, supervisors, and logging workers were approximately two classes or 10 hours (Table 3). The requirement cited most frequently was annual contact hours. Two programs (one registration and one certification program for 6.9%) reported that they do not have annual class requirements for any member category.

Factors Creating Successful Training Experiences. The "most important" factors in building a successful training experience were presentation format (63% of programs), discussion sections for participants (47% of programs), and incorporating hands-on experiences (47% of programs; Table 4). "Important factors" included class length (63%), class size (43%), and discussion sections for participants (43%). Testing was considered "least important" by 52% of programs. "Other" factors added by programs and rated "most important" were the relevancy of the material; experience, knowledge, and skill of instructors; cost; use of field sessions; application of adult education principles; and conducts course evaluations.

Training Formats and Optimal Class Size. All but four programs used three or more training formats during 2003 and 2004. Lecture and PowerPoint formats were

used by nearly all (94 and 91%, respectively). Videotapes and large group discussions were used by all but seven programs (78%). Classroom computers and paper-based independent study were each used by three programs (9%) and computer-based independent study was used by two programs (6%). "Other" formats were the use of multiple formats during workshops and job-site coaching. The average optimal class size was generally between 30 and 40 individuals. Independent study courses had optimal class sizes of 10 or fewer.

New Training Offered in 2003 and 2004. Thirty-six new classes were offered in 2003 and 2004. Those classes were placed into three categories: business management (11 new reported for 31% of total new classes offered), forest management (15 for 42%, 4 of which related to global positioning systems [GPS]), and safety (10 for 28%). New business management classes offered included

- Business management for loggers.
- Legal and tax issues of purchasing stumpage from private landowners.
- Forest Stewardship Council land certification.
- Carbon credit exchange for logger landowners.
- Basic finance using business calculators.
- Ethics and images.

New forest management classes included topics such as

- Applying best management practices (BMP).

- Invasive species control.
- Job layout and profitable skidding.
- Soils analysis.
- GPS.

New safety classes included topics such as

- Game of logging and logger safety.
- Occupational safety and health administration regulations.
- Hazardous materials and spills.
- Log truck requirements.
- Mechanical harvesting.
- Chainsaw safety.
- Logger rescue.

New Training Planned for 2005.

There were 27 new classes planned for 2005. These classes were placed into the 3 categories of business management (6 new reported for 22% of planned new classes), forest management (14 for 52%), and safety (7 for 26%). Upcoming 2005 classes in business management included

- Leaders, managers, and followers (communication).
- Business planning.
- Department of Transportation (DOT) audits.
- Wage per hour laws.

New 2005 forest management classes included

- Biodiversity measuring for pre- and post-harvest assessment.
- Forestry, ecology, and silviculture offered online.
- Hardwood value improvement.
- Aesthetics.
- GPS.
- Building and distributing skidder bridges.

Future safety classes included

- DOT regulation update.
- Garage safety.
- Liability.
- Advanced first-aid/cardiopulmonary resuscitation.
- Chainsaw safety.
- Game of Logging.

Use of Formal Evaluations. This question addressed the extent to which participants were evaluated for material learned during training. Four categories of participant outcomes were evaluated: change in knowledge, participant retention, actual application, and “other.” Nineteen programs (61%) reported that formal evaluations were conducted to determine participants’ knowledge. An increase in knowledge was cited by 13 programs (42%). Evaluations to assess participant retention and actual application of training were reported by 7 and 13 programs, respectively. Three programs

Table 4. Percentage of programs ranking the importance of factors that create a successful training experience.

Factor (<i>n</i> = number of programs)	Relative importance			
	Most important	Important	Somewhat important	Least important
Testing (<i>n</i> = 27)	4	11	33	52
Hands-on (<i>n</i> = 30)	47	37	13	3
Discussion (<i>n</i> = 30)	47	43	10	0
Presentation format (<i>n</i> = 30)	63	30	7	0
Class length (<i>n</i> = 30)	10	63	27	0
Class size (<i>n</i> = 30)	10	43	43	3
Other ^a (<i>n</i> = 8)	88	13	0	0

^a In decreasing order of frequency, the “other” categories mentioned were (a) relevancy; (b) instructor experience, knowledge, and skill; and (c) cost, incorporates field sessions, use of adult education principles, and conducts course evaluation.

conduct other types of evaluation, which were reported as expected application of training, all knowledge categories evaluated annually by a random audit, and course evaluations (i.e., exit surveys that are not designed to assess change in knowledge, participant retention, or actual application).

Collaboration between LEPs. Eighty-one percent of the 32 programs said they currently have a collaborative relationship with one or more LEPs in other states, either neighboring or regional. Three programs reported having more than one type of collaboration with other programs. Fifteen (58%) reported reciprocity for recognition of training, 11 (42%) identified sharing curriculum and discussing items of common interest, and 3 (12%) provided training in other states.

Twenty-seven of 31 programs (87%) saw further benefits from increased collaboration between LEPs. Twenty-five of those 27 programs expressed interest in a sharing forum with LEPs in other states. One program reported the considerable differences between state laws as the reason they were not interested. Curriculum exchange and periodic meetings were most frequently cited as the preferred formats, with a preference for regional cooperation. “Other” suggestions included funding collaboration and improved informal relationships, each preferred at both the regional and the national levels.

Fourteen different entities were recommended to take the lead in initiating and facilitating collaborative efforts. Some programs suggested that more than one entity should take the lead. The FRA was cited in 35% of responses. This is by far the largest amount, reflecting the confidence many state LEPs have in the national role of FRA. The American Loggers Council (ALC) was

the second most frequently suggested entity (13%).

As a follow-up to this study, the Minnesota LEP and FRA assessed this recommendation and used the 2006 SFI Annual Conference to bring statewide logger training and education program directors together to share ideas for improving the quality of logger education programming. A breakout session on logger education during the Annual Conference identified best practices and emerging issues in logger training.

Discussion and Recommendations

LEPs vary considerably from state to state, evidenced by the large variance around average values. For many of our questions, the response SD was nearly as large as (or larger than) the average reported value. This illustrates that there is no common approach to designing an LEP. Instead, these programs have evolved based on in-state history and needs, organizational interests, funding opportunities, and personnel. The following recommendations are presented from a synthesis of responding program comments and suggestions.

Membership and training eligibility are important features that increase both the professionalism and the personal investment of all members of the logging workforce. Extending membership to all logging workers creates cross-training opportunities, safety awareness, and skill development. All LEPs extend eligibility to logging business owners. Recognizing that those owners may not always be on site, it is important for other individuals within the business to obtain membership. In addition, interested non-logging parties such as foresters, land managers, and industry personnel are part of the

logging community and should be included in membership.

Funding. Average delivery costs for educational programming comprise approximately 63% of logger education budgets, with administrative expenses averaging 37%. Training fees are an important source of revenue, supporting an average of 38% of the overall program budget. This situation conflicts with the growing need and desire to send multiple personnel within a logging business to training programs because logging business owners generally cover those costs. Securing a diversity of funding sources may be one key to the financial success of LEPs, while maintaining reduced fees and tuition. Some identified sources are grants, legislative appropriations, SFI Implementation Committee funds, industry contributions, conference vendors, advertisement sales, donations, and workers' compensation commission.

An additional source of revenue might come from a reorganization of logger training services. Some states experience duplication of logger training because of the varied requirements of programming conducted by industry, public land management agencies, and state LEPs. Coordination of general and specialized logger education programming could allow state LEPs to assume the majority of training, supported by increased funding from industry and land management agencies that no longer bear the cost of training. One program suggested that companies that call for logger training to support SFI Certification requirements should contribute to the costs of hiring quality educators. This would help defray program expenses and show that the companies that require the training value loggers' efforts in meeting training requirements.

One program noted that most of the classes in their program are taught by volunteers who are professionals from the fields of forestry, law, accounting, safety, and medical relations. These professionals come from state and federal agencies, universities, and the private sector. This type of service rendered could be beneficial to LEPs, parent agencies, and the logging community. Also, retired professionals could be considered as a resource in this same capacity.

Factors Creating Successful Training Experiences. An average training requirement of 10 contact hours/year per member represents a substantial amount of time spent off the work site. These are lost work hours and often lost pay hours for logging

crews. Program administrators must endeavor to make that time as productive to participants as possible by providing effective training that will pay off in the long run through increased proficiency and safety. A variety of factors that help create successful training experiences were identified. Qualified instructors who understand the challenges facing small business and logging personnel are important for effective communication. There was a strong preference for hands-on experiences and field-based classes that engage participants in course materials, encouraging interest, learning, and retention. Participants prefer selecting their courses from a menu of smaller, relevant classes that provide discussion opportunity and applied experience and that use a variety of teaching techniques. In a recent New England study, on-the-job training was preferred over formal training by a majority of loggers (Egan 2005). Relevant subject matter was best chosen through direct input from loggers themselves.

Many programs face difficulties in implementing these practices. Numerous loggers located over wide geographic areas, limited training resources, and financial constraints may force program administrators to offer larger classroom experiences. Lecture, PowerPoint presentations, videotapes, and large group discussions are the most widely used training formats and are best suited for large audiences. However, these standard teaching methods, if relied on exclusively to deliver information, hold the greatest risk of not effectively reaching an audience who is most comfortable working with their hands in an outdoor setting. When it becomes necessary to offer training in large groups, providing breakout sections that form smaller groups can facilitate discussion, promote participation, and address a variety of topics.

According to RenJye et al. (2002), harvesters consider logger-to-logger conversations and field demonstrations to be the most effective means of technology training. Cross-training is one such approach, which brings together two or more audiences with different logging interests (e.g., loggers and foresters and loggers and family forest owners). This format allows participants to learn from each other about a topic of mutual interest through interactive indoor or outdoor presentations and exercises.

One program administrator described their LEP, which is based on an on-site coaching model, in which training special-

ists work in the company setting, for varied time periods, with specific topics requested by the company owner. This program requires a field site inspection as part of membership. Initial group exercises are held for logging business owners at local field sites, addressing issues of common interest in a small group setting. The field setting is more relevant for this audience than a classroom and facilitates on-the-spot questions. After the group session, logging business owners submit requests for specific topics on which they want their crews coached at their job site. This field coaching allows particular company concerns to be addressed with all involved employees present, without relying on repetitive communication and potential loss of information from the workshop attendee to the field personnel. Knowledge retention and application are assessed in the field by the trainers through random audits of participants.

Two formats that are used less frequently by LEP programs are independent study paper- and computer-based programming. Recent technological advances in computer resources have created an opportunity to combine these formats into a new training niche: independent study computer classes. Benefits of independent study include allowing a participant to take a course at his/her own pace, to review materials in private, and to not miss a day of work. Also, it generally requires a higher level of hands-on work than traditional classroom experiences. The potential downside associated with an independent study system (it requires an honor system) is balanced by the fact that this is an ideal way for many adults to learn. Computer-based training is more readily available as both businesses and individuals increase computer use. Computer classes that focus on business management could be particularly appropriate for logging business managers who use computers in their operations.

Opportunities for customized training also have increased with the growing availability of computer resources (e.g., Internet, CD and DVD storage media, and specialized software). Computer formats could be an effective means to cut costs of training delivery without increasing costs to members. This also can be an effective way to reach loggers in remote areas where training opportunities are limited. LEPs could explore these possibilities, which allow members to fulfill training requirements through

home study courses, meeting both business needs and membership requirements.

The following computer-based independent study model was described by another program. The core courses offered are safety, business management, BMPs, and aesthetics. The courses were developed by an independent computer contractor and are accessible through his website. Web formats include video, sound over, photo images, and reading material, with links to relevant websites. Participants log in and pay by credit card. The web contractor posts a list of participants weekly, which are retrieved by the LEP and entered into their records. At the conclusion of each class there is a verification sheet, which the participant prints off, signs, and faxes to the LEP office. Short quizzes are part of the core classes. Interest and participation have been positive, and the program anticipates the addition of more continuing education topics in the future.

Formal Evaluations. Thirty-nine percent of the programs did not perform evaluations to assess participant knowledge. However, gaining short- and long-term measures of the effectiveness and outcomes of a program's training can be beneficial for a variety of purposes such as determining additional training needs, promoting future classes, and providing relevant information in support of fundraising.

Participant class evaluations at the end of a session provide immediate feedback to trainers so that they can make improvements to subsequent presentations and so that program administrators can assess trainers and logistics. Participant input regarding such points as topic relevance and content, quality of instruction, interest level, and presentation effectiveness are valuable for continuing development. These evaluations also can provide a systematic method for identifying new training needs.

Enhanced field performance is the ultimate result of effective training—but it is

more efficient to determine the degree (or lack) of success of a training session at the time of delivery than in the field where mistakes are costly. Appraisals or assessments conducted several weeks or months after completion of the training event can help trainers determine whether the training effort resulted in a change in participant knowledge, retention of training material, and/or actual workplace application.

Collaboration between LEPs. Over 80% of programs currently maintain a collaborative relationship with LEPs in other states. Differences in state laws (e.g., forest management guidelines and required credentials of logging businesses) may preclude other states from collaborating. Relationships across state and regional boundaries are most common, because landscape and environmental issues affecting logging communities are often similar. Despite this high level of ongoing cooperation between LEPs, there is strong support for increased collaboration with programs in other states. This exhibits recognition between LEPs of their shared commitment to helping each other, and highlights an opportunity that should not be missed. LEP administrators are very interested in a structured platform that allows them to share new ideas, develop curriculum, combine problem solving, and expedite solutions.

One program offered the following comment: "National guidance on continuing education is lacking. The SFI program specifies what is required for initial recognition, but each state handles continuing education differently. Standardization of hours would help those operating in several states." Regional meetings would be an appropriate place to address this issue. Another program suggested a discussion regarding funding collaboration. This presents the idea of a cost-share plan between state programs that currently exchange training with each other. Increased standardization of training modules and templates, customized with state-

specific content as appropriate, could facilitate shared funding. In another idea, discussions between loggers from different states could add interest and interactive dimensions to training experiences while reducing the unease of talking among competitors.

A large interest was expressed for a periodic regional sharing forum. The FRA was cited most often as the appropriate lead organization to develop such a meeting, with the ALC named by the next largest group. Maximum resources could be combined to reach the largest audience by the cooperation of the FRA and the ALC in this endeavor, while also increasing collaboration between national organizations.

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