

THE HARDWOOD ECOSYSTEM EXPERIMENT: EXTENSION AND OUTREACH

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Abstract.—The Hardwood Ecosystem Experiment (HEE) in Indiana is a long-term, large-scale experimental study of forest management and its impacts on plants and animals. Information from the HEE should and will be made available to a diverse group of potential users. This paper summarizes educational efforts during the pre-treatment period and highlights potential mechanisms and considerations for future efforts.

INTRODUCTION

Forests provide a multitude of environmental (e.g., carbon sequestration, enhanced water quality, wildlife habitat), economic (e.g., timber, wood products manufacturing, tourism), and social (e.g., recreation, aesthetics) benefits to society. The sustainability of these benefits is strongly tied to the stability of the resource. Although the number of hectares of forest area may describe the amount of forest base available, it fails to account for loss of forest values as a function of fragmentation and parcelization (Carman, this publication). In fact, the 2010 National Report on Sustainable Forests (U.S. Forest Service 2011) reported the loss of working (actively managed) forests as one of three overarching issues of “crucial importance” to our forests.

Forest land in the eastern United States is mostly (83 percent) privately owned, and landowners continue to grow older while the average parcel size decreases (Butler and Leatherberry 2004). Eighty-six percent of the 1.88 million ha (4.65 million acres) of forest land in Indiana is privately owned (U.S. Forest Service

2007) with an estimated 151,300 private landowners (Birch 1996). Most of these landowners control small areas with very few (3 percent) owning ≥ 40 ha (100 acres). Large ownerships of forests, such as state and federal forests, offer the best (and usually only) opportunity to manage for a wide diversity of forest life (Prugh et al. 2008). The Hardwood Ecosystem Experiment (HEE) provides a test of management options and offers a unique opportunity to learn how ecosystem responses differ as a function of the type of forest management.

The HEE takes place on Morgan-Monroe State Forest (9,710 ha) and Yellowwood State Forest (9,440 ha) in Morgan, Monroe, and Brown Counties in south-central Indiana. The study area and HEE study design are described in detail by Kalb and Mycroft (this publication). The general focus of the HEE is to experimentally study how timber harvesting affects plants and animals. This information can in turn be used to develop management prescriptions that maintain oak (*Quercus*)-dominated forest communities and the services they provide. A primary goal of the HEE also is to provide demonstration sites and educational programs to engage the public concerning forest management (Kalb and Mycroft, this publication). Here, we summarize educational efforts during the pre-treatment period of the HEE and highlight potential mechanisms and considerations for future efforts.

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PRE-TREATMENT EXTENSION EDUCATION

During the pre-treatment phase of the HEE, educational programming focused on the sustainability of oak forest ecosystems and how the HEE can help to inform management decisions within oak forest ecosystems. Outputs developed during the pre-treatment phase consisted of a project Web site, informational pamphlet, and newsletter. The HEE Web site (www.HEEForestStudy.org) was launched in 2007 and included a project overview, general study design and research activities, project partners and personnel with contact information, and job and meeting announcements. The HEE Web site also included a portal to a secure site where researchers could post and share information with each other. A quarterly newsletter, the HEE Update, was initiated in April 2008. Its purpose was to inform those directly involved with the HEE and those interested in learning about ongoing activities associated with the HEE. Individuals could sign up on the HEE Web site to receive the newsletter by e-mail, and all issues were posted on the HEE Web site. Both the Web site and newsletter offered an open door for stakeholders to learn more about the HEE.

Web statistics from 2007 through 2010 were not available. During 2011, visitors had 3,613 page views and an average page view time of 2 minutes per page. The initial HEE Update distribution was limited to project sponsors and investigators. By March 2009, the distribution list totaled 104. Ninety-two percent were university faculty, staff, and graduate students (44 percent); government agency personnel (30 percent); and HEE student workers (18 percent). More than half (56 percent) of university faculty, staff, and graduate students were directly involved with the HEE. Unfortunately, we were unable to separate traffic sources for the HEE site from the Forestry and Natural Resources Web site. We theorize that most Internet traffic was either from referral links from project sponsors and cooperators or direct traffic and

Web searches from people who were familiar with the project. However, one must be at least aware of the HEE before seeking these information sources.

FUTURE OUTREACH EFFORTS

As the HEE progresses, it will provide much data to inform forest management policy for public forests in Indiana and the Central Hardwood Region. However, land management decisions are not strictly science-based. Studies have demonstrated that stakeholders do not disagree that sound science is necessary to solve natural resource problems, but they can disagree on the appropriate roles that science and scientific experts play in making management or policy decisions (Vogel and Lowham 2007). Because the Indiana Department of Natural Resources-Division of Forestry and many other natural resources agencies across the country seek stakeholder input on strategic planning and management prescriptions through public comment, it is beneficial to understand how stakeholders and the general public view woodlands and their management.

The public has a general lack of knowledge and awareness of woodlands and their management. For example, in a telephone survey of Indiana adults, Witter et al. (this publication) found that although 90 percent of respondents were either “very” or “somewhat” interested in Indiana’s forests and other natural resources, most (58 percent) were not familiar with the Indiana Department of Natural Resources-Division of Forestry, and 18 percent thought most of Indiana’s woodlands were privately owned. People generally are not opposed to timber harvesting (Schaaf et al. 2006), especially for specific reasons such as disease control and wildlife habitat (Witter et al., this publication), yet they may not understand the scientific basis of timber harvesting and other forest management decisions.

Information that improves the public’s understanding of the scientific basis of forest management may

change public opinion. For example, adjacent landowners and recreationists of Morgan-Monroe State Forest had mixed views regarding the same forest management practices used on the HEE (i.e., group selection, clearcut, shelterwood, no harvest). However, a minimal level of informational intervention improved acceptability of all forest management practices, although the increase was nominally small (Rogers et al., this publication). Educational programming developed by the HEE could provide recreationists, adjacent landowners, and other stakeholder groups a better understanding of the scientific basis of forest management practices and their associated tradeoffs. Specifically, programs that help people experience nature or link them to a natural resource professional (Witter et al., this publication) may offer the best potential for impacting their views about woodland management and timber harvesting.

In addition to informing state forest policy, the HEE also can serve to inform management decisions on private forests. Eighty-six percent of the 1.88 million hectares of forest land in Indiana is owned by private citizens or corporations (U.S. Forest Service 2007), including 141,300 non-industrial private forest landowners (Birch 1996). Thus, programs that target forest land in Indiana as a whole must involve private landowners. How do we reach such a large and diverse group? Indiana and other states already offer a variety of resources through land grant institutions and public resource agencies. Nonetheless, most landowners do not seek out those resources largely because they were unaware of assistance and programs available (Broussard and Lamprecht 2006, Hodge 1996, Measells et al. 2005).

Beliefs and values generally shared by private forest landowners and specific types of forest landowners may also offer insights into how to approach educational and outreach efforts associated with the HEE. Most people who own forest land indicate they believe timber is very important, but protection of natural beauty and wildlife ranks higher for reasons

of ownership (Sampson and DeCoster 1997). Non-industrial private forest landowners share a deeply rooted stewardship ethic and are open to receiving more information about managing their land (Sampson and DeCoster 1997).

Information about forest management may be better received if consideration is given to the type of landowner because all forest landowners do not share the same goals and objectives for their property. Ross-Davis and Broussard (2007) found that forest landowners in northern Indiana could be divided into three distinct groups—new forest owners, forest managers, and passive forest owners. These groups differed in whether they considered their land to be managed, harvested timber on their land, and used information from the Department of Natural Resources and foresters (Ross-Davis and Broussard 2007). The HEE is focused on timber management and its impacts on plants and animals. However, woodland owners in Indiana (Ross-Davis and Broussard 2007) and across the country (Kilgore 2004) have a declining interest in timber production, and many own forests for reasons other than producing timber. Indiana woodland owners considered timber production to be “not important” as a motivation for ownership and ranked timber production much lower than enjoyment of scenery, privacy, wildlife habitat, and learning from nature among other motivations (Ross-Davis and Broussard 2007).

Even though the HEE focuses upon the use of timber harvesting as a management tool, educational programs associated with the HEE can present the costs and benefits of management activities (or disturbance in general) that will enhance wildlife habitat and other recreational and ecological values of forests. Hoover (this publication) reviewed the broad range of values that should be considered when making management decisions for forests in the Morgan-Monroe-Yellowwood Complex (MMYC). To the extent possible based on available data, he estimated a \$2.6 million total annual value for outdoor

recreation within the MMYC. When the forest was used only for timber production, the gross annual economic impact of timber sales averaged \$94.9 million from 1993 to 2010 (Hoover, this publication). However, he estimated a reduced value of between \$2,590 and \$7,770 per ha of forest land in the MMYC when even-age management is used. Although these numbers are not directly comparable (see Hoover, this publication), they demonstrate the importance of identifying recreational and ecological values of forests and how management decisions may influence them.

Clearly the HEE will provide much science-based information that can inform forest management on both public and private forests in Indiana and beyond. However, determining how different types of harvesting impact oak regeneration or how wildlife utilize harvest sites is not the end result. We need to better define what types of impacts we want to achieve and how we will measure them. The Renewable Resources Extension Act (RREA) offers federal funding to states with a focus on sustaining the nation's forests and rangelands. Dovetailing the goals, strategies, and performance measures of the HEE into existing programs such as RREA may offer a solution. For example, the RREA strategic issue of forest stewardship and health aims to increase the health and sustainability of privately owned forests by various ways, including educational programs that help landowners develop management strategies and implement stewardship practices (U.S. Department of Agriculture 2004). Information gained from the HEE can inform these management strategies and provide the background for demonstration of management practices.

Use of demonstration sites has been a cornerstone of traditional forest and wildlife extension programming. Adoption of management practices can be influenced, in part, by attending educational programs (Rasamoelina et al. 2010) and learning by example from peers (Snyder and Broderick 1992). These traditional in-person educational programs have much value for those who attend, but they also

have limitations. Generally, in-person programs are expensive (advertisement, travel, and refreshments) and offer low potential for reaching large numbers of landowners given that attendees come from a limited geographic area near the location of the program. The HEE field sites have been used for media events, landowner workshops, professional training, and teacher summer courses, among others.

We certainly advocate for continuing these types of events, especially for specific target audiences such as foresters who provide technical assistance and advice to forest landowners, teachers who can instruct a new cohort of students annually, model forest landowners who can serve as an example to their peers, and media who relay information to the general public. However, truly understanding the impacts of the HEE resulting from these efforts requires the assessment of workshop participants in terms of how they used the information they learned and what type of difference it made for the people with whom they work. Adapting and expanding the HEE Web site to provide information on how to manage for specific plants and animals, the types of technical assistance and cost-share available to forest owners, and a means to track how visitors use the information would be of value.

Forest landowners will not seek out the HEE to find information relevant to their woodlands. Rather, HEE scientists must design educational programs specifically to engage this group. Creating new partnerships and enhancing existing partnerships with stakeholder groups offer much potential. Professional societies (e.g., The Wildlife Society, Society of American Foresters), non-governmental organizations (e.g., The Nature Conservancy, Indiana Woodland Steward), landowner groups (e.g., Indiana Forestry and Woodland Owners Association), and trade associations (e.g., Indiana Hardwood Lumbermen's Association) all have an interest in sustaining the ecological and biological integrity of forests. Many have extensive communication networks that include annual meetings, newsletters and circulars, and training/educational workshops.

These groups and many more also serve on the Indiana Forest Stewardship Coordinating Committee (IFSCC). This group brings together and maintains communication among stakeholder groups and individuals concerned with the management of Indiana's forest resources. Stakeholder groups represented on the IFSCC could communicate findings and management implications gained from the HEE to a broad audience. The same groups could also provide membership feedback to HEE scientists that could be used to identify key issues and optimal ways to reach end users (e.g., electronic publications, Internet seminars, and blogs). A formal survey instrument or focus groups would facilitate this process.

In summary, the HEE offers a unique informational resource for forestry professionals, educators, and landowners in Indiana. To maximize its value, we need to specifically outline and implement a plan that addresses desired impacts for each target audience that includes ways to evaluate success.

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LITERATURE CITED

- Birch, T.W. 1996. **Private forest-land owners of the northern United States, 1994**. Resour. Bull. NE-136. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 293 p.
- Broussard, S.R.; Lamprecht, C. 2006. **Understanding your perspectives: a survey of Indiana forestland owners**. Technical Report. West Lafayette, IN: Purdue University. 48 p.
- Butler, B.J.; Leatherberry, E.C. 2004. **America's family forest owners**. *Journal of Forestry*. 102(7): 4-9.
- Hodge, S. 1996. **Challenges for ecosystem management with Virginia NIPF owners**. In: Baughman, M.J., ed. *Proceedings, symposium on nonindustrial private forests: learning from the past, prospects for the future*; 1996 February 18-20. St. Paul, MN: Minnesota Extension Service: 426-433.
- Kilgore, M.A. 2004. **Public forest policies and the family forest**. *Journal of Forestry*. 102(7): 11-12.
- Measells, M.K.; Grado, S.C.; Hughes, H.G.; Dunn, M.A.; Idassi, J.; Zielinske, B. 2005. **Nonindustrial private forest landowner characteristics and use of forestry services in four southern states: results from a 2002-2003 mail survey**. *Southern Journal of Applied Forestry*. 29(4): 194-199.
- Prugh, L.R.; Hodges, K.E.; Sinclair, A.R.E.; Brashares, J.S. 2008. **Effect of habitat area and isolation on fragmented animal populations**. *Proceedings of the National Academy of Sciences*. 105(52): 20770-20775.
- Rasamoelina, M.S.; Johnson, J.E.; Hull, R.B. 2010. **Adoption of woodland management practices by private forest owners in Virginia**. *Forest Science*. 56(5): 444-452.
- Ross-Davis, A.; Broussard, S. 2007. **A typology of family forest owners in north central Indiana**. *Northern Journal of Applied Forestry*. 24(4): 282-289.
- Sampson, R.N.; DeCoster, L.A. 1997. **Public programs for private forestry: a reader on programs and options**. Washington, DC: American Forests. 100 p.

- Schaaf, K.A.; Ross-Davis, A.L.; Broussard, S.R. 2006. **Exploring the dimensionality and social bases of the public's timber harvesting attitudes.** Landscape and Urban Planning. 78(1-2): 135-146.
- Snyder, L.B.; Broderick, S.H. 1992. **Communicating with woodland owners.** Journal of Forestry. 90(3): 33-37.
- U.S. Department of Agriculture. 2004. **Sustaining the nation's forest and rangeland resources for future generations: Renewable Resources Extension Act strategic plan for the state-federal partnership.** Washington, DC: U.S. Department of Agriculture. 33 p.
- U.S. Forest Service. 2007. **Forest inventory and analysis fiscal year 2006 business report.** FS-884. Washington, DC: U.S. Department of Agriculture, Forest Service. 39 p.
- U.S. Forest Service. 2011. **National report on sustainable forests – 2010.** FS-979. Washington, DC: U.S. Department of Agriculture, Forest Service. 210 p.
- Vogel, J.; Lowham, E. 2007. **Building consensus for constructive action: a study of perspectives on natural resource management.** Journal of Forestry. 105(1): 20-26.