

Communicating the Story of Silviculture on the Allegheny National Forest

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Abstract.—To communicate the story of silviculture on the Allegheny National Forest, we need to distinguish silviculture—the art and science of manipulating forest vegetation to achieve management objectives—from forest management. During the field trip for the National Silviculture Workshop we visited five sites that demonstrate how inventory and monitoring, resource management, research, education, demonstration, and partnerships help communicate the role of silviculture. They also demonstrate communication to practitioners, policy makers, and members of the public who participate in setting management direction for national forests. On the Allegheny National Forest, our close association with our partners in Research and State and Private Forestry increases our effectiveness as communicators about the role of silviculture in managing this National Forest.

INTRODUCTION

For years, many of us thought of ourselves as both silviculturists and forest managers - as though these roles were one and the same. And for years, this was an accepted association. In recent years, it has become more and more apparent that these are truly separate roles. Management choices are made in concert with public participation. Silviculturists then identify and implement the silvicultural practices needed to achieve the desired management conditions. The joint silviculturist/manager role may have been effective in the past. Today, with increased public participation in our management decision-making process, there are some very good reasons to separate the roles of silviculturist and manager more distinctly.

Stepping away from center stage of the management debate strengthens our ability to show how silviculture can be used to achieve ecosystem objectives. It helps us show that silviculture is focused more on growing forests and helping vegetation develop to the desired condition than it is on making stumps. Silviculture is much more than maximizing volume or value production in an Allegheny hardwood stand. However if volume production is the selected management objective, we know a variety of techniques to employ to meet that goal. The management debate draws on the expertise of silviculturists and other specialists to assess management options. Management decisions then reflect a wide range of concerns.

Communication Themes

Silviculture is an integral component of the varied functions served by the Forest Service. We communicate the role of

silviculture, both internally and externally, through policy making, inventory and monitoring, resource management, research, education, demonstration, and partnerships. We must effectively communicate what silviculture is, how it contributes to the management of the National Forests, and how we can use it to create the vegetative conditions that enhance ALL resources managed on the Forest.

Background

An understanding of the history and origin of the forests and vegetation found today on the Allegheny National Forest (ANF) is the foundation for today's silvicultural practices (Marquis 1975). The turn of the century timber industry made an indelible mark on the landscape - in terms of vegetation, structure of local communities and economies, and on people's perceptions of what kinds of wood products can be produced here. There are several other equally important developmental influences on this forest.

The oil and gas industry had its origin in nearby Titusville, PA where Francis Drake successfully drilled the first well in 1859. There was a period of exploration and development that peaked in 1883 and continued into the 1890's. Things remained relatively static until the 1920's when the development of new extraction techniques resulted in a resurgence of more intensive development (Ross 1996). Mineral development is a permanent feature on the Forest, as 93 percent of the mineral rights are owned by private interests.

The Forest provides a range of recreation opportunities, as well. By the 1920's, deer populations had recovered from near extirpation at the turn of the twentieth century sufficiently to begin attracting hunters from nearby urban areas and adjoining states. Fishing opportunities also attracted many visitors. The sporting traditions established several generations ago influence the expectations of today's hunters and anglers.

The Civilian Conservation Corps ran thirteen resident camps on or near the Forest during the 1930's. The men participated in a wide range of activities, many of which were geared toward restoring renewable forest resources or the development of recreation sites. Recreation sites developed by the CCCs increased popular use of the ANF for picnicking, swimming, and camping, and many CCC facilities are still in use today.

The national interest in the development of Forest Service recreation resources and facilities in the 1950's and 60's resulted in the construction of many developed campgrounds and recreation facilities along the Allegheny Reservoir shoreline. More diverse recreation development occurred in the last 10-15 years, including all terrain vehicle and motorbike trails, snowmobile trails, and the designation of the Hickory Creek and Allegheny Island Wildernesses

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and the Allegheny National Recreation Area. Recreation is big business; it provides more than twice as many jobs in the local economy as does the timber industry. Given that the Forest is located within a half day drive of one-third of the US population and half of the Canadian population, we expect that recreation demands will continue to increase over time.

The Forest Service established the Kane Experimental Forest in 1932, following the initiation of forest management research in 1927. This marked the beginning of what has become a very productive and supportive relationship between the Northeastern Forest Experiment Station Laboratory in Warren, PA (the Lab) and the ANF. Early studies focused on the growth and development of the young Allegheny hardwood stands, although researchers recognized problematic changes in herbaceous, seedling and shrub vegetation caused by the rapidly expanding deer populations of the 1930's and 40's.

A major silvicultural shift occurred in the east during the 1960's from uneven-aged to even-aged management philosophies. On the ANF and at the Lab, this shift focused attention on the establishment, survival and development of tree seedlings. In 1970, the Lab began an intensive effort to develop guidelines to ensure successful regeneration through silviculture. Today, managers on the ANF rely upon the research findings of the past 27 years as we implement prescriptions that support our management decisions.

There is intense interest in virtually every acre of this forest, usually by more than one user group, often with divergent points of view. Management debates are interesting - often intense and filled with emotion. As silviculturists, we can contribute information about the capabilities of the forest ecosystem to achieve different management objectives. Within these limits, we can suggest actions that will take us in the directions that our public wants us to pursue - all we need to know is the desired direction. To fulfill these dual roles for silviculturists—helping members of the public understand the capabilities of the forested ecosystem, and achieving management objectives—we must communicate effectively about the role of silviculture. The sites selected for the 1997 National Silviculture Workshop Field Tour represent our use of many different techniques to communicate the story of silviculture on the Allegheny National Forest.

FIVE SITES ON THE ALLEGHENY NATIONAL FOREST

We visited five sites as part of the field tour conducted during the National Silviculture Workshop (Warren, PA, May 19-22, 1997). Each exemplifies one or more strategies for communicating the role of silviculture in the management of the ANF. While the communication technique and silvicultural messages differ from site to site, there is one element common to all five. This is the strong partnership between the ANF and the Northeastern Forest Experiment Station Lab. Because of this partnership, researchers share information promptly with managers. Managers apply the information quickly and monitor its effectiveness in

operational use. Monitoring information provides feedback for planning new research.

Hearts Content – Communicating the Role of Silviculture through Demonstration and Education

One challenge we face in communicating the role of silviculture in National Forest management is developing a baseline understanding of ecological processes. A 120-acre remnant of the presettlement forest, Hearts Content Scenic Area has long been a favored site for forest visitors (Lutz 1930). Its importance as an ecological remnant is recognized by its designation as a National Natural Landmark. Managers from the ANF worked with scientists from the Lab and cooperators from the University of Indiana to select key messages and develop an interpretive plan. The interpretation includes multisensory (visual and tactile) signs and a self-guided tour tape. These help visitors understand ecological processes associated with the old-growth ecosystem, the history of the ANF, and the key role that deer play in this forest region.

Hearts Content vividly displays the interaction of natural factors that affect the development of an old growth forest. The impacts of years of over-browsing by white-tailed deer on understory vegetation (Whitney 1984), and the more recent, rapid impact of beech-bark disease on 200-300 year old beech trees are quite evident. The public can see and understand how browsing by white-tailed deer has prevented the establishment of any new age classes for the last 60 years. In the growing space vacated by deer browsing, resistant and resilient species like fern and beech have become dominant. Even as deer densities go down, these plants shade out seedlings of other species. Since 1985, the exotic beech scale-nectria complex has affected overstory beech in this area. Beech represented 40 percent of the trees in the original old-growth on the Allegheny plateau, but the beech bark disease complex is altering the structure and composition of the forest over time.

The messages are complex and raise several important questions for even the casual visitor. What does the future hold for our old-growth forests when key species are threatened with disease? What are the implications of this for overall forest health? If we can effectively explain the important ecological processes that are occurring on the "neutral ground" of an undamaged, old growth forest, then perhaps people will understand these challenges separately from the management decisions and silvicultural options available in managed forests. A well-thought out interpretive plan can communicate the role of silviculture in some surprising places.

Intensive Oak Reforestation Site - Communicating the Role of Silviculture through Resource Management

Our management activities themselves can be important tools for communicating the role of silviculture in National Forest management. In the ANF Land and Resource Management Plan (Forest Plan), approved in 1986, managers made a commitment to maintain the oak forest

type. When 18,000 acres of overstory oak mortality developed in 1988 in response to the first wave of gypsy moth defoliation and a severe drought, managers were forced to address two major issues. Should forest managers use pesticides during periods of insect outbreak and could forest managers overcome the historical difficulties associated with regenerating oak?

Public interest in maintaining the oak type resulted in a series of treatments in response to gypsy moth outbreak and subsequent tree mortality. The Forest treated 137,000 acres with an aerial application of dimilin and Bt from 1984 to 1993. Public reaction to this program was mixed, but pesticide use to maintain the oak seed source during insect outbreak has been accepted by most of the public. The high visibility of both gypsy moth defoliation and the resultant mortality helped build public acceptance.

Public support for maintaining the oak type continued, though mortality occurred. We explained the difficulties encountered in stand regeneration so that people would understand the intensive reforestation treatments we proposed. These included browsing by white-tailed deer, eliminating both acorns and seedlings, and understories dominated by species like fern, grass, beech and striped maple that prevented the establishment of oak species. The Forest carried out many reforestation treatments, including herbicide application, area fencing, tree planting, and individual seedling protection with tree tubes. Many of these treatments were in highly visible areas, along main roads and recreation and river corridors. We use these sites frequently for field tours to communicate with internal and external audiences.

Interpretive signing, readily accessible and observable sites that display the range of oak regeneration treatments, and field tours communicate our commitment to meeting the wishes of the public. A partnership with State and Private Forestry to inventory the scope of the oak mortality has been important, as are ongoing research and monitoring efforts by the NEFES labs in Morgantown and Parsons, WV.

Thinning Research - Communicating the Importance of Silviculture through Partnerships and to Policy Makers

Silvicultural research can create visually striking changes in forests. These differences can help policy makers and practitioners understand the role of silviculture in managing National Forests and other forests as well. This is especially true in the complex, stratified species mixtures that characterize the eastern hardwood forest. Species of widely different commercial, aesthetic, and wildlife values grow together at different rates. On the Kane Experimental Forest, researchers have installed and followed thirty-two two-acre research plots for this study. These show the separate and combined effects of residual stand density and residual stand structure on growth and development of even-aged cherry-maple forests since 1973 (Marquis and Ernst 1991; Nowak 1996). The contrasts created by these treatments have been invaluable during training sessions for

practitioners, for loggers, and tours for policy makers. These contrasts demonstrate otherwise abstract ideas about the effect of intermediate treatments on stand value, structure, volume, habitat, and regeneration over time. These training sessions are sponsored by the Lab and Penn State Cooperative Extension, acting in partnership.

At the policy level, results from the research conducted on these sites forms the official basis for intermediate treatments on all public land and some large industrial holdings in Pennsylvania. The growth and yield model used for development of the ANF Forest Plan was developed using data from these plots, as was the widely used SILVAH decision support system (Marquis and Ernst 1992; Marquis and others 1992).

In 1992, the Lab/Penn State partnership organized the first logger training sessions in Pennsylvania using the Kane Experimental Forest research plots as key demonstration areas. These plots were so effective at communicating the role of silviculture that a new partnership was formed to install similar plots at seven other locations across the State. Penn State and the Lab worked with many other partners to find funding and to identify sites, install the treatments, design monitoring protocols, and interpret the new installations to users (Harmon and others 1997).

Allegheny Highlands Diversity Study - Communicating the Importance of Silviculture through Research

New research can also be an important tool to communicate the role of silviculture and the commitment of the Forest Service to expanded understanding of forest ecosystems. The silvicultural guidelines included in the Forest Plan are based largely on research completed on the Kane Experimental Forest, the ANF, State Forest lands, and nearby private industrial forest lands. The desired future condition described in the Forest Plan includes a more balanced age-class distribution and stands that continue to produce high-quality sawtimber. Realizing both these conditions requires successful regeneration of desired species after harvest. Effective herbicide treatments are essential tools for achieving regeneration success in the face of decades of deer browsing and the thousands of acres of fern, grass, beech and striped maple understories that interfere with the regeneration of other species.

The guidelines for herbicide-shelterwood treatments are based on nearly 20 years of research that focused on target plants and commercial tree species (Horsley 1992, 1994). In 1991, the Forest prepared an Environmental Impact Statement to amend the Forest Plan to include the use of sulfometuron methyl (in addition to glyphosate) in our herbicide program. The process involved an intensive public involvement effort that included field tours, correspondence, and several public meetings, some held as far away as Pittsburgh, PA. At the public meetings, we found that coordinated presentations were extremely effective for communicating our message. Resource managers presented the need for the reforestation treatment, while the scientist

who had conducted the experiments offered detailed explanations of the chemicals and their effects.

Through the public involvement process, we learned of the public's concerns regarding the impact of these herbicides on non-target organisms. The public gained an increased understanding and acceptance of the use of herbicides in our reforestation program. The Allegheny Highland Diversity Study is a direct outgrowth of the public meetings, promised in the final Environmental Impact Statement as a mitigation measure. This study will extend our knowledge by testing the impacts of operational herbicide-shelterwood treatments on songbirds, small mammals, reptiles, amphibians, and herbaceous plants at ten locations across the ANF (Ristau 1995, 1997). It is a formal research study conducted by the Lab.

Red Bridge Sugar Maple Mortality Monitoring - Communicating the Importance of Silviculture through Inventory and Monitoring, and Partnerships

Inventory and monitoring can communicate the importance of silviculture by providing evidence of the scale of problems that require silvicultural solutions. When ANF managers realized in 1994 that sugar maple decline affected nearly 90,000 acres of the 500,000-acre Forest, silvicultural intervention was an immediate consideration. Allegheny Forest Plan objectives include maintaining continuous forest cover and producing high quality sawtimber. Of the 90,000 acres of mortality, about 11,000 have >50 percent mortality/decline, 30,000 have 20-49 percent, and 49,000 have 5-19 percent. Management options have been analyzed on about 76,000 acres. Based on a 1991 inventory conducted by the ANF, we know that on 70 percent of the ANF, plants that interfere with tree seedling development dominate the forest floor. This field trip site is a prime example, where even the seed source has been lost. The combination of overstory mortality and historic regeneration problems creates "forest decline." Reforestation is a key activity, but with such drastic forest change, managers are forced to work at the edge of their comfort zone with familiar silvicultural treatments. Adaptive management and monitoring become the norm.

Changing conditions, such as these, require ecological research to understand the reasons for change and research or adaptive management to develop or adapt silvicultural strategies to address changed conditions. The mortality is associated with many environmental stressors, and there is an aggressive multiagency interdisciplinary research program designed to assess the causes (Long and others in press) and develop appropriate long-term management responses. Stressors include three droughts within the last decade, defoliation of more than 70 percent of the ANF by one or more native and exotic pests, pollution stress (the Allegheny region receives some of the highest levels of nitrogen and sulfate deposition in the country), and nutrient poor, unglaciated soils. Sugar maple in the second growth forest is about twice as abundant as it was in the presettlement forest, and it appears on different landscape positions.

SUMMARY

Forest managers have relied upon the expertise of silviculturists and other specialists for treatment options in the day to day decision making of the management of our National Forests. One of our professional strengths is our ability to clearly define what impact silvicultural treatments can have on ecosystems, and how these actions can support the implementation of Forest Plans. Communicating the silvicultural message internally and externally can be challenging, but the rewards of doing so are great.

Communication can be strengthened by partnerships in our working environment. The Allegheny is fortunate to have a close working relationship with both the Northeastern Station and with State and Private Forestry in Morgantown, WV. The benefits of these partnerships show in the forest around us today and in the forest we are growing for the future.

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