

Silvicultural Research Needs In The Lake States: The Nature Conservancy Perspective

Introduction

The largest conservation organization in the United States, The Nature Conservancy uses a number of collaborative, entrepreneurial tools to achieve its mission:

To protect plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

Founded in 1951, The Nature Conservancy (TNC) focused its early efforts on land acquisition. Over the last 50 years, TNC has worked to protect over 98 million acres around the world. Today, TNC owns over 2 million acres, and we are 1 million members strong. As the organization has grown, so has the number of approaches available for biodiversity conservation. The use of silviculture to achieve conservation goals is an example of one science-based approach that is on the rise at TNC.

The Nature Conservancy and Forestry in the Americas

Over the last several years, TNC has become increasingly involved in active forest management on our own lands and the lands of our partners. Currently, it owns 250,000 acres of working forest land across the United States. Increasingly, timber production on TNC lands is certified through the Forest Stewardship Council (FSC). Internally, land managers earn their certification through the new Certified Resource Manager Program. Conservancy staff members serve on the boards of both FSC and the Sustainable Forestry Initiative.

To enhance our forest management capacity and that of our partners, TNC has developed a number of different forestry programs and tools. For example, the *Forest Management Network* (<http://tnc-ecomangement.org/Forest/>) has provided a forum and ongoing support for the development and implementation of silvicultural practices that are compatible with biodiversity conservation. TNC staff and partners have taken advantage of this forum in over 30 landscapes in the United States and Central America. TNC's *Conservation Forestry Program* was recently launched with the goal of working in partnership with private landowners to promote the economic productivity of working forests while protecting the ecological health and natural diversity of the landscapes in which they occur. The program recently published a "Forest Operations Manual" that describes on-the-ground operations for making our forests healthier, more diverse, and more valuable places in the future than they are today. This manual is designed as a "how-to" book for conservation forestry (<http://tnc-ecomangement.org/Forest/Resources/#FstOpsManual>). A number of other tools, such as a sample management plan and sample conservation easement, are available on the Forest Management Network Web site.

Some examples of the conservancy's early forays into the world of silviculture and timber management came from New England, including the Upper St. John River in Maine and the Atlas Timberlands Partnership in Vermont. Both projects are working forests with an emphasis on maintaining biological diversity. The Upper St. John River includes 180,000 acres of conservancy-owned lands purchased in 1999. Huber Resources is currently under contract as the land manager. The average annual harvest is 30,000 cords of saw logs and pulpwood. The Upper St. John is making

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use of riparian buffer and core reserve areas to complement the working forest portion of this project. FSC certification is in progress. The Atlas Timberlands project is a partnership between The Nature Conservancy and the Vermont Land Trust. FSC-certified in 2002, this 26,000-acre project is the third largest private ownership in Vermont. Through carefully designed silvicultural strategies, the goal for these lands is to produce high quality sawtimber and long-term profitability in addition to maintaining biodiversity values.

TNC's silvicultural activities in the Upper Midwest have geared up more recently than those in Vermont and Maine. To date, projects in the Great Lakes area have taken place on a smaller scale than in other regions, but with the potential to grow over time. For example, The Nature Conservancy of Minnesota recently purchased 7,300 acres of lowland conifer forest at the headwaters of the St. Louis River. UPM-Kymmene is under contract to develop an ecological management plan for these lands. Louisiana Pacific (LP) holds the timber rights on approximately 450 of TNC's acres in the project area. TNC's forester, UPM-Kymmene's ecologist, and LP's contract foresters and loggers collaborated on a plan for the timber sale that met the needs of all parties. Early efforts have focused on retaining trees after harvest, sustaining ecological reserves, and protecting natural regeneration.

Silvicultural Research Needs in the Lake States

In the Lake States, and more broadly wherever the conservancy has forest interests, the use of silviculture to further our conservation mission is part of the organization's adaptive management framework. TNC is a science-based organization, and a number of silvicultural research themes have emerged as TNC ventures into the world of forest management including:

1. Silvicultural techniques based on natural disturbance processes
2. Maintenance of biodiversity while ensuring a sustainable rate of economic return
3. Forest management at the appropriate scale in partnership with multiple landowners
4. Consideration of landscape context and cumulative impacts of forest management

Silvicultural techniques based on natural disturbance processes

An example of TNC's efforts to base silvicultural practices on natural disturbance processes comes from the Chequamegon Bay watershed of northern Wisconsin, where the Wisconsin Chapter recently purchased 1,000 acres from Nekoosa Papers. Under the State's Managed Forest Law (<http://www.dnr.state.wi.us/org/land/forestry/ftax/managed.htm>), 860 acres of the Caroline Lake preserve will be managed as productive working forest land. The conservancy hired a local forester to develop a forest management plan for these lands, which are dominated by even-aged northern hardwood forest, a mixture of sugar maple, birch, and oak.

Northern hardwood ecosystems are driven largely by small gap-phase dynamics. The silvicultural systems for this preserve were designed to match the natural disturbance processes. Long-term management goals include the development of an uneven-aged structure typical of mid- to late-successional northern hardwood forests and the promotion of underrepresented species such as red oak, yellow birch, white pine, and hemlock. With an emphasis on crop tree release, the plan emphasizes variable gap sizes, ranging from 20 to 70 feet in diameter. To maintain a continuous canopy, prescriptions will avoid reducing basal area by more than a third during a single stand entry.

Research designed to develop silvicultural practices based on the timing, frequency, size, and pattern of natural disturbance processes for the spectrum of forest ecosystems in the Lake States is a priority for TNC. Our forested preserves and partnerships with other landowners represent potential research sites for testing hypotheses about management and natural disturbance processes.

Maintenance of biodiversity while ensuring a sustainable rate of economic return

The Manitou Forest landscape is a 100,000-acre region in northeastern Minnesota defined by the watersheds of the Manitou, Caribou, and East Branch of the Baptism River in the North Shore Highlands of Lake Superior. Like the Chequamegon Bay project, most of TNC's silvicultural work in the Manitou Landscape to date has focused on northern hardwoods. Major landowners in this landscape include Lake County, the Minnesota Department of Natural Resources, the USDA Forest Service, The Nature Conservancy, Potlatch, and the Wolfwood Corporation. Several of these landowners came together in 2000 to form the Manitou Collaborative, a partnership dedicated to working together on mutual land management goals.

Managing northern hardwoods in this landscape comes with a special challenge: this particular forest ecosystem is at the northern edge of the range for many component species. As a result, the stature of trees in this forest is diminutive, compared to northern hardwood systems in Wisconsin and Michigan. Moreover, sugar maple is susceptible to frost cracking. Through the help of a grant from Minnesota's Coastal Program¹, the Manitou Collaborative is partnering with researchers at the University of Minnesota to develop silvicultural systems tailored to the particular growing conditions of this landscape.

The goals of the Manitou partnership are twofold. Like its counterpart in the Chequamegon Bay project, the Manitou project strives to improve the ecological condition of northern hardwood ecosystems, such as increasing structural complexity and species diversity. The more challenging goal lies in

designing silvicultural prescriptions that serve the dual purpose of managing for ecological attributes while producing quality sawtimber over the long term. The feasibility of achieving both ecological and economic goals for northern hardwoods in this landscape depends on the development of local markets for both intermediate and end products. Additional resources and expertise from TNC's Business Consulting Group will contribute to identifying solutions.

The lack of quality sawtimber and limited local markets for small diameter timber are not unique to the Manitou project. These and other challenges around the Lake States raise questions about how to develop silvicultural practices that both sustain or restore natural patterns of biodiversity and meet economic goals. As a community-based organization, TNC recognizes forestry as a centerpiece of the local economy. Unless silvicultural methods for working forests are economically viable, their usefulness for conservation is limited. We seek additional opportunities to partner on research on how to sustain the region's natural resource-based economy while maintaining biological diversity at multiple scales.

Forest management at the appropriate scale in partnership with multiple landowners

As with the Manitou Forest, a patchwork of ownership occurs at the Sand Lake-Seven Beavers landscape (named for two important lakes at the headwaters of the St. Louis River in northeastern Minnesota). The USDA Forest Service, Lake County, St. Louis County, the Minnesota Department of Natural Resources, and The Nature Conservancy have formed a working group to develop common management goals. The relationship among several of the partners was formalized through the signing of a Memorandum of Understanding in early 2003.

Before the working group was established, landowners each engaged in stand management without the benefit of understanding the larger landscape context. Past timber sales have been set up on the basis of ownership patterns, resulting in a cutting pattern that reflects ownership boundaries rather than natural patterns created by differences in soil, topography, hydrology, and past natural

¹ This project was funded in part under the Coastal Zone Management Act by NOAA's Office of Ocean and Coastal Resource Management in conjunction with Minnesota's Lake Superior Coastal Program.

disturbances. With the formation of the working group, there is potential for better coordination on land management in the future.

For example, rather than setting up several different sales for a 600-acre black spruce stand that spans four ownerships, a cooperative plan may be developed to manage the stand as a single ecological unit. Such an arrangement confers many benefits. Each partner saves on expenses. The operation would require fewer roads and would therefore be more efficient. Finally, this approach would foster natural patterns of regeneration designed to reflect what the land can best support, rather than the fragmentation that can result from uncoordinated management.

Managing at the appropriate scale and in coordination with other landowners also comes with a unique set of challenges, such as unaligned management planning cycles, interagency politics, and the logistics of managing land across ownership boundaries. Research in this new arena will help further the work of TNC and all land managers in developing approaches for sustaining multi-ownership landscapes.

Consideration of landscape context and cumulative impacts of forest management

For many project locations in the Lake States, TNC is using landscape context to inform stand management decisions, in an effort to better conserve biodiversity at multiple scales. Once landscape goals have been established, whether stand management decisions will actually meet those goals remains a vexing question.

To help find answers, TNC has begun research, through a project funded by the David H. Smith Postdoctoral Fellowship Program, to better understand ecological processes and cumulative effects of site actions in priority landscapes of the Great Lakes region. The project will develop modeling tools that help explore ways to enhance both biodiversity and timber values in large landscapes by adjusting the timing, type, spatial arrangement, and intensity of forest harvest and management activities. With the Manitou Forest landscape as a test case, the tools and principles

developed for this project will be broadly applicable to other landscape-scale forest conservation efforts.

Few tools and principles are available to help balance goals at both stand and landscape scales. Moreover, many are not user-friendly or are employed with little input from land managers. Research emphasizing the development of tools that help achieve land management goals at multiple scales is needed across the Lake States landscapes where TNC works with partners.

Conclusions

The use of silviculture as a conservation tool is on the increase for The Nature Conservancy. In recent years, the conservancy has invested heavily in working forest lands across the Nation, a trend expected to continue. TNC is eager to work with other researchers on testing innovative, ecologically based silvicultural practices in the landscapes where we work throughout the Great Lakes region. We also seek opportunities to partner with other landowners on mutually beneficial forest management projects within priority conservation areas.