

Chronic Regeneration Failure in Northern Hardwood Stands: A Liability to Certified Forest Landowners

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Abstract: Long-term overpopulation of white-tailed deer (*Odocoileus virginianus*) and a ubiquitous ground cover of Pennsylvania sedge (*Carex pennsylvanica*) have dramatically reduced or eliminated regeneration of commercially important northern hardwood species on approximately 35,000 acres of forestland owned by International Paper Company (IP) located in the southern Upper Peninsula of Michigan and northern Wisconsin. Silvicultural guidelines used for dense hardwood cover types are implemented to create all-aged stands. IP forestlands are certified to the International Organization for Standardization (ISO 14001) and the Sustainable Forestry Initiative® (SFI) Standard. During a 2004 third-party audit on IP lands, it was noted that natural regeneration was not established within five years of a harvest in accordance with SFI Performance Measure 2.1. IP will explore other land management options on the impacted acreage to ensure future compliance with these environmental certification programs.

Keywords: Hardwood regeneration failure; White-tailed deer; Pennsylvania sedge; Environmental certification

Introduction

During the week of September 27, 2004, an environmental performance audit was conducted on the forest ownership of International Paper Company (IP) in Michigan and Wisconsin. Auditors became concerned that certain tracts did not have adequate natural regeneration of northern hardwood species present within five years of timber harvest. The observation made on an IP management block commonly referred to as the Vega tract located in Dickinson and Menominee Counties, Michigan will have an impact on IP's preferred method of managing dense northern hardwood stands.

Background

International Paper, the world's largest paper and forest-products company, owns 444,328 acres in the Upper Peninsula of Michigan and 69,038 acres in northern Wisconsin, known as the Lakes States Region. IP's objective is to manage this forestland sustainably and profitably while conserving cultural sites and sensitive natural resources. Nearly all of the acres are enrolled under either Michigan's Commercial Forest Act (CFA) or Wisconsin's Managed Forest Law. Approximately 85 percent of these forestlands can be generally characterized as northern hardwood types. Management goals for the dense hardwood cover types are to achieve regulated all-aged sawlog quality stands. This is accomplished using marked selection harvests initiated on a 10 to 15 year cutting cycle. Post-harvest basal areas are approximately 70-80 ft². Pulpwood grade products help support fiber supply needs at the IP paper mill at Quinnesec, Michigan. Other products generated (e.g. bolts, sawlogs, veneer) provide income to the Company.

All of IP's ownership is certified under the International Organization for Standardization addressing environmental management systems, specifically ISO 14001 and the Sustainable

*A paper delivered at the Michigan Society of American Foresters "Forests & Whitetails-Striving for Balance" Conference
9-10 June, 2005 at the Little Bear Conference Center in St. Ignace, Michigan*



Forestry Initiative Standard (SFIS, 2004). Increasingly, customers of IP are demanding that their magazines and catalogs be manufactured from green certified fiber. Maintaining environmental certifications on its forest ownership is important to International Paper and the customers that use its products.

SFI certified landowners demonstrate that they manage their forestland in conformance with the Principles, Objectives, Performance Measures and Indicators of the Sustainable Forestry Initiative® Program. Most relevant to the lack of regeneration issue is SFI Objective 2 which states "...to insure long-term forest productivity and conservation of forest resources through prompt reforestation, soil conservation, afforestation, and other measures". The mandatory Performance Measure 2.1 for this objective further stipulates that within five years after final harvest, the treated area must be regenerated when using natural regeneration methods. In this instance, the managing forester prepared a silvicultural plan noting that the area was to be managed as an all-aged high quality northern hardwood stand. Natural regeneration was to be established within five years of the marked harvest. The auditor, while reviewing the harvest area, noted that the regeneration and sapling component of the stand was absent sufficient numbers of commercially important species to satisfy Performance Measure 2.1.

The Problem

Approximately 35,000 acres of IP's northern hardwood tracts in Menominee, Dickinson, and Iron Counties in Michigan; and Florence and Marinette Counties in Wisconsin have inadequate regeneration and a flourishing ground cover of Pennsylvania sedge (*Carex pennsylvanica*). The sedge and regeneration concern was first documented in 1978 and 1979 during a stand level forest inventory conducted by Champion International Corporation (prior owner to IP). Anecdotal file notes indicated concern over the occurrence of sedge as early as 1970.

A company deer browse survey was conducted at the 14,000 acre Vega Block during the summer of 1987. The Vega Block is located in northern Menominee and eastern Dickinson Counties. The report referenced Michigan Department of Natural Resources (MDNR) information that this region of NE-SW oriented drumlins is well documented as a historic deer yard with an estimated 200 deer / mi² during restrictive wintering conditions (Lee, 1988). Recently, the supervising MDNR biologist for the Western UP District characterized this region as the most important deer wintering area in the Upper Peninsula of Michigan. The Champion International Corporation report further characterized the hardwood stands as park-like with regeneration of commercial tree species heavily browsed or absent (Ibid.). Five miles south of the Vega Block in Menominee County is the IP owned Faithorn tract. At this location, Michigan State researchers have established that the deer population is >31 deer/mi² (Randall, 2005). A map titled "Relative Density of Deer for 2004 Deer Management Units" developed by the MDNR, Wildlife Division illustrates that Menominee, southern Dickinson and southern Iron Counties have relatively high deer populations. Recent data from Deer Management Units 022 and 255 indicated that deer populations exceeded 40 deer/mi² (Doepker, 2005).

IP foresters, as did their predecessors, recognized the potential of these tracts to grow commercially valuable northern hardwood species. They responded by applying tried and true uneven-aged management prescriptions developed over the past century that were being successfully employed throughout the majority of the quality northern hardwood stands in the Lake States Region (LSR Silvicultural Guidelines, 2004). The preferred management methods are no match to the primary and secondary consequences of a deer population that has far exceeded its carrying capacity for thirty or more years. The reality is that if we continue to manage these tracts by current IP silvicultural guidelines, without a dramatic reduction in deer numbers or proactive control of the sedge, we will be at risk of being issued a **nonconformance** by external auditors. When a nonconformance is found to be warranted, certification is at risk of being withheld until corrective action is implemented and results verified (SFIS, 2004).



Need vs. Perception

Both the State of Michigan and IP have options to remedy the long-term hardwood regeneration failures. First, MDNR can implement a strategy to reduce the deer population to a level below carrying capacity. Habitat recovery in this region of drumlins will be complicated because deer that winter here traditionally travel from a much larger area of the western UP. In short, deer numbers substantially increase in the winter (Doepker, 2005).

MDNR is facing a daunting task. Most hunters want more deer not less. A 1998 hunter survey conducted by Michigan State University in Menominee County found that many hunters believed that deer numbers were at a low level (5 deer/mi²) on the IP tracts (Bull, 1999). When told that the estimate was >30 deer/mi², they were incredulous. Support for doe reduction programs was also questioned for many believe that *"you can't have too many does because they produce the bucks"* (Ibid.). It is clear that the Wildlife Division staff of MDNR has a significant public education job ahead of them to change the long standing beliefs of most hunters. Current initiatives to address the problems associated with high deer populations include support for the voluntary implementation of Quality Deer Management (QDM) practices in a Deer Management Unit provided that two-thirds of the hunters and landowners surveyed support the program. A 2004 proposal to implement QDM in the entire UP failed to receive the necessary threshold of support (MDNR, 2005). Currently, there are experimental QDM regulations in four small DMUs in the vicinity of Dickinson and Menominee Counties. Complaints to Wildlife Division staff of low deer numbers indicate that continuing this initiative in these DMUs is uncertain. Early antlerless seasons have been offered only on private land in southern Menominee County. CFA land is treated as public and DMU allocations of any deer permits for use on public and CFA enrolled lands have not resulted in noticeable improvements to regeneration on the IP tracts.

A study of hardwood forest development under four deer densities (10, 20, 38, and 64/mi²) by the U.S. Forest Service in Allegheny Northern Hardwoods of Pennsylvania indicated that when a deer population exceeds 20 deer/mi² negative impacts to vegetation in a landscape will likely occur (Horsley, et. al., 2003). At population of 10 deer/mi², adequate hardwood regeneration became established in clearcuts. Regeneration was also evident in thinned and uncut areas as well (Ibid.). Conversations with a Wildlife Habitat Ecologist at the Forest Sciences Laboratory, US Forest Service, Durham, NH, stated that deer populations needed to be 10 deer/mi² or less to successfully regenerate northern hardwoods in the White Mountain National Forest (Yamasaki, 2005). New York Department of Environmental Conservation Biologists issue antlerless permits through the Deer Management Assistance Program to maintain the deer populations ~ 15 deer/mi² on forested ownerships and 10 deer/mi² when the objective is to re-establish hardwood regeneration (Reed, 2005). In neighboring Wisconsin, the Department of Natural Resources has established deer density goals at 50 to 70% of carrying capacity across northern deer management units in an effort to reduce a population estimated at 25 deer/mi² (Rooney et al., 2003). Seventy percent carrying capacity of Wisconsin's northern forest equates to 18 deer/mi² (WDNR, 1998). They also report that herbaceous plants may be reduced in abundance and species richness when deer exceed 12-15/mi² and abundance of trees and shrubs change with reduced regeneration when deer numbers exceed 20-25/mi² (Ibid). Therefore, this research and expert opinion would suggest that an existing deer population estimated to exceed 30 or 40 deer/mi² would need to be reduced to allow natural regeneration to become established, notwithstanding the need for sedge control.

IP Options

In addition to reducing deer densities, the second option is for IP to make decisions to bring this acreage, as it exists today with deer and sedge challenges, into meeting ISO 14001 and SFI compliance standards.

Feasible strategies within the control of IP include-

- Continue with an uneven-aged strategy with herbicide treatments to control the sedge to support establishment of regeneration.

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- Allow basal area to increase and canopy to close in an effort to reduce the sedge population before continuing with an uneven-aged strategy.
- Change to even-aged management system via shelterwood or clearcut with herbicide treatments to control the sedge.
- Convert the sites from current northern hardwood types to conifer plantations.
- Sell the affected acreage.

The IP Manager of Silviculture/Technical Services for Lake States Region has been focusing on finding a silvicultural solution to the regeneration problem over the last five years. Herbicide trials will be initiated in 2005 as a first step to determine the most effective way to sustainably manage northern hardwood stands that have been impacted by overpopulations of deer and site competition by the Pennsylvania sedge. The silvicultural system that will be used on these acres has yet to be determined. The supervising wildlife biologist of the Western UP District has suggested a meeting with the MDNR Wildlife Division staff and landowners (public and private) in the area of this large historic deer wintering area to discuss techniques to remediate the impacts of high winter concentrations of deer on the forest ecosystem. This type of forum would provide an opportunity for information exchange and may eventually result in a program to disperse winter concentrations of deer.

Discussion

The review of the literature adequately documents that long-term over population of white-tailed deer has a dramatic effect on a forest ecosystem. The mission of the MDNR, Wildlife Division is "*To enhance, restore, and conserve wildlife resources, natural communities, and ecosystems for the benefit of Michigan's citizens, visitors, and future generations*". Hunters may want to see more deer but the MDNR must continue efforts to bring the state's deer numbers to a level below carrying capacity. To do otherwise, is contrary to its mission; and a disservice to the deer resource that they are mandated to manage for the people of Michigan, the landowners whose forestland has been degraded by chronic overpopulation, and the prospect of attaining healthy functioning forest ecosystems in this region of the UP. Until then, IP will need to consider alternate methods over the preferred all-aged silvicultural system to manage impacted northern hardwood stands. One thing is clear; losing our ISO 14001 and SFI certifications is not an acceptable option for IP.

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