

An Economic and Ecological Analysis of: Northern Hardwood Single-Tree Selection Order of Removal Procedures and Evaluation of Red Pine Plantation and Aspen Forest Type Rotation Ages

Principle Investigator

Forrest M. Gibeault, ACF
 Analysis and Investments Operations Director
 Steigerwaldt Land Services, Inc.
 Tomahawk, WI

Statement of Objectives

To investigate forest conditions created on Native Community designated state lands, as well as public and private forestlands, by strictly following the Wisconsin Department of Natural Resources (WDNR) Order-of-Removal (OOR) tree marking guidelines, and to use alternative marking scenarios to evaluate the economic and ecological consequences of the OOR guidelines. The analysis was supported by field inventory efforts in northern hardwood forest stands marked for harvest.

In a second study, the WDNR rotation age guidelines for red pine and aspen are evaluated using discounted cash flow principles to identify financial optimum rotation lengths.

Summary of Key Findings

For the OOR studies, the alternative marking scenarios prioritized the removal of high risk trees (low Growing Stock classification) and often increased the economic value of timber designated for harvest. This result was significant on the Native Community timber sale analysis. In the sample of northern hardwood stands marked statewide, harvest value increased by 38 percent when all owners (state, county, and private MFL) are averaged together in one marking scenario model. Results suggest that simplifying the decision criteria for northern hardwoods, and allowing flexibility when using a marking guide, could increase financial returns. Removal of medium to large sawtimber, 14 inches and greater, would increase by applying a marking approach that more strictly follows maximum tree size management at sizes smaller than typically applied (24 inches).

Harvest Comparison All Plots					
	Existing	Scenario 1		Scenario 2	
	Value Per Acre	Value Per Acre	Percent Dif.	Value Per Acre	Percent Dif.
Cut	\$641.40	\$884.80	38.0 percent	\$740.60	15.5 percent
Leave	\$2,499.70	\$2,256.20	-9.7 percent	\$2,400.40	-4.0 percent
Total	\$3,141.00	\$3,141.00	-	\$3,141.00	-
	Polelimber (Tons)	Polelimber (Tons)	Percent Dif.	Polelimber (Tons)	Percent Dif.
Cut	19.2	26.9	40.2 percent	23.3	21.3 percent
Leave	43.0	35.2	-18.0 percent	38.9	-9.5 percent
Total	62.1	62.1	-	62.1	-
	Sawtimber (MBF)	Sawtimber (MBF)	Percent Dif.	Sawtimber (MBF)	Percent Dif.
Cut	885.8	1014.1	14.5 percent	812.4	-8.3 percent
Leave	4366.3	4238.1	-2.9 percent	4439.7	1.7 percent
Total	5252.2	5252.2	-	5252.2	-
	Basal Area (Sq. Ft.)	Basal Area (Sq. Ft.)	Percent Dif.	Basal Area (Sq. Ft.)	Percent Dif.
Cut	32.7	43.0	31.64 percent	35.8	9.67 percent
Leave	85.5	75.2	-12.09 percent	82.3	-3.70 percent
Total	118.2	118.2	-	118.2	-

The current rotation length regulation reduced financial returns from aspen harvests on only the better quality sites, while the red pine rotation regulation of 60 years reduced timberland financial returns on all sites. Financial returns for aspen could be increased by using a minimum age of ± 33 years for better sites, while 40 years is adequate for lower quality sites. Financial returns for red pine could be increased on better quality sites by allowing harvest at 45 years of age, while poor sites would be better suited for harvest at 55 years.

The green bars below show age classes containing areas eligible for harvest under the respective relaxed MFL scenarios that are outlined above. The aspen model contains 94,977 acres eligible for immediate harvest under the current guidelines. Relaxing harvest ages results in a 24 percent increase in harvest-eligible area. The red pine model contains only 9,042 acres eligible for immediate harvest under the current guidelines. This area increases to 43,273 with relaxed minimum harvest ages, a 378 percent increase in eligible area.

