

Northern Hardwood Regeneration Every Forester Wants: A 33-Year Case Study

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THE STAND: ASHLAND COUNTY FOREST COMPARTMENT 24, STAND 12

The stand is located approximately ¼ mile north of a residential area surrounding Augustine Lake in northern Wisconsin. The surrounding area is a mix of county owned forest and private forest land.

This stand underwent a single tree selection harvest in 1986 and again in the summers of 2006 and 2007. The stand is 138 acres and the primary forest type is northern hardwood (large sawlog size class [15+ inches d.b.h.], medium density [71–110 ft²/ac]), and the dominant overstory species are sugar maple² and basswood; yellow birch only accounts for 2 percent of the overstory. In 1986 the selection harvest reduced stand basal area from 135 ft²/acre to 85 ft²/acre. In 2004, the stand's basal area was 138 ft²/acre, and notes indicate heavy browse of dense sugar maple regeneration, and that marking needed to occur leaf-off due to the dense understory of sugar maple. After harvest, stand density was reduced to a residual basal area of 68 ft²/acre. Canopy gaps were created as opportunities were presented by marking several large nearby trees. The decision to reduce the stand's density lower than the standard 84 ft²/acre was largely based off an overstory that showed decline and was of fair to average quality. The habitat type is *Acer saccharum*-*Tsuga canadensis*/*Dryopteris spinulosa* (ATD).

Deer management unit deer densities from 2004 to 2013 averaged 15.6 deer/mi². The highest densities occurred in 2007 (20 deer/mi²) while the lowest occurred in 2013 (8 deer/mi²). Historical deer densities were similar ranging from 7 deer/mi² in 1983 to 19 deer/mi² in 1989, averaging 14 deer/mi² from 1983 to 1993. These data were based on old deer management unit 28; 2013 was the last year that data were calculated before the use of county units.

In 2006 the actual harvest was done with the use of a hot saw and tree length grapple skidding. In 2006 allowing such equipment to operate in this stand was a contentious issue among foresters working on the forest as some were of the opinion this equipment would cause too much damage. In March 2019, the stand was re-evaluated for the next harvest. We observed some interesting trends with regard to the abundance of yellow birch and sugar maple regeneration vs. ironwood and their relationship to stand density.

OBSERVATION

Excellent hardwood regeneration established in areas that were marked to an estimated residual basal area of 55 to 75 ft²/acre in 2004 (Fig. 1). Areas with an estimated basal area greater than 80 ft²/acre (80 to 110) in 2004 had very little regeneration and were dominated by ironwood and musclewood, including small canopy gaps in these areas (Fig. 2). In most stands, sedge cover averaged between 50 to 75 percent. Deer live in this stand year round as three sides of it are cedar swamp deer yards. There is browse, but it is not a limiting factor based on abundance of

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² Scientific names of tree species are in Table 1.



Figure 1.—Canopy gap regeneration. Basal area 55 to 75 ft²/acre. Courtesy photo by Matt Schultz, used with permission.



Figure 2.—No canopy gap. Basal area 80 to 110 ft²/acre. Courtesy photo by Matt Schultz, used with permission.

regeneration in adjacent portions of the stand. Past browse damage is visible on many sugar maple seedlings but they have been able to grow above the deer's ability to browse and are doing well. Soil maps show the same soil type across the stand. Because of the soil disturbance caused by the tree length skidding, outstanding yellow birch and some random northern red oak regeneration established and sugar maple regeneration is everywhere. Stands with larger canopy gaps/small groups resulted in the best regeneration of all species.

Table 1. Common and scientific names of tree species listed in this paper

Species	Scientific Name
Northern red oak	<i>Quercus rubra</i>
Sugar maple	<i>Acer saccharum</i>
Yellow birch	<i>Betula alleghaniensis</i>
Basswood	<i>Tilia americana</i>
Ironwood	<i>Ostrya virginiana</i>
Musclewood	<i>Carpinus caroliniana</i>

The content of this paper reflects the views of the author(s), who are responsible for the facts and accuracy of the information presented herein.

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