

# Hemlock

**Project Subject/Title:** Minocqua Thoroughfare

**Contact Person:** NHAL SF forester (retired WDNR Forester Tim Friedrich)

**Abstract:** The objective for this treatment is to develop old growth characteristics in mesic hemlock hardwood, white pine and red oak forests on the NHAL SF. Variable density thinning (136 acres) and patch shelterwood (6 acres) silviculture methods were used to promote and increase vigor of long-lived species as well as maximize old growth characteristics. Long-term objectives include uneven-aged management in these forest types and maintain/increase aesthetics in the area. Forest reconnaissance, regeneration and down woody debris surveys were conducted post-treatment. This site is used as a demonstration area for silviculture training.

**Trial Location:**

**County:** Oneida

**Township:** 39N **Range:** 7E **Section:** 17, 18

**GPS Coordinates:** Lat: 45.870506 Long: -89.656809

**Property Name:** Northern Highlands American Legion State Forest – Clear Lake Recreation Management Area (Minocqua, Wi)

**Site Map:** See *Figure 1*.

**Baseline Stand Data:**

- *Cover Type:* Hemlock, White/Red Pine with some Oak
- *Acres:* 143 Acres (Stands 4, 5, 7, 10, 11, 18, 20, 25)
- *Habitat Type:* ParVAa, ATD, ATM
- *Soil Type:* Sayner loamy sand, Padus-Pence sandy loam, Karlin fine sand
- *Year of Origin:* 1848 – 1924
- *Total Height:* 76 – 125
- *Site Index Species and Site Index:* Eastern white pine, red pine, Eastern hemlock, Northern red oak. Ranges from 50 – 67
- *Mean Stand Diameter:* 10 – 24
- *Total Basal Area per acre:* 63 – 145
- *No preharvest tree regeneration was noted*

**Prescription and Methods:**

- *Type of prescription:* Variable density thinning, patch shelterwood (with patches up to 2 acres), and free thinning with 50 ft. plus gaps, one per acre. No artificial

regen or post-harvest activities. Natural regeneration is anticipated in patches and gap openings.

- *Year initiated:* 2016 – 2017
- *Establishment methods:* Stand was harvest in 2016 and 2017 with patches, gaps and skips while leaving many mature trees on site. Leave trees include hemlock, yellow birch, white pine, and red oak. This will allow for natural regeneration from seed trees in these areas.
- *Data collection methods:* The stand was visited in the summer of 2020 to collect post-harvest data. Plots were taken throughout the stand that included 10 BAF variable radius plot, regeneration plot (Forest Regeneration Metrix 1/300<sup>th</sup> acre plot), deer browse percentage and down woody debris(dwd) transects. Crown cover, presence of duff, and habitat type were observed.

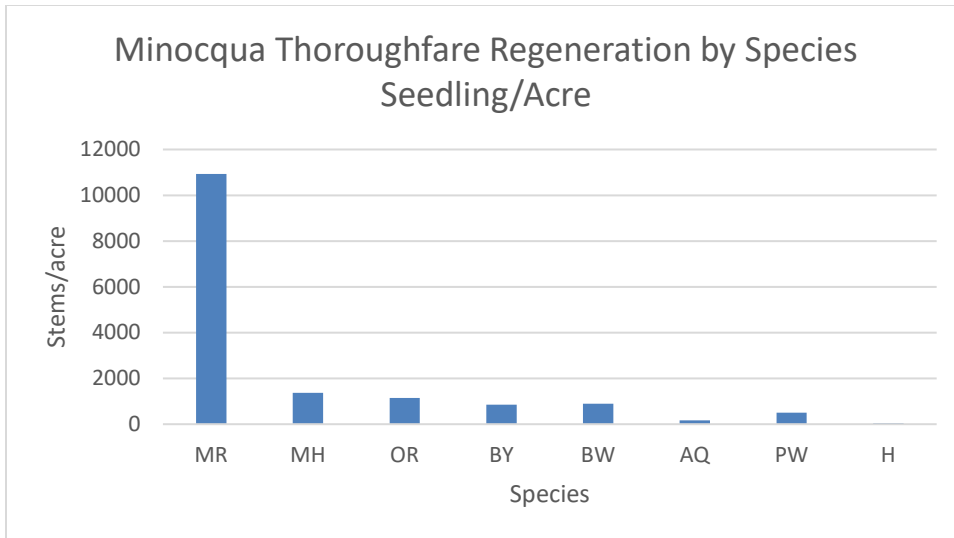
### **Results**

After the harvest, a field survey was completed in summer of 2020 highlighting regeneration, down woody debris and basic forestry reconnaissance. Sixteen random plots were established collecting data on seedling species, size, number, and distribution; and browse.

**Regeneration-** The seedling data mainly consisted of stems under a foot in height (figure 1.) and only a few areas had advanced regeneration > one foot in height. Red maple was the dominant species in both the matrix and gaps of this timber sale comprising over 76 % of the species composition in the understory. Sugar maple and white birch were the 2<sup>nd</sup> and 3<sup>rd</sup> dominant species – white birch was found in many of the gaps and patches. Although hemlock and white pine regeneration were observed throughout the harvest area, they were not in significant numbers on the plots. Pennsylvania sedge was a significant understory herb throughout the stand with minimal evidence of other understory species.

Most plots had a > 50% browse rating specifically on red maple and red oak. Deer trails and deer pellets were commonly found throughout the stand. Deer were even seen while collecting data.

**Down woody debris-** The dwd diameter averaged 5.7 inches in diameter and 9 feet in length with a decay class of 2 (mostly intact log, starting to decay). The duff layer was present throughout the area averaging about an inch of organic material above mineral soil although Pennsylvania sedge mats with no duff was common.



**Figure 1. Tree regeneration- average stems per acre by tree species**

**Discussion/Recommendations:**

Patch shelterwood and variable density thinning are relatively uncommon silviculture practices. This project demonstrates a variety of techniques to enhance old growth characteristics while encouraging a diversity of tree regeneration. Although this data and analysis represents only 3 years after treatment, a few notable observations are apparent. The dominance of red maple is a common response after harvest in many northern hardwood stands and can outcompete other species as seen in this trial. Since there was no site preparation and minimal down woody debris, species such as yellow birch and hemlock have difficulty with establishment. These species respond to a mix of mineral soil and organic substrate in the seed bed to germinate as well as minimal competition.



The dwd assessment results are consistent with other hemlock trials where the average diameter of dwd ranges from 4 inches up to 6 inches. Management for dwd can help enhance conditions for species such as yellow birch and hemlock, however, deliberate measures to develop large diameter snags for future woody debris are needed. The picture to the left depicts a live hemlock tree growing on an old stump in the timber sale area.

Earthworm assessment was not conducted but an abundance of Pennsylvania sedge in the understory was present throughout the stand. This species is sometimes an indicator of earthworm impacts and/or high deer browse.

**Fig. 2 Hemlock growing on decayed stump**

In summary, the results show that a few factors may be impacting tree regeneration such as deer browse, minimal soil substrate (coarse woody debris) and little site preparation for target species such as yellow birch and hemlock. The results also show that achieving the objectives may take a long-term effort with a sequence and timing of steps in the regeneration process. Follow-up will continue on this trial.

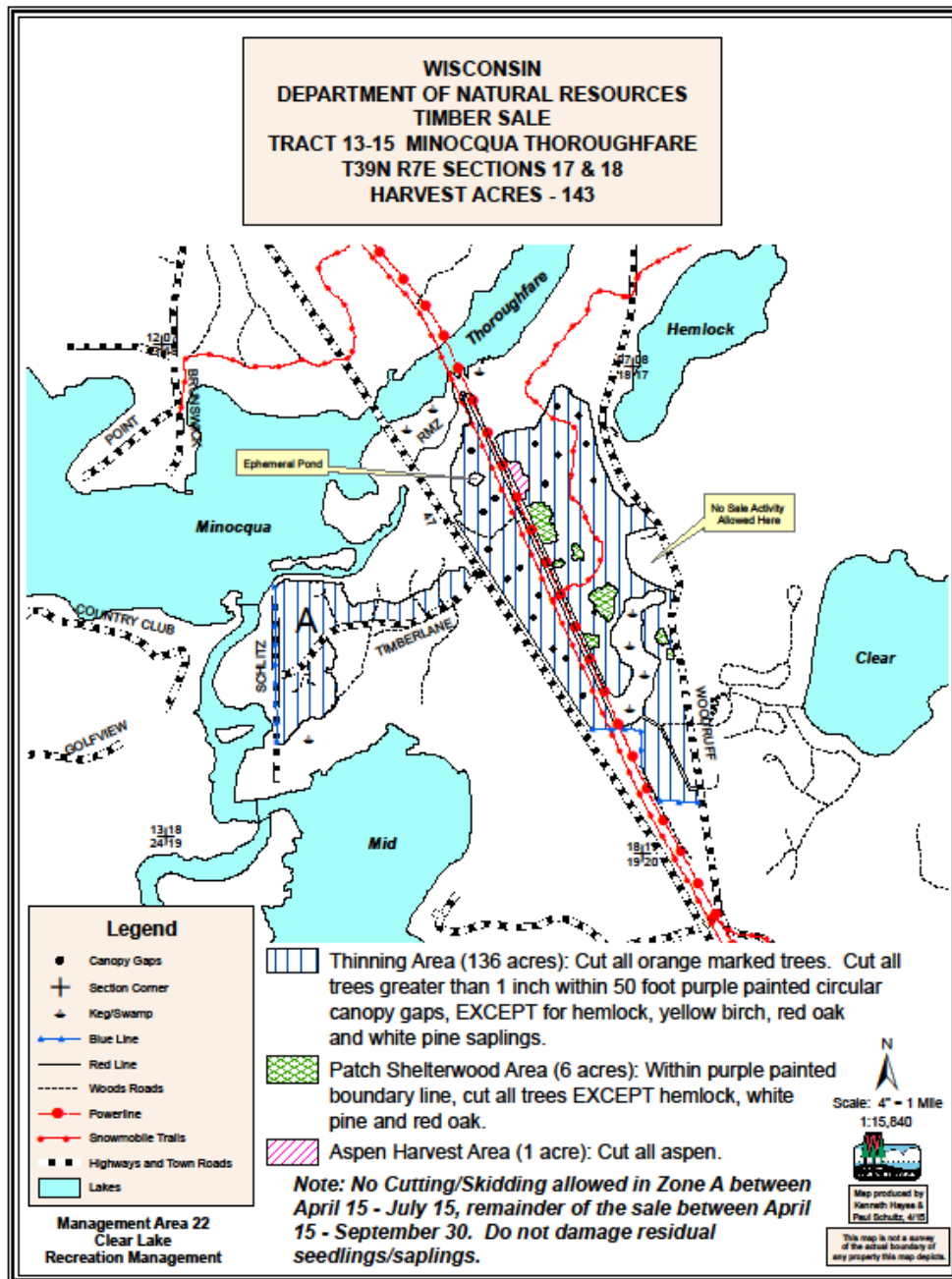


Figure 3. Minocqua Thoroughfare Timber sale map