5.3 ICE AND WIND DAMAGE

BACKGROUND

Tornadoes, hurricanes, ice storms, and floods can damage the forest.

Although hurricane-size storms rarely strike New England, expect damaging wind storms every 15 to 30 years. Species and forest types vary greatly in resistance to wind damage. White pine is most susceptible—as much as 80 percent of the volume was damaged in the 1938 hurricane. Hemlock trees also were damaged. Spruce-fir (especially the fir) is next in susceptibility to losses from wind. Northern hardwoods are least damaged; the 1938 hurricane produced losses of about 10 to 20 percent, even in heavily damaged stands. Factors other than forest type also affect vulnerability to wind. They include:

- Exposure to wind. (Noticeable in the mountain notches that characterize central and northern New Hampshire.)
- Soil depth and soil moisture. (Shallow and wet soils are worst.)
- Stand age. (Large, overmature stands are most susceptible.)
- Stand density. (Heavily thinned stands are most at risk.)

OBJECTIVE

Prepare forests to withstand ice and wind damage and when damage occurs, make informed forest management decisions.

CONSIDERATIONS

- Damage from natural factors such as wind, snow, and ice regularly occur in New Hampshire's forests. This damage is a normal part of natural-ecosystem functioning and an important factor in creating a diverse forest structure by providing dead and down woody material, wildlife trees, and openings for regeneration.
- Microbursts, in-line winds, tornadoes, hurricanes, and ice-forming events can cause economic damage. No amount of silvicultural preparation can eliminate the risk of catastrophic damage.
- Healthy trees blown over with roots intact will remain alive and free of insects and pathogens for many months.
- Ice storms cause most forest damage at elevations between 1,000 and 3,000 feet and within hardwood stands. Softwood branches naturally point down. Under extreme weight they sag down and in rather than bend and break like hardwoods.
- It isn't necessary to quickly salvage standing, live, ice-storm-damaged trees. It takes many years for previously healthy trees to succumb to a single severe ice storm. Discoloration and decay travel from the damaged branches into the stem of the tree only a few inches to a few feet per year. Breaks in the main stem are more severe than breaks of the secondary branches. Decay fungi and rot will affect the product quality and strength of the tree.
- Salvaging trees damaged by an ice or wind storm can be difficult and dangerous; often only a portion of the original timber value is recouped.
- Fire hazard can increase with severe storms that accumulate large amounts of debris, if followed by severe fire weather.

RECOMMENDED PRACTICES

Wind Damage

- ✓ Maintain a diverse forest to spread the risk, especially by limiting the acreage in susceptible types such as mature white pine on wet soils.
- ✓ Consider the rooting depth, butt flair, crown size and soil profile when planning a partial harvest in overstocked stands. Trees growing for long periods in tight conditions or on shallow or wet soils are at risk of windthrow from moderate to severe wind. Limit partial harvests in susceptible stands to no more than one-third of the basal area, and perhaps leaving an uncut buffer on the windward side of the stand.
- ✓ Position thin strip cuts so that prevailing winds skip across the narrow width rather than down the full length of the strip, orienting strips at right angles to the prevailing winds. Position larger openings so that prevailing winds cross at the narrowest point.
- ✓ Remove high-risk trees that have stem cankers, forking tops, or signs of internal decay such as visible rot, cavities, or conks.
- ✓ Consider even-aged management in locations where repeated occurrence of wind damage is evident, e.g., stands naturally growing in mosaics of even-aged groups because of localized wet or shallow soils or exposure to high winds are candidates.
- ✓ Post-windstorm actions:
  - Determine the footprint of the storm.
  - Determine the percentage of trees blown over with roots intact versus trees broken above the stump, and salvage broken trees first. There is no need to immediately remove trees blown over with tops and roots attached.

Ice Damage

- ✓ In forests with signs of previous branch breakage and top dieback, remove trees with weak or hazardous branch structure. Trees with branches forked in a V-shaped crotch are weaker than those with the stronger U shape.
- ✓ Post-ice storm actions:
  - Determine the footprint of the storm.
  - Inventory to determine the percentage of trees damaged and the average amount of branch breakage by species; salvage according to the following guidelines:
    - Trees with less than 50 percent branch breakage are likely to recover, except for paper birch.
    - Trees with greater than 75 percent branch breakage and trees with any bole breakage below the live crown are unlikely to produce a high-quality tree for future harvest.

CROSS REFERENCES

2.1 New Hampshire Forest Types; 2.2 Forest Structure; 2.3 Regeneration Methods; 6.2 Cavity Trees, Dens and Snags; 6.3 Dead and Down Woody Material.

ADDITIONAL INFORMATION

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Shortle, W.C., K.T. Smith, and K.R.Dudzik. 2003. *Tree Survival and Growth Following Ice Storm Injury*. USDA For. Serv. Res. Pap. NE-723. http://www.fs.fed.us/ne/newtown_square/publications/research_papers/pdfs/2003/rpne723.pdf Accessed March 9, 2010.

Shortle, W.C., and K.T. Smith. 1998. *Tree Biology and Ice Storm '98*. UNH Cooperative Extension, Durham, N.H. http://extension.unh.edu/resources/files/Resource000987_Rep1127.pdf Accessed June 7, 2010.