

Rationale

One of the primary goals of the Lakes District SBFEP program is “To demonstrate that the forest resources are being adequately managed and conserved in the area covered by the plan” (1999-2004 FDP). An independent audit of the SBFEP identified windthrow as an issue that needed to be addressed. In response to this audit, these guidelines were developed to provide consistent direction on behalf of the SBFEP.

These guidelines are not intended to be a comprehensive review of the mechanics or management of windthrow but are meant to be a checklist to consider while writing silviculture prescriptions. As such, these guidelines should not be considered “set in stone”, on site evaluation and experience should take precedence.

These guidelines are not meant to restrict the decision-making ability of the people completing the prescriptions, instead they are intended to assist the forester in fulfilling forest management objectives.

Windthrow Introduction

Wind force and the trees resistance to overturning determine windthrow resistance. Four basic factors affect windthrow resistance:

- Tree and Stand characteristics
- Root-soil zone characteristics
- Topographic exposure characteristics
- Meteorological conditions.

It is imperative that all of these influencing factors are assessed and taken into account while completing silvicultural prescriptions. Factors of importance should be noted and a decision rationale should be included in the final copy.

Local Information

In order to assist foresters working within the Lakes District the following notes are important:

1. The prevailing winds within this district are from the south/southwest, which results in windthrow on the north/northwest boundaries of the openings.
2. The majority of windthrow in this district has been found upon soils with a moderate to high clay content and most often in saturated conditions.
3. Harvest boundaries established on the top edge of gullies or depressions are more susceptible than boundaries that are established over the crest or to the bottom of the gully or at least part way down the slope.

(This information was the result of an independent study undertaken by Stronstad Forestry Services during the 2000 field season and completed in January 2001)

4. The majority of the timber to be harvested in this district is either lodgepole pine or hybrid spruce.
 - Lodgepole pine is usually of a uniform age and stand composition that makes it susceptible to windthrow after disturbance
 - Lodgepole pine has a long, cylindrical trunk with a low ratio of crown that makes it susceptible to windthrow after disturbance.
 - Lodgepole pine is windfirm in a contiguous stand or with openings less than one hectare.
 - Spruce has a plate-like rooting pattern, large crown and a preference for moist sites that make it susceptible to windthrow after disturbance.
5. Areas within the SBFEP chart that have a history of windthrow include, but are not limited to, Tercer, Maxan Lake, Binta-Ootsanee, Kasdorf and Tatalaska Forest Service Roads.

Guidelines

Through the combination of existing knowledge on BC windthrow mechanics and local knowledge gained from an independent study, the following guidelines are recommended in order to achieve good windthrow management practices.

1. If the location of boundary within a moderate or high-risk area is unavoidable, edge feathering should occur with removal of no more than 15-20% of the total number of trees.
2. Edge feathering should include good tree selection practices, with trees removed in the following order of preference:
 - unsound trees (including diseased, deformed, forked, scarred, mistletoe and root rot infested trees;
 - trees with asymmetric or stilt roots;
 - trees growing on unstable substrates (e.g. rocky, saturated);
 - tall non-veteran trees, especially with any of the above features or with disproportionately large crowns.
3. In high density, single storied stands edge thinning is not recommended as the contiguous nature of the stands has a great effect on the windfirmness.
4. In areas that are vulnerable to windthrow, leave reserve strips between blocks that are at least 500m in width.
5. Stands with high levels of root and butt rot infestation should be considered a high-risk windthrow area.
6. When locating small leave patches, ensure they are located on deep, well-drained soils or other sites that have a low windthrow hazard.
7. When using group selection or patch cuts, ensure that all high-hazard areas are either completely logged or adequately buffered.

8. If a partial cutting silviculture system is to be used on a high-hazard site, no more than 15-20% of the basal area should be removed in the initial harvest. In this case, the most vulnerable stems should be removed first, especially those with disproportionately large crowns or poor rooting conditions.
9. Trees with a height-diameter ratio of greater than 100 have a higher windthrow potential (e.g. a 35cm dbh tree at a height greater than 35m).
10. If recommendations regarding thinning are made, only prescribe low intensity thinnings (<25% removal) on high hazard windthrow sites.
11. If possible, include areas with shallow soils or poor drainage completely within an opening. As an alternative leave a buffer of well-drained soils (and therefore well-rooted trees) between the saturated or restricted rooting zone and the opening edge.
12. Ensure that when assessing soils during the silviculture prescription fieldwork that limiting soil conditions are identified in regards to the windthrow hazard.
13. The north/north-west boundaries (unless local evidence suggests different prevailing winds) should be located on sites that are considered low risk, specifically:
 - deep, well drained soils;
 - in valley/gully bottoms or part way down a slope when the wind is perpendicular to a ridge;
 - midway down a slope if the wind is parallel to the ridge or hilltop.
14. In areas of high risk, block boundaries should be smooth and uniform with no sharp corners or indentations that are exposed.
15. Be sure to consider the surrounding landscape, complex terrain resulting from a heterogeneous canopy or multiple openings can induce considerable turbulence and therefore encourage windthrow.
16. Leeward stands are usually windfirm even on high hazard sites and, if necessary, the south/south-west boundaries may be located on moderate to high hazard sites (unless on-site indicators are contrary).
17. If an area has a high windthrow hazard, ensure the silviculture prescription includes not only identification and mitigation measures but also flexibility to harvest the potential windthrow through amendment after the initial harvesting is finished.
18. Overall, ensure that the windthrow hazard has been assessed and mitigation measures (or lack thereof if other priorities are to take precedence) along with the rationale is included in the final copy of the silviculture prescription to demonstrate active management of the windthrow issue.

This document was created with Win2PDF available at <http://www.daneprairie.com>.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.