Impacts of precommercial thinning on snowshoe hare in Quebec's eastern balsam fir-white birch boreal forest

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INTRODUCTION

In north-eastern North America, the increased use of precommercial thinning (PCT) has become a source of concern in relation to wildlife (Homyack et al. 2001). In Quebec, hunters and trappers associations and wildlife societies also have commented about its potential negative impact on the habitat of several early succession species following clear-cutting (Sansregret et al. 2000). The drastic reduction of stem density following mechanical PCT and the rapid increase in the surface area treated in Quebec since late 1980's is the major cause for this concern (Gouvernement du Québec 2002).

Snowshoe hare (*Lepus americanus*) is identified as an indicator species for sustainable forest management at the sapling stage (McLaren et al 1998). It is closely dependent on this stage for cover and food (Litvaitis et al. 1985), and is considered as a keystone species supporting predators such as the Canada Lynx (*Lynx canadensis*) and the American marten (*Martes americana*) (Boutin et al. 1995).

OBJECTIVES

Evaluate the short-term impact of mechanical PCT on the snowshoe hare.

(i) assess the dynamic of snowshoe hare habitats following PCT;

(ii) compare the use by snowshoe hare of PCT stands and controlled unthinned stands;

(iii) describe snowshoe hare habitat use pattern in a landscape dominated by PCT stands;

(iv) assess efficiency of mitigation measures.

STUDY AREA (Figure 1)

Eastern balsam fir (*Abies balsamea*)-white birch (*Betula papyrifera*) bioclimatic sub-domain. Being in proximity of large population center, this is an intensively used forest region for both wood production and forest recreation. This research was conducted in Forêt Montmorency, a 66km² research forest managed since 1966, and in public land managed by Stadaconna paper. At the beginning of the study the sapling stands were good habitat for snowshoe hare.

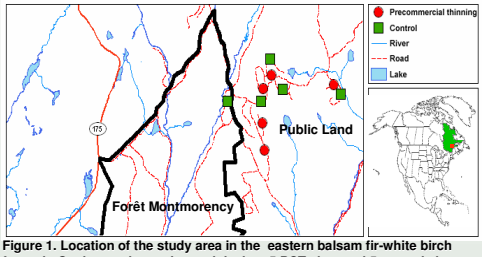


Figure 1. Location of the study area in the eastern balsam fir-white birch forest in Quebec and experimental design: 5 PCT sites and 5 control sites (6-9 ha).

Unthinned stands

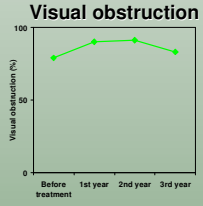
20 000 Stems/ha:

41 % conifers

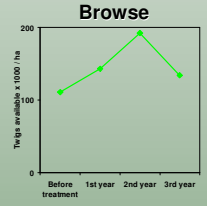
59 % deciduous

Photo 1. A naturally regenerated site used as control.

Visual obstruction

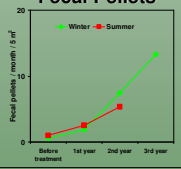


Browse

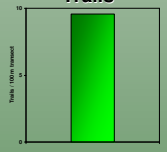


Hare densities

Fecal Pellets



Trails



PCT stands

4000 Stems/ha:

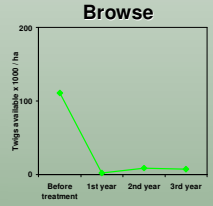
75 % conifers

25 % deciduous

Photo 2. A naturally regenerated site treated by precommercial thinning, the winter after treatment.

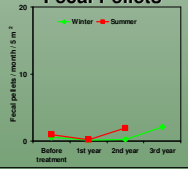
Visual obstruction

Browse

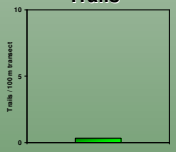


Hare densities

Fecal Pellets

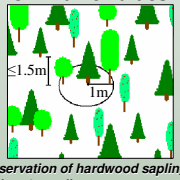


Trails



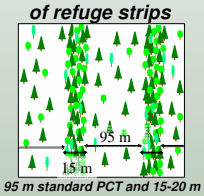
Experimental mitigation measures

PCT with conservation of wildlife values



- *Conservation of hardwood saplings within a 1m radius*
- *Full conservation of shrubs less than 1.5 m in height*
- *Conservation of fruit trees*

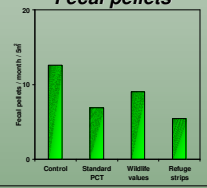
PCT with conservation of refuge strips



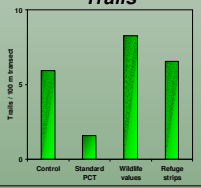
- *95 m standard PCT and 15-20 m unthinned strips*

PCT 8 years results

Fecal pellets



Trails



Avoidance of PCT in landscape dominated by treatment

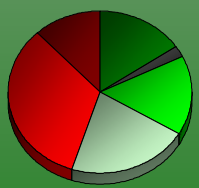
Legend

PCT influence

- PCT ecotone
- PCT stands

- Sapling stands
- Mature – Sapling
- Mature stands
- Mature fragments

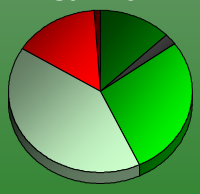
Available habitat types



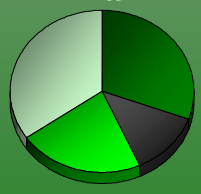
VS

Used habitat types

Summer



Winter



Conclusion

PCT are avoided by snowshoe hare in the short term

- *Treated areas under-utilized in summer*
- *No use of thinned stands in winter*
- *Low hare density indices in PCT*

Untreated ecotones, unthinned and residual forests were used as refuges

Loss of good habitat at a critical moment

- *Low visual obstruction in PCT*
- *Lake of food availability in PCT*

Duration of impact on habitat

- *8 years after PCT, "wildlife values PCT" is a better habitat than standard PCT*

Management recommendations

- *Adoption of mitigation measures at the stand level*
- *Consider maintaining more conifer stems in PCT stands*
- *Disperse spatially and temporally treated areas*
- *Don't treat ecotones between mature and sapling stands*
- *Keep untreated sapling stands at the landscape level*

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