

Baltic ForBio, WP 2, GA 2.4

Information about Demonstration Site and Demonstration of Early Thinning for Wood Fuel/Energy

Country	<i>Finland</i>
Region	<i>North Karelia</i>
Demonstration Site ID	<i>Forest Estate 146-408-24-20</i>
Year/Date of the Thinning	November 2020
Topic	<i>Forest is artificially regenerated spruce stand with naturally growing broadleaved species due to unmanaged forest site during the last 20 years. The site will be harvested as energy wood in order to improve growing conditions for the leaving trees. The energy wood harvesting is based on multi-tree cutting with harvester & forwarder configuration.</i>

Information about the Forest Stand

General Information

Forest Stand ID	<i>Forest Estate 146-408-24-20</i>
Area [ha]	15 hectares
Age [years]	20 years

Tree Species

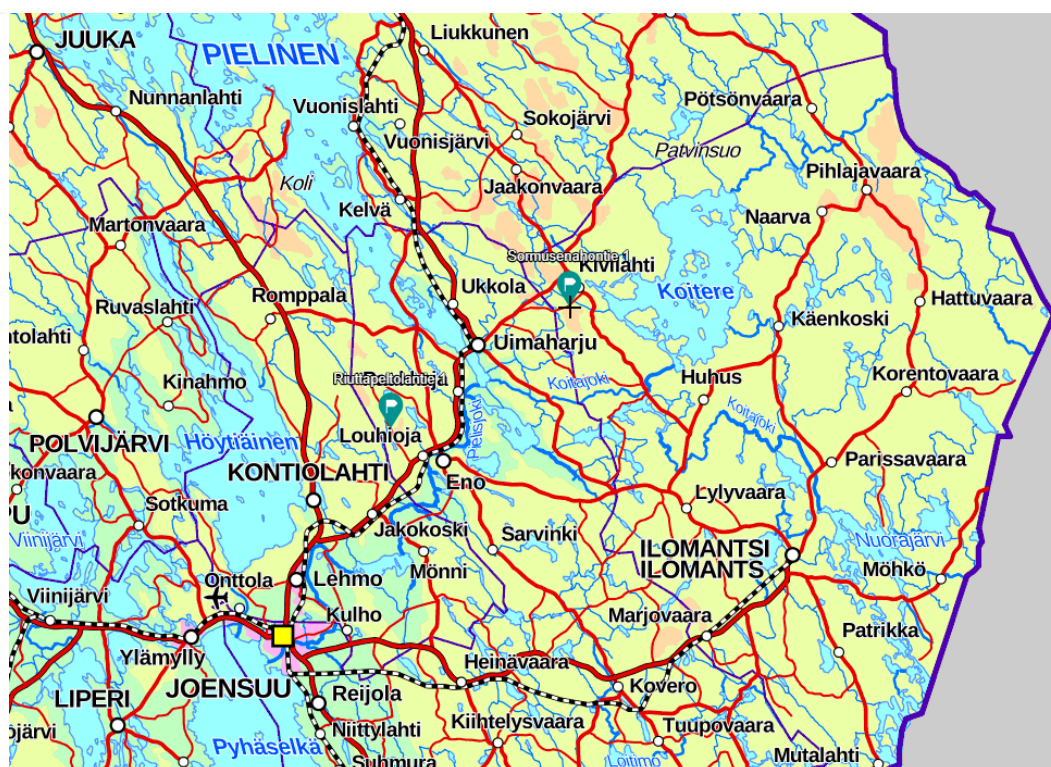
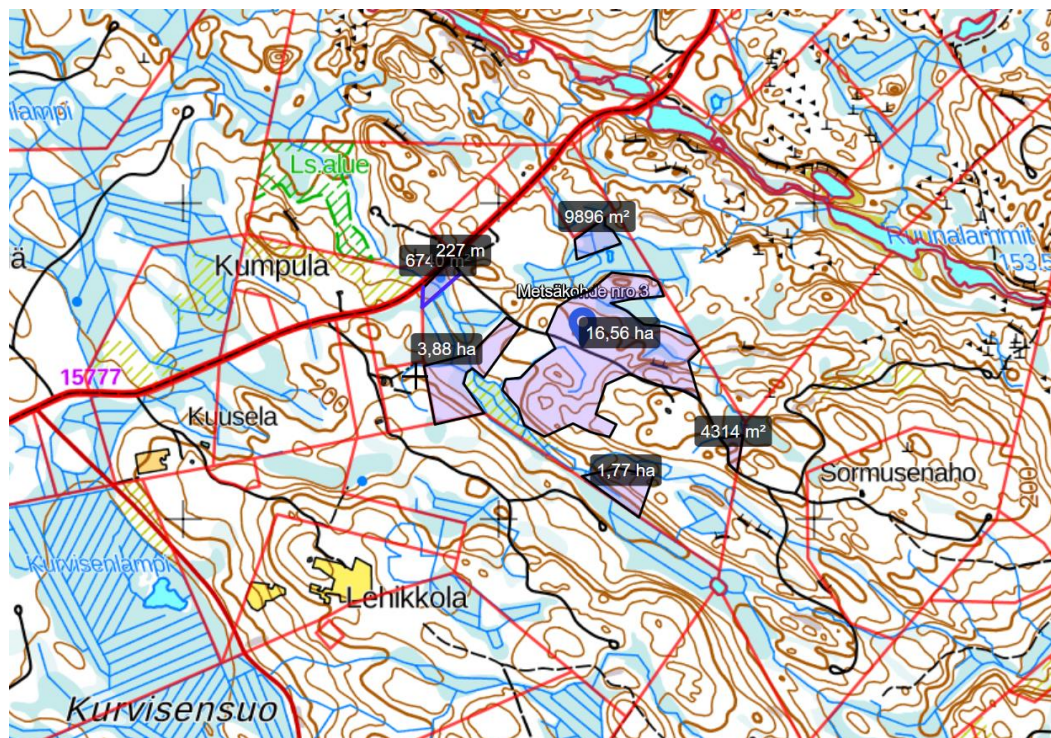
Tree species in mixed stands (%): Birch 60%, spruce 30% and 10% pine.

Terrain and Soil Conditions

Terrain with small hills, fresh soil growing blueberries and covered with moss, good bearing capacity of the soil enabling the harvest operations during the summer and winter time (snow cover), the terrain height at the level of 190-220 meters over the sea surface.

Map with the Location of the Demonstration Site

Location of the forest site (Sormusenahontie 1, Ilomantsi):



Stand Description Before Thinning

Diameter at breast height (arithmetic mean) [cm]	7
Tree height [m]	9
Number of trees per hectare [N/ha]	6,400
Volume [m ³ /ha]	160

Objectives of Forest Management

Brief description:

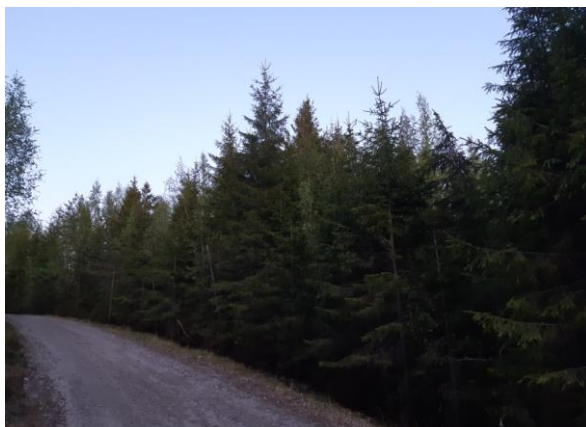
- *The general objectives of forest management in this forest stand (midterm perspective): To achieve the good growth state for the forest site because of the site has been without forest management practices after its forest regeneration.*
- *The last measures of forest management that have been conducted in this stand (if any): Spruce planting 20 years ago.*
- *The objectives connected to the planned early thinning (planned effects on the forest stand, wood production,): To grow the forest as mixed stand for spruce and birch after energy wood harvesting as thinning operation.*

Pictures *Before* Thinning

Ten pictures of the forest stand before the thinning (photos taken 2.6.2020):



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Stand Description After Thinning:

Dbh (arithmetic mean) [cm]	8
Tree height [m]	10
Number of trees per hectare [N/ha]	2,000
Volume [m ³ /ha]	90

Pictures After Thinning

Eight pictures of the forest stand directly after thinning:







Damages to Trees and Soil

Description of the damages to trees and soil caused by harvesting and forwarding procedure:

There are quite many damages to the remaining trees. In average, the stem damages were 2 cm² but these cases were quite many. Most probably they were caused by the harvester head. The tree crowns were in good condition. In some places the soil was damaged by the harvester and forwarder drive. In some places the tracks were more than 10 cm deep and over 5 meters long.

Thirteen pictures describing the damages to the soil and tree stems.













Thinning Method

Description of Working Process:

The main characteristics of the applied harvesting methods and the expected advantages:

Thinning is based on the multi-tree cutting in order to improve the work productivity to the profitable level. The best trees are left to the stand based on their stem and crown structure. The other characteristics can be seen in the videos by listening the operator's statements.

Machines (incl. pictures):

The forest machines used for harvesting and forwarding with their most important/notable technical features and the reasons why they were chosen for the demonstration.

Harvesters are Komatsu 901TX equipped with the conventional C93 harvester head capable for the multi-tree cutting and Valmet 911.3 equipped with Moipu 400ES purpose build energy wood harvester head. Forwarder is Komatsu 845 equipped with the crane scale. Multi-tree handling devices increase the work profitability in small tree harvesting compared to single-tree handling.

Attachments:

- Map with forest stand (general map/detailed map)
- Pictures of the forest stand before thinning
- Pictures of the forest stand after thinning
- Pictures of the machines, see the video in Luke Youtube Channel