



Network of knowledge for efficient
private forests

**O4: Good practice examples in
optimization of forestry**

**Vätteskogen, Sweden
-implementing
Continuous Cover Forestry
in a Boreal Forest**

Author:

Back Tomas Ersson

PhD in Forest Management

SLU Skogsmästarskolan

(Swedish University of Agricultural Sciences,
School of Forest Management)

June 2021



Co-funded by the
Erasmus+ Programme
of the European Union



1. What is Vätteskogen, and who owns it?

Forestry in Vätteskogen takes into account the economic, ecological and social values of the forest. This assertion means that the forest is managed from a holistic perspective (**Figure 1**). In order to reach this objective, it was decided to manage the forest using Continuous Cover Forestry (CCF).

Vätteskogen encompasses approximately 240 ha in total, and was founded in 2018 with the help of seed money from the regional board of Västmanland county (**Figure 2**). The landowners are the state-owned company Sveaskog (circa 200 ha) and Skinnskatteberg's municipality (circa 40 ha). SLU Skogsmästarskolan (the School of Forest Management at the Swedish University of Agricultural Sciences) is the third collaborative partner in Vätteskogen.

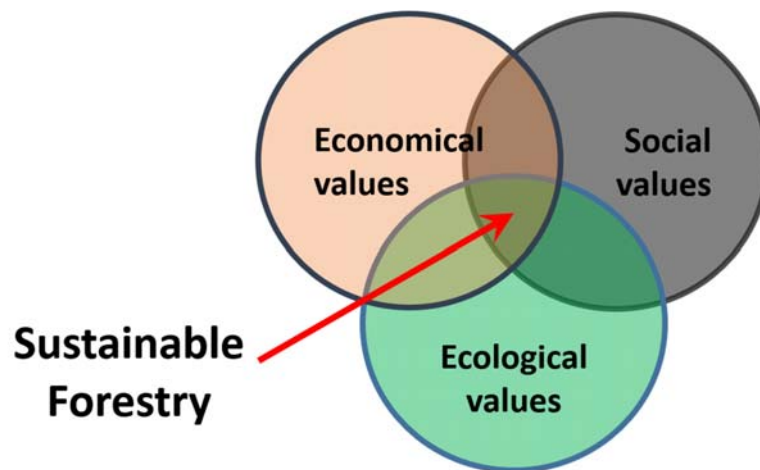


Figure 1. Sustainable forestry is forest management which takes into account the forest's ecological, economic, and social values.

2. Where is Vätteskogen located?

Vätteskogen is an urban forest along the eastern border of the town of Skinnskatteberg, Västmanland. There are many frequently visited forest stands in Vätteskogen (**Figure 3, top**). Within Vätteskogen there are illuminated running trails, mushroom and berry stands, ski trails, Mulleskog (forest stands used as a playground by preschoolers), mountain biking- and hiking trails (**Figure 3, bottom**), Borntorpet's yoga center, and Kolarbyn Ecolodge, also known as Sweden's most primitive hotel. Along the southeastern edge of Vätteskogen lies Skärsjön, Skinnskatteberg's most popular swimming spot.

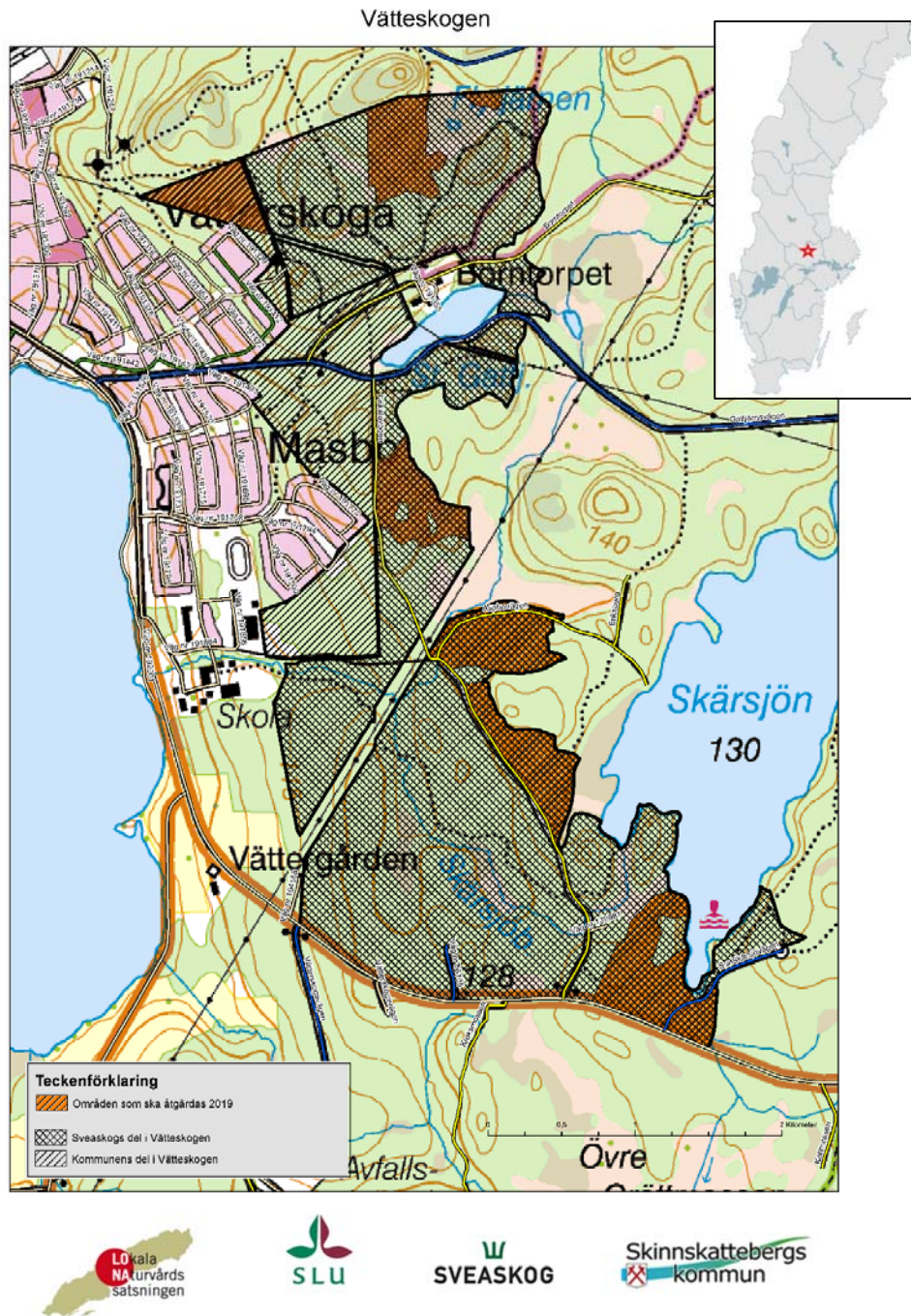


Figure 2. Map of Vätteskogen, and its location in relation to the town of Skinnskatteberg and the rest of Sweden (the little map of Sweden, where the star indicates Skinnskatteberg). Below the map are the logos of Vätteskogen’s main funding body (Swedish Environmental Protection Agency through LONA-funds) and its three collaborative partners. On the large map, the single striped lines indicate land owned by Skinnskatteberg municipality, the double striped lines indicate land owned by Sveaskog, and the orange polygons show where CCF cuttings were conducted 2019-2021. Map from Sveaskog.



Figure 3. Most of Vätteskogen's forests are visitor-friendly and are appreciated by both municipal residents and national / international tourists. (top). Fiskelevägen, the main forest road in Vätteskogen, is a popular biking and walking route that is also used for ski trails in winter (bottom). Photos: Back Tomas Ersson.

3. Why was Vätteskogen founded?

Vätteskogen lies close to urban areas and has many visitors: local (municipal residents), regional (Västmanlänningar who visit Skärsjön in particular), national and international visitors (mainly visitors to Kolarbyn and Borntorpet). Among the local population and ecotourism entrepreneurs, there was a wish that the landowners in Vätteskogen (Sveaskog and Skinnskatteberg municipality) would take into better account the forest's social values during forest management.

In 2017, Skinnskatteberg's municipality and SLU Skogsmästarskolan (located in the municipality) identified a lack of knowledge about how to incorporate social values during efficient management of boreal forests, and how to manage Vätteskogen with regard to roundwood production as well as the forest's ecological, economic and social values. (**Figure 4**). In response to this knowledge gap, Vätteskogen was founded with the help of a government-funded LONA project, and the project has aimed to “develop management methods for boreal forests with high social values that sustain and promote all the values of the forest”.



Figure 4. In Vätteskogen, sustainable forestry is pursued where trade-offs are made between (clockwise from top left) economic profitability; visitor-friendly forests; ecological values including biodiversity; and roundwood production. Photos: Back Tomas Ersson and Karl-Erik Johansson.

4. How is Vätteskogen managed?

Vätteskogen has a steering committee consisting of foresters from Sveaskog, Skinnskatteberg municipality and SLU Skogsmästarskolan. In order to achieve social sustainability in the management of Vätteskogen, the steering committee decided early on that stakeholders should be **involved** (step 3 in the 5-step Ladder of Participation, **Figure 5, top left**), which means that the stakeholders' opinions and proposals would be taken into account throughout the whole process.

Vätteskogen's stakeholders were identified in 2018 by sending an invitation to all associations and ecotourism companies in the municipality. In the end, 15 of them chose to participate in Vätteskogen. During several meetings and workshops (both indoors and in the forest, **Figure 5**), a representative of each stakeholder (association or ecotourism company) identified the stakeholder's current use of Vätteskogen (location and frequency of use), made wishes about the forest stands' future function and form, and rated different types of silvicultural measures and management proposals. Based on this input, the steering committee determined that CCF was the best forest management system for advancing all of Vätteskogen's values.



Figure 5. Vätteskogen involves local associations and ecotourism companies that use the forest, and participatory planning is a central component of forest planning in Vätteskogen. Clockwise from top left: the Public Participation Spectrum / Ladder of Participation for determining the stakeholders' degree of engagement in the participatory planning; gathering at Borntorpet for a field trip with Vätteskogen's stakeholder group in the spring of 2018; visit in the autumn of 2018 with some of the associations and companies in Vätteskogen's stakeholder group at the site where the patch in Figure 6 was later opened up; evaluation in the autumn of 2020 by Vätteskogen's stakeholders of completed CCF cuttings. Photos: Back Tomas Ersson. Diagram adapted from International Association for Public Participation, www.iap2.org

Continuous cover forest management includes several different silvicultural systems such as single tree/group selection, plenterwald, shelterwoods, and patch cutting. Shelterwoods and patch cutting are especially important systems for Continuous Cover Forestry (CCF) in boreal forests when managing pioneer tree species. Pioneer species such as pine (*Pinus sylvestris*), birch (*Betula pendula/pubescens*), aspen (*Populus tremula*), and willow (*Salix caprea*) were identified by the stakeholders as especially desirable tree species in Vätteskogen.

When shaded, pioneer tree species grow poorly or not at all, and therefore patches (gaps) have been cut in both older (**Figure 6**) and middle-aged pine stands in Vätteskogen. These patches will hopefully allow multiple cohorts of pioneer species to grow within the same stand.



Figure 6. Patch cutting is one of the Continuous Cover Forestry (CCF) methods used in Vätteskogen to try to regenerate pioneer species such as pine (*Pinus sylvestris*) and birch (*Betula pendula/pubescens*). This patch of 0.3 ha was created in January 2021 in the pine stand between Kolarbyn and Skärsjön's swimming area. Photo: Back Tomas Ersson.

Spruce (*Picea abies*), however, is the climax tree species of the boreal forest, and spruce grows well when shaded. Therefore, in spruce stands, we can use silvicultural systems where individual/single trees are harvested, such as during selection cutting and plenterwald. But how should you choose and communicate exactly which trees/stems to cut? Because in cost-efficient forestry in the boreal forest, we usually use different people to plan the cutting (planners) than those who actually cut the trees (machine operators/loggers).

In order to enable efficient and accurate communication between planners and machine operators in Vätteskogen, we developed a decision support that is used by both planners and operators/loggers (“Toolbox for Continuous Cover Forestry”, **Figure 7**). The decision support helps the planner to identify and clearly communicate the outline for the harvest (for example through simple written limits specified in a site prescription), after which the operator/logger chooses exactly which trees are subsequently cut. In the decision support, you first choose tree species, then the basal area, then the crown class, and finally the spatial distribution of the trees to be harvested (in that order). The "toolbox" has been tested with good results by both planners and machine operators during training exercises (**Figure 7, right**) and actual harvests.

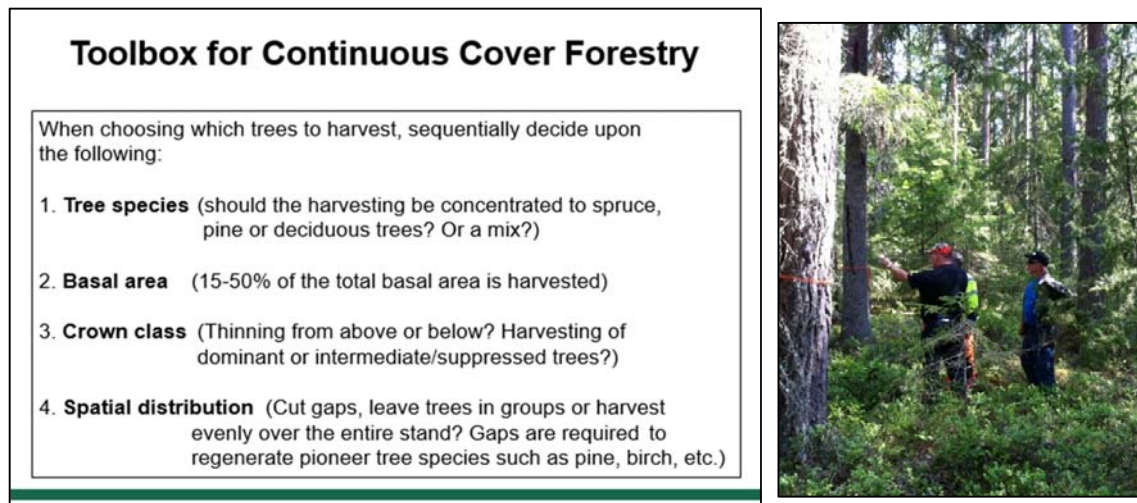


Figure 7. Left: the decision support used in Vätteskogen for selection cutting during CCF (usable for both single tree selection and group selection harvesting). Firstly, you decide which tree species to harvest, then you decide what proportion of the stand's basal area should be harvested (the extracted basal area determines the strength of the cutting), then you choose the crown class to which the harvested trees should belong, and finally you decide the spatial distribution of the harvested (or remaining) stems. Right: machine operators, forest workers and forest officials practice using the decision support when choosing which stems to harvest in a selection cutting exercise in Vätteskogen June 2019.

5. Summary

Forestry in Vätteskogen must be sustainable and all of the forest's values are to be balanced from a holistic perspective. To enable socially sustainable forestry, Vätteskogen's stakeholders needed to be involved in the forestry planning process. To better take into account the stakeholders' opinions and proposals, Continuous Cover Forestry (CCF) was chosen as Vätteskogen's forest management system (instead of clear-cutting which is today the most common forest management system in the Swedish boreal forest).

Participatory planning and the Ladder of Participation have been important tools for formulating detailed management objectives in Vätteskogen. Patch cutting has been a key method in the implementation of CCF cuttings in pine stands. And when planning and accomplishing cuttings in spruce stands, the decision support tool “Toolbox for Continuous Cover Forestry” has been of significant value.

During stakeholder evaluations of completed cuttings in Vätteskogen, it has been shown that CCF is not a magic wand that makes all stakeholders happy. But despite this fact, both Vätteskogen's stakeholders and the steering committee agree that using Continuous Cover Forestry (rather than clear-cutting) makes it easier to maintain all of Vätteskogen's values.

Additional reading about Vätteskogen and the Continuous Cover Forestry performed within its boreal forest

Björk, A. 2018. Participatory planning in a case of urban disputes about the forest – stakeholder analysis and preference study in the area around Skärsjön, Skinnskatteberg. Swedish University of Agricultural Sciences, SLU Skogsmästarskolan. Examensarbete 2018:08. [Bachelor thesis]. <https://stud.epsilon.slu.se/13562/>

Ersson, B.T. 2020. Hyggesfritt skogsbruk [Continuous Cover Forestry]. Swedish University of Agricultural Sciences, SLU Skogsmästarskolan. Publication from EU Erasmus+ project Net4Forest. <https://pub.epsilon.slu.se/19134/>

Karlsen, T. 2021. Harvester productivity during felling in selection harvesting. Swedish University of Agricultural Sciences, SLU Skogsmästarskolan. Examensarbete 2021:xx. [Bachelor thesis].

Karlsson, O. 2020. Goal-driven classification of the forest's social values. Swedish University of Agricultural Sciences, SLU Skogsmästarskolan. Examensarbete 2020:08. [Bachelor thesis]. <https://stud.epsilon.slu.se/16005/>

Pershagen, K. & Westerlund, J. 2020. Continuous Cover Forestry methods for the development of social values within an urban forest –Project Vätteskogen in Skinnskatteberg's municipality. Swedish University of Agricultural Sciences, SLU Skogsmästarskolan. Examensarbete 2020:05. [Bachelor thesis]. <https://stud.epsilon.slu.se/15954/>