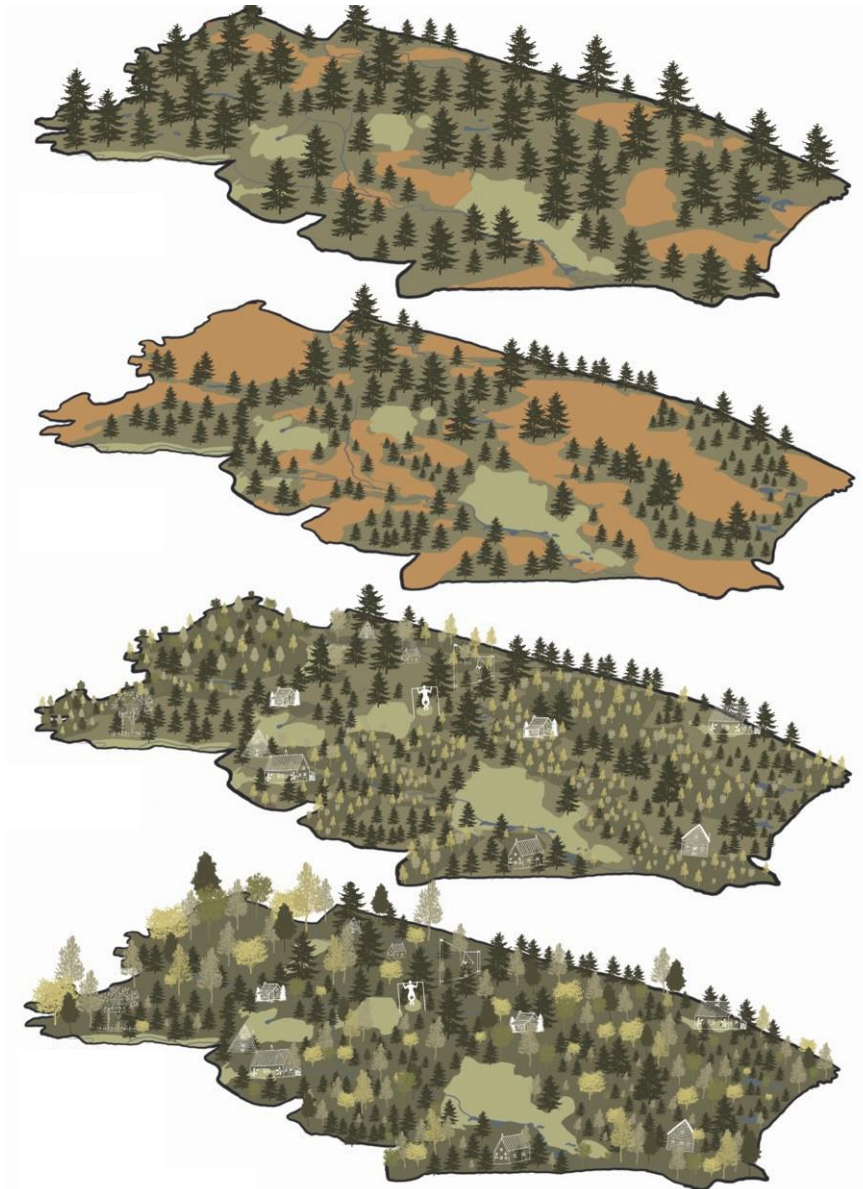


CLEARCUT TOURISM

A FRAMEWORK FOR A FOREST REGENERATION INITIATIVE BASED ON SUSTAINABLE FORESTRY AND PUBLIC PARTICIPATION INVOLVEMENT



TAMARA HADHAZI

Independent Project in Landscape Architecture, 30 hp

Swedish University of Agricultural Sciences, SLU

Department of Landscape Architecture, Planning and Management

Landscape Architecture Master's Programme

Alnarp, 2023



CLEARCUT TOURISM – A FRAMEWORK FOR A FOREST REGENERATION INITIATIVE BASED ON SUSTAINABLE FORESTRY AND PUBLIC PARTICIPATION INVOLVEMENT

TAMARA HADHAZI

Supervisor: Arne Nordius, Swedish University of Agricultural Sciences, Department of Landscape Architecture, Planning and Management

Examiner: Anna Peterson, Swedish University of Agricultural Sciences, Department of Landscape Architecture, Planning and Management
Azadeh Shahrads, Swedish University of Agricultural Sciences, Department of Landscape Architecture, Planning and Management

Credits: 30

Level: A2E

Course title: Independent Project in Landscape Architecture

Course code: EX0852

Programme/education: Landscape Architecture – Master’s Programme

Course coordinating dept: Department of Landscape Architecture, Planning and Management

Place of publication: Alnarp

Year of publication: 2023

Cover picture: Overall change in the forest landscape, by Tamara Hadházi, 2023

Copyright: All featured images are used with permission from the copyright owner.

Keywords: *sustainable forestry, landscape architecture, clearcutting, sustainable tourism, ecosystem-based forestry, single-tree selection, clearcut-tourism, sustainable business model, environmental psychology, environmental education, ecosystem services, detached tourism*

Swedish University of Agricultural Sciences

Faculty of Landscape Architecture, Horticulture and Crop Production Science

Department of Landscape Architecture, Planning and Management

ABSTRACT

Swedish forestry (and forestry in general) is a long-term investment that should last through generations. Some generations are only putting in the money to take care of it and not seeing much profit. Sometimes there is a point, where an individual landowner decides, it is time to get at least some income by clearcutting the forest. The state and other marketing systems convince landowners that clearcutting is the only economic harvesting method (Swedish Forest Industries, 2022), whereas the wood from a young and severely thinned forest will never be equal to the quality of wood that an older tree can provide which has been chosen carefully to be felled.

Clear-felled forests create enormous scars in the landscape, leave animals without shelter by separating them from their habitats, and the carbon that has been tied down in the forest's carbon sink gets emitted to the atmosphere, pushing us ever so closer, little by little, to a drastically changed climate that is not suitable for us nor most species on Earth. To create a positive change, we must depend on individuals, such as forest owners and their willingness to protect nature as best they can by using their resources.

This master's thesis explores the possibility to create changes that all matter in protecting our natural values. The thesis offers a framework for landowners to change their ways of forestry in order to gain income from sustainably controlled tourism by letting tourists help regenerate forests on a heavily thinned or clearcut area without creating a nature reserve, thus being able to practice forestry in a more environmentally friendly manner. Some landowners buy the land already bare, and some just want to change their ways of harvesting.

Allowing tourists to plant the forest themselves will automatically create a connection between them and the land, which is often missing in our forever rushing and digital world. This prospect is briefly explored in this work through literature study and results from questionnaires. By letting the public plant the land, the landowner not only receives labour from them, but through the experience, they get environmental education that can only come from first-hand knowledge.

The result of the thesis will present comparisons between potential changes in the landscape, should this framework be realised.

PUBLISHING

Approved students' theses at SLU are published electronically. As a student, you have the copyright to your own work and need to approve the electronic publishing. If you check the box for **YES**, the full text (pdf file) and metadata will be visible and searchable online. If you check the box for **NO**, only the metadata and the abstract will be visible and searchable online. Nevertheless, when the document is uploaded it will still be archived as a digital file.

If you are more than one author you all need to agree on a decision. Read about SLU's publishing agreement here: <https://www.slu.se/en/subweb/library/publish-and-analyse/register-and-publish/agreement-for-publishing/>.

YES, I/we hereby give permission to publish the present thesis in accordance with the SLU agreement regarding the transfer of the right to publish a work.

NO, I/we do not give permission to publish the present work. The work will still be archived and its metadata and abstract will be visible and searchable.

PREFACE

The idea of working with forestry matters as a landscape architect student came from a previous course I took on SLU, which was called *Explorations into landscape architecture*. Even though I already had a bachelor's degree in the same discipline, this course was different in a way that I was introduced to the profession from a more Scandinavian perspective, rather than a Central European one which was what I was used to, coming from Hungary.

As today climate change is a pressing matter, during the first part of the course we focused on big landscapes in Northern Sweden and how they would change due to global warming, including the boreal forests and the forestry industry in general. I found myself both deeply traumatised and interested in the overexploitation of forests and how it contributes to climate change.

Growing up, I had a deep connection with the woodlands in Hungary, as we visited one almost every weekend with my family, doing various activities such as endurance hikes, where we had to collect stamps at different locations, taking hikes with the dogs, or just a big family walk in the nature.

As a naïve young adult, my perception was that all forests of the world were as lush as ours through the country (see later on Figure 15), thus I felt a deep sense of shock and sadness when I passed many clearcut areas in Sweden by train. In our modern world it is almost natural to society that every material is available for us to use conveniently and for that not only nature pays the price, but soon humanity will too, due to its consequences. Perhaps that is why I felt so dedicated and excited to come up with a proposal that can shift our perspectives on how we handle our resources.

I only encountered one clearcut in my country, so when we were introduced to the effect that intensive forestry has on our climate, and how Swedish forestry is built up, I felt called to work with the matter.

ACKNOWLEDGEMENTS

Thank you *Mats Öhagen* for the many valuable insight and support you have given me alongside memorable conversations.

Thank you, *Jake Swindells*, for supplementing another perspective and encouragement.

Thank you, *Ida Ek Mitchell*, for always giving me useful tips, valuable ideas, and most of all emotional support.

Additional thanks to *Mikael Karlsson* from Ecoforestry foundation, *Tim Ozkurt* from Mossy Earth and *Rickhard Lantto*.

TABLE OF CONTENTS

INTRODUCTION	15
BACKGROUND/PROBLEM DESCRIPTION	15
We are losing the old forests.....	15
Detached tourism	18
AIM, RESEARCH QUESTION AND DELIMITATIONS	20
Aim	20
Research questions.....	20
Limitations	20
TARGET GROUP(S)	21
METHODOLOGY	21
Supporting literature	21
Reference projects.....	21
Getting insight through questionnaires	22
Site study.....	22
Analysis.....	22
Design process	23
PART I – FOUNDATIONS.....	24
SITE STUDY	24
Geographical location	24
Forest type.....	25
Choosing the site.....	28
HARVESTING METHODS.....	30
Today’s forestry practices in Sweden	30
Ecosystem-based forestry as a solution	34
PART II – GETTING INSIGHT	36
QUESTIONNAIRES	36
Tourism.....	36
Landowners.....	40
ANALYSES.....	43
Travel trends and patterns	43
Perceived Sensory Dimensions (PSDs) analysis on the site.....	45
Discussion about potential arguments	50

PART III	51
POSITIVE INFLUENTIAL SHORT CASE STUDIES	51
Alladale Wilderness Reserve, Scotland	51
Wildwood EcoForest, Canada	52
Laphroaig	53
Mossy Earth	54
Forestry practices in Hungary	54
Payment for Ecosystem Services (PES)	57
Ecotopia Österlen.....	61
CONCLUSION PART III: HOW WILL THE FRAMEWORK COMBINE THE REFERENCES ABOVE?.....	62
PART IV – PROPOSAL.....	64
FRAMEWORK.....	65
Description.....	65
Map of the resort.....	68
Accommodations	70
Planting system and planting kit.....	73
Maintaining the connection.....	75
An equal distribution of forest stands	78
CHALLENGES & SOLUTIONS	80
Harvesting methods	80
Finances	81
Grazing.....	85
Attractiveness.....	86
Negative impacts of tourism	87
DEVELOPMENT OF LANDSCAPE VALUES.....	89
Change in the landscape – PSD analysis update after implementation	89
Impacts on the landscape	95
Overall change in the landscape	98
PART V – NARRATIVE	101
PART VI – DISCUSSION.....	110
Research questions.....	110
SWOT	112
Tourism	114
Next steps.....	115

Conclusion	117
REFERENCES	120
LITERATURE.....	120
ORAL REFERENCES.....	125

LIST OF FIGURES

Figure 1: Forest Insight's interactive maps. *Skogsinsikt, 2023*: <https://skogsinsikt.se/en/skogen-i-bild/fore-och-efter-avverkning/r42-area1/>

Figure 2: Geographical location of chosen sample site, Gullaskruv, Nybro municipality, Sweden.

Figure 3: A more mature hemi-boreal plot on the sample site.

Figure 4: Skogsstyrelsen's GIS felling data.

Figure 5: various hiking distances on site.

Figure 6: Low retention cut area in Gullaskruv, potential additional wind damage, loss of forest biodiversity.

Figure 7: Questionnaire question: the frequency of posting on SM when on vacation

Figure 8: Q: does the participant feel present on their vacation while posting on SM?

Figure 9: Q: does the presence of SM negatively impact the respondent's ability to feel relaxed?

Figure 10: International visitors may possibly arrive to the site from a 700 km buffer zone.

Figure 11: National visitors may arrive to the site from an 80 km buffer zone.

Figure 12: Existent Perceived Sensory Dimensions on the sample area in Gullaskruv based on P. Grahn's method.

Figure 13: Hidasi-völgy (Valley Hidasi) in the Eastern-Mecsek Landscape Protection Area, 2022 spring.

Figure 14: Hidasi-völgy, January 2023.

Figure 15: A marvellous example of old growth trees that are preserved in Hungarian forests

Figure 16: Vision of the site's overall change after implementation of the framework.

Figure 17: Sign showcasing how the forest should look like comparing it with the low-retention cut background.

Figure 18: A map of the resort showcasing different accommodations and activity points.

Figure 19: A part of Treeline Obstacle course at Silva Renatus

Figure 20: An outdoor cinema made by Nelson Treehouse.

Figure 21: Cabin "Betula" – a more modern tiny cabin with a greenhouse for the seedlings in a coniferous forest

Figure 22: An example of the interior of the greenhouses at each cabin

Figure 23: Planting guide for educational purposes and for correct installation.

Figure 24: Stainless steel name tags applied on the "eternal trees", to mark the contribution.

Figure 25: Wall of Contributors in the Visitor Centre of Silva Renatus

Figure 26: Creation of wooden name plaques to apply to the Wall of Contributors

Figure 27: Perceived Sensory Dimensions in Year 0.

Figure 28: Perceived Sensory Dimensions in Year 20.

Figure 29: Perceived Sensory Dimensions in Year 50.

Figure 30: Impacts on the landscape before and after implementation of Silva Renatus.

Figure 31: Overall change in the landscape.

Figure 32: Increase in clearcut areas between 2006 (left) and 2020 (right) on the sample site.

Figure 33: Year 2 of Silva Renatus, first stages of planting.

Figure 34: Year 30 of Silva Renatus

Figure 35: SWOT analysis

Figure 36: Silva Renatus logo.

LIST OF TABLES

Table 1 – the rate of visitor contribution based on the length of their visit.

Table 2: Cost categories of restoration activities applied on Project Silva Renatus

Table 3: Economic results of ecosystem-based forestry management in Lübeck

ABBREVIATIONS

BCR: Benefit to Cost Ratio

CBA: Cost-Benefit Analysis

CC: climate change

ESS: Ecosystem Services

GHG: Greenhouse gases

GIS: Geographic Information Systems

IUCN: International Union for Conservation of Nature

PES: Payment for Ecosystem Services

PSD: Perceived Sensory Dimensions

PSU: Problematic Smartphone Usage

SM: Social Media

SWOT: Strengths, Weaknesses, Opportunities and Threats (Analysis)

TCC: Tourism Carrying Capacity

“We must provide pathways for global development that work with rather than against nature, and we need to give the communities affected a seat at the table.”

– Sir David Attenborough (The Royal Society, 2021)

INTRODUCTION

BACKGROUND/PROBLEM DESCRIPTION

We are losing the old forests

The decrease of biodiversity and countless species ending up on the red list has been a hot topic all over the world for decades by now. The impact it has on us is indispensable, since we rely on the resources that nature provides us, such as the quality of the soil that we grow crops in, the pollinators who are responsible for the reproduction of our flowering plants (U.S. Forest Service, 2018) and the coral reefs that protect coastlines from the destruction of storms and erosion just to mention a few (National Oceanic and Atmospheric Administration, 2019).

The decline of the species responsible for these processes are caused by the change in climate that we, humans have caused by over- and mismanagement of our lands and resources. An industry that contributes to the rapid speed of global warming (amongst many others) is intensive forestry.

Forests in Sweden cover 68.7 percent of the total land area (The World Bank, 2020) – about 28 million hectares – out of which approximately 1 percent is clear-felled each year – ~270.000 hectares – (Swedish Forest Industries, 2021; Sveriges Officiella Statistik, 2020). Although 1 percent a year doesn't sound plentiful, the decrease in tree-cover across the country has doubled in the last 20 years due to clearcutting according to the Global Forest Watch (2021).

Why is it so important to address the loss of tree coverage, especially the loss of cohesive forest stands due to clearcutting? It is important, because the organizations, companies and individuals that are responsible for producing wood products, – which undoubtedly, we need for our everyday lives – must see the comparison of the effects between different harvesting methods and their consequences. For us to understand more clearly why tree cover loss through clearcutting is drastic, I am quoting a section of a study done by the Nordic Forest Research (2017):

“One cubic metre of stem wood contains carbon equivalent to approximately 750 kg CO₂. One average forest hectare in the Nordic region, growing at a rate of 5 cubic metres per year, therefore annually stores the equivalent of about 4 tonnes of carbon dioxide in its stems”. It can now be understood how much CO₂ a hectare of trees is able to store within themselves and the ground.

Palviainen et al. (2010) conducted a study of carbon and nitrogen releases of Scots pine, Norwegian spruce and silver birch stumps in the following years of clearcutting in Southern Finland. As trees are carbon sinks which tie down atmospheric carbon in the whole body of the tree and the soil around them, it is needed to address that when these sinks are cut down, they release the carbon they sequestered as CO₂ into the atmosphere. According to Palviainen et al.'s study, we can compare the percentages of the change of carbon and nitrogen amount in these three types of typical hemiboreal forest trees. The most rapid change is happening in the first five years, where pine loses 40 percent, spruce and birch around 25 percent of carbon of its original amount. By the 40th year, pine and spruce stumps have lost around 80 percent of carbon, and birch lost approximately 90 percent. There is also the question of harvesting the stumps to use as bioenergy, which increases the potential of even more rapid carbon respiration, given that most carbon ends up being stored underground and not the tree itself (Melin, 2014).

Utilizing this knowledge, we can grasp an approximate amount of the loss of carbon storage due to clearcutting in Sweden: if one hectare holds 4 tonnes of carbon, and 270.000 hectares of forests are harvested each year, we are losing ~ 1 billion tonnes of stored carbon, out of which around 30 percent will be lost immediately due to the different types of respiration rates of tree taxa. In the upcoming five years after harvest, 324 million tonnes of CO₂ are constantly being emitted from cut down forest stands while this amount is slowly growing even further and will continue to grow annually as clearcutting is being preferred across Sweden, each year topping it up with the same amount of GHG emissions.

To further understand the landscape-scale changes, the Swedish website, Forest Insight (Skogsinsikt, 2023) has an eye-opening interactive tool which pictures the landscape fragmentation that clearcutting does, making calculations about carbon storage and what would happen if in certain parts of Sweden more forestlands would be protected. They create interactive maps specific to a given area, and generally just shedding light on how the industry corresponds to even more grave consequences of climate change, habitat loss, landscape fragmentation etc. (Figure 1).



Figure 1: Forest Insight's interactive maps.

On the map on the left, one can choose an area shown in light green. This example is from Western Svealand, a nearly 60-hectare big clearcut made in a 120-year-old Scots-pine dominated forest, where now pine dependant species lost a big fraction of their habitat.

Source: Skogsinsikt (2023)

To conclude this section, it can now be seen that through intensive soil disturbance and clearings, local GHG emissions are on the rise which contribute to enhanced global temperature increase that leads us to a more irreversible change of climate, not to mention the increased loss of biodiversity due to the loss of forest habitats. There are other methods of forestry, that still contribute to the industry, but is better for the climate, for example ecosystem-based forestry, or simply selective cutting. These methods keep the forest stands – and therefore forest habitats – intact while producing forest products to satisfy the need for raw material, although on a lower scale. Thus, the benefit of transitioning to selective logging methods would be of lowering local GHG emissions, keeping forest stands intact, protecting biodiversity and the ecosystem services that are provided by the forests (provisioning, regulating, cultural and supporting services (Wallace, 2007)). Without these services, humanity's quality of life would rapidly decrease and would not be able to maintain itself, therefore it is incredibly important that small, local changes are made to protect these services which benefit us.

Detached tourism

In today's rushing world, people are taking part in a competition with each other, without even being aware of it or knowing the people they are competing with. The "competition" is based on going to places for the sake of taking photos and post it to social media (not to experience a place's culture), to show that they were able to afford to visit an "instagrammable" place and chasing likes by posting them, which eventually results in not engaging with their destination at all (Williams, 2018). This leads to a complete lack of authentic connection with the places we visit (Tribe & Mkono, 2017). Just by scrolling through social media nowadays, we can come across "alternative places" to travel to instead of popular tourist destinations, like Lake Garda instead of Lake Como (Matadornetwork,2022), or Kea instead of Santorini (Sharma, 2022) because there is such a crowd of tourists – overtourism – that it is not desirable to visit anymore.

A quite recent movement called "Unhashtag Vienna" is aimed at providing a real-time and stress-free experience for tourists, because according to the Vienna Tourist Board, questioned by researchers (Siegel, Tussyadiah, & Scarles, 2019), travellers seemed to get more stressed trying to spend time capturing "intragammable" photos. The movement was created because it was starting to become obvious, that most modern tourists only see their destinations through their smart phones' lenses and therefore it is questionable if they are interested in the local culture at all or just gone there to take pictures (Orosz, 2018; Siegel & Wang, 2018).

Based on my own experience from travelling to places and trying to capture everything to be able to show them to my family, I realised how exhausted I felt, always thinking about where did I put my phone, if it was charged enough to capture everything, if the pictures will give back the same sight I saw, when all along, I didn't pay attention to the details that surrounded me both in natural and cultural aspect. Nowadays, I may think about a particular sight while hiking or travelling that is worthwhile to take a picture of, however, I found it more enjoyable to live the present moment through without feeling obliged to capture it. After all, society is the one who pushes and forces us to keep up with being updated on everyone's lives every hour of every day, even though this infinite connectedness makes us feel more alone.

Social media usage can be toxic to our mental health in many ways: it can cause body dysmorphia; one can develop eating disorders, it could lead to depression, but it could also urge us to feel the need to always be connected to our social network, which could cause a loss of emotional connection with our surroundings. One study has been done in connection with

problematic smartphone usage (PSU) related to nature connectedness (Richardson, Hussain, and Griffiths, 2018). It describes that PSU is indeed a reason for decreased connection with nature and an overall increase in anxiety. The conclusion from that study is that by using our phone too much, our attention is redirected from the natural to the digital world: we are not present, we do not live in the moment which can lead to increased stress levels and overall mental health problems.

I have made an online questionnaire to get feedback on this matter myself, which will be mentioned in the *Methods* section.

AIM, RESEARCH QUESTION AND DELIMITATIONS

Aim

The purpose of this thesis is to create a framework that allows the regeneration of a diverse forest via sustainably controlled tourism. Creating a destination that contributes to not only re-establishing and protecting ecosystem services (ESS) but nourishing our mental health as well. This forest land should be harvested in a more environmentally conscious way that benefits first and foremost our environment by contributing to carbon sequestration and habitat protection, but also getting income from it. Letting it to grow and be managed with low disturbance ecosystem-based forestry, that allows the thriving of an abundant amount of flora and fauna which is missing from monocultural forests in Sweden.

Secondly, the framework's goal is to re-establish a healthy and wholesome connection with our touristic destinations that are not overshadowed by social media via participating in improving biodiversity on forest land.

Using this proposal, I wish to suggest forest landowners, landscape architects and people working in the forestry sector that our actions and mindsets – no matter how big or small – can help our environment and society during the uncertain times of climate change.

Research questions

How can privately owned forests be managed in a way that preserves endangered ecosystems, creates recreational values, and provides sufficient income from logging at the same time?

What qualities of an intensively working forestry site need to be developed to reach this goal?

Limitations

Due to an already broad selection of topics and the limit of this work, this thesis mainly focuses on creating a theoretical, site-specific plan for forest ecosystem restoration using a visitor participation initiative.

The thesis therefore does not include detailed plans for infrastructure such as electricity and water supply, and it does not go into extensive financial plans either.

TARGET GROUP(S)

The target groups of this thesis are private forest landowners who are interested in investing in tourism and passing on knowledge of environmental education, or any company/individual/organization who'd wish to purchase forest land and start an ecotourism business with a sustainable forestry mindset.

METHODOLOGY

This chapter will briefly introduce the work process that was conducted during the creation of the framework. The methods below were chosen to approach the underlying matter in question from different angles: the literature gave me a thorough, scientific understanding of all the topics concerned. The reference projects presented ideas that are already established and working, and therefore showing the tangible possibility of realising the project. The questionnaires gave me understanding of the opinions of the people involved and the site study and analysis helped me see through the issues and possibilities of the area in question.

Supporting literature

The main literature sources have been scientific papers published online regarding the topics: Swedish forestry, sustainable forestry, reforestation, wildlife management, ecosystem services and biodiversity, the influence of social media in our traveling behaviours, tourism patterns and environmental psychology.

To find such literature, I have used databases like Google Scholar, Scopus, Primo, and looked at reference theses on Epsilon.

Reference projects

I find reference projects to be very effective motivational tools when it comes to creating a design proposal and theoretical framework. Reference projects that have been conducted in the past are both showing us examples to follow or gaps to fill. One finds a pattern in most reference projects and can identify the missing element or see the potential in combining certain aspects of projects into a new one.

I have found positive influential projects mostly through internet and social media platforms such as Google, YouTube, Instagram and TikTok. These platforms can be either a blessing or a curse in spreading information, for which reason one should filter their research carefully.

The reference projects later mentioned contain aspects of sustainable forest management, rewilding and regeneration practices, place attachment and payment for ecosystem services (PES) strategies as well as ecotourism.

Getting insight through questionnaires

A method that was the most helpful of getting insight on landowners' perceptions about the system in Sweden and of people's view on tourism nowadays was through online questionnaires. I have made one for the landowners to understand their decision-making process when it comes to forest management and one for tourists to gain insight whether social media has a negative impact on their ability to relax when they are travelling and their connection to the destination they visit. These questionnaires will be introduced in *Part II – Getting insight thoroughly*.

Site study

The site study involved a field trip to the chosen sample area of Gullaskruv, Nybro municipality, Sweden, in order to have a realistic vision of the landscape I was dealing with. For further understanding, I was able to back up my observations based on the site visit by applicable literature such as the type of forest involved, specific logging data based on ownership, current land-usage habits etc.

Analysis

The main landscape analysis I worked with was Patrick Grahn's Perceived Sensory Dimensions (PSDs). The PSD analysis is mostly used for outdoor areas such as care facilities, rehabilitation gardens or simply an outdoor environment that is used for recreation purposes. The analysis shows us the potential a landscape has, and points out what elements can complement each other, what is missing to create a balanced and cohesive outdoor area that can be enjoyed as a place of its own character.

A larger scale analysis was done to find out where might potential visitors come from nationally and internationally: I have conducted a simple spatial analysis in GIS based on research done on tourism trends and patterns.

After completing the design process, I also carried out a SWOT analysis that allows us to see every angle of the proposal, let it be positive or negative, and helps us to foresee complications that might arise during implementation.

Design process

The design was strongly influenced by all materials that were the results of the reference projects, questionnaires, analysis and site study. By combining certain parts of the references (see later in *Conclusion Part III*) with the findings of the landscape analysis, the design was tailored to the site itself and was made to remedy a certain problem, that is the consequences of intensive forestry.

The design in this thesis mainly focuses on the whole sample site and its aim is to create a cohesive area that is a world of its own. Therefore, the design was strongly linked to the PSD analysis and wishes to introduce how the landscape can change for the better once we decide to construct a forest land that is able to offer as many functions and ecosystem services as it can.

My aim by showcasing the ideas I had was not to create something that is too idealistic or unfeasible but rather something that pairs reality with the dreams of a forest that is honoured and cared for by many. That is why I have been incorporating as many little details from the informal interviews with landowners as I could, such as plant species, harvesting methods, possible threats etc.

Once the overall vision of the new site was created, we will come across zoomed-in details of the design, that focuses on accommodations, free-time activity spots, and educational functions.

The overview of the new site was created using Procreate, QGIS, Adobe Illustrator and Photoshop, whereas the smaller scale details were modelled in 3ds Max and rendered in Lumion.



Figure 3: A more mature hemi-boreal plot on the sample site. Dominated by Scots pine (*Pinus sylvestris*) and Norwegian spruce (*Picea abies*) with just a few birch trees (*Betula*) in them, with very scarce understory and forest floor vegetation.

Photo: Tamara Hadházi

Forest type

This plantation can be best described as the typical hemiboreal forest mentioned above: spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) dominant with the occasional birch (*Betula spp.*) which, according to Drössler (2010) could indicate a mesic, well-balanced supply of moisture in the soil (Figure 3).

Upon my visit I could differentiate a few types of understory plant coverage depending on the type and age of a certain plantation in the area, which are the following:

- at the entrance of the site, there is a significant amount of Scots pine monoculture with dense planting distance, which doesn't allow much light into the understory. This leads to a poor ground coverage with mostly bryophytes occurring.
- leaving the monocultures, I encountered a very young mixed plantation of Scots pine and Norway spruce. According to Skogsstyrelsen's GIS inventory (Skogsstyrelsen, 2023) (Figure 4), these plots have been mostly harvested in 2012, some of them even in 2004 and 1999, however the saplings seemed quite small (50-100 cm),

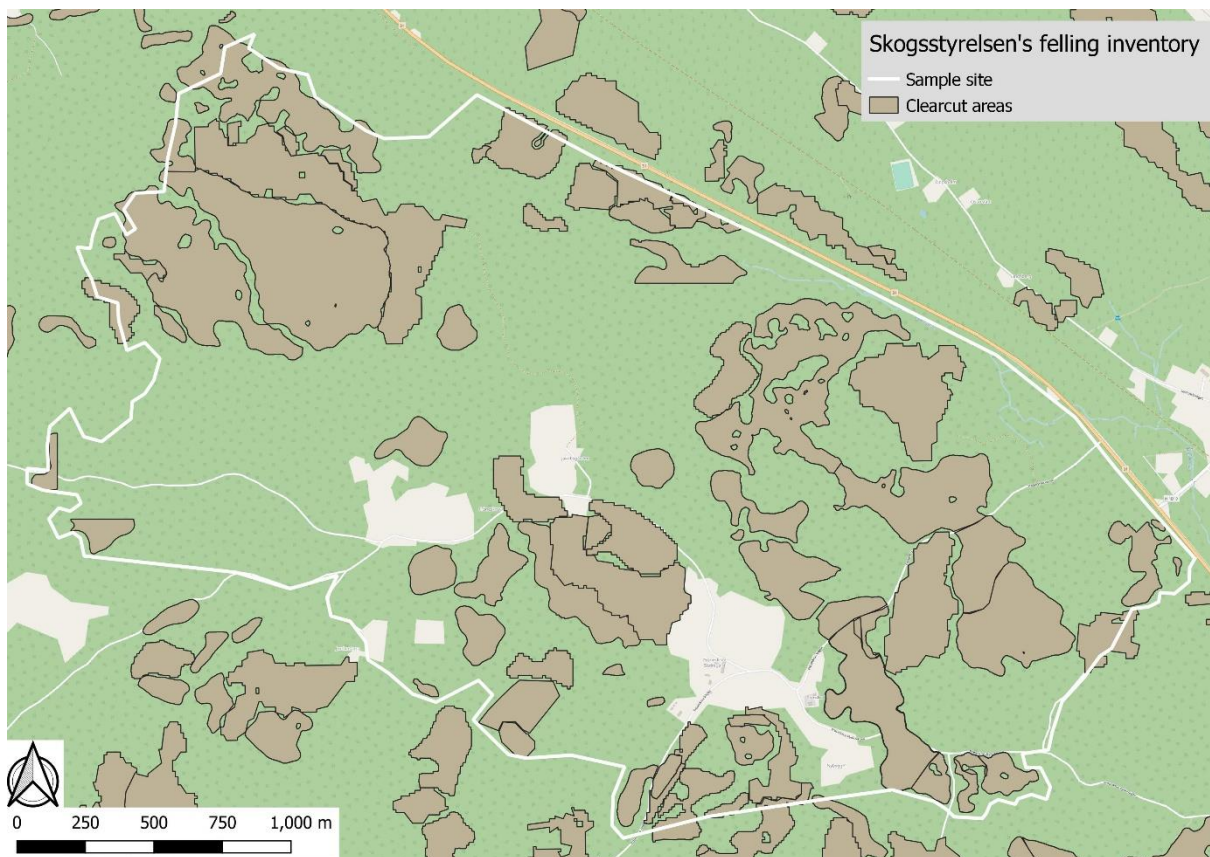


Figure 4: Skogsstyrelsen's GIS felling data. Map illustrated by Tamara Hadházi

Source: Skogsstyrelsen (2023), base map: OSM

therefore, they might be around 3-5 years old trees (Arbor Day Foundation, 2022). According to Skogsstyrelsen's report (Skogsstyrelsen, 2020), planting should be done as soon as possible after harvesting, which probably didn't happen on all harvested plots. On these new plantations the young saplings were growing from under a dense cover of heather (*Calluna vulgaris.*) with a mixture of crowberries (*Empetrum nigrum*) and lingonberries (*Vaccinium vitis-idea*).

- Denser Scots pine and Norway spruce mixtures almost without any birch (*Betula spp.*) present, had mostly low ground coverage with ferns on the edges of the plot, and in the denser, darker parts only moss (*Bryophyte*) and grass (*Poaceae*) coverage. These stands have the "lower canopy layer" of Norway spruce, but otherwise there are not many layers in these plantations. According to Lõhmus and Kraut (2010) this forest fits for the description of dry, *Vaccinium*-type boreal forests.

- The mixed plantations, which were mostly planted with pine, and the occasional birch and spruce, had a bit more diversity in the undergrowth with heather on the edges (*Calluna vulgaris.*) and quite a lot of blueberry bushes (*Vaccinium myrtillus*), followed by fewer lingonberries (*Vaccinium vitis-idea*) and bryophytes such as *Artemisia spp.* in the understory. Not every mixed plot had this type of undergrowth however, since it really seemed to depend on the canopy cover and the amount of light that was able to get to the forest floor.

According to Felton et al. (2010) even though the spruce-birch, or in this case pine-spruce-birch polycultures are indeed better than conifer monocultures, it is still not enough for the conservation and protection of red-listed species: if these forests would be even more diverse with multiple canopy levels and enriched with species such as oaks (*Quercus spp.*) or beech (*Fagus sylvatica*), then the endangered species in southern Sweden would benefit much more from such a change than solely including birch in coniferous monocultures. Furthermore, the paper mentioned also discusses the method of production of which these plantations are harvested: from the 1990s retention forestry became implemented more instead of clearcutting (*Skogsstyrelsen, 2020*) because of the increased disappearance of red-listed species, however, the retained trees are overly being exposed to wind damage, and even though foresters keep them, they are bound to break or fall. Moreover, the density of the trees remaining are not functionable as habitats for forest flora and fauna, except for some species, such as open-habitat birds or spiders (Fedrowitz et al. 2014). Felton et al. are questioning this method simply because these plantations are harvested so much ahead of their time, that some species, such as lichens cannot establish before cutting them down, and the amount of deadwood left is not sufficient to host for example saproxylic beetles (red-listed). Another study was looking at whether the retention cuts supported biodiversity more than clearcuts, which the answer is yes, they do with a slight amount. However, retention forestry does not support keeping the habitats of forest species, such as birds, bryophytes, amphibians, reptiles, mammals, birds, beetles, lichens and fungi compared to a forest with lower harvest rate or selectively cut forest (Fedrowitz et al. 2014).

Choosing the site

Even though this project should not be aimed at state-owned forests, I started looking up lands owned by Sveaskog to make sure I chose a site where intensive forestry is happening for certain. The reason for this is because some private landowners also clearcut their forests thinking, it is the best economical way to harvest. Their input and perception are invaluable since some of them own quite a big piece of land. I made an online questionnaire for private landowners, which I posted on Skogsforum.se where I got 12 answers. Calculating a mean value of the ones who filled the questionnaire, a private landowner can generally be responsible for ~165 hectares of land. For this project, I aimed to create a plan for those who have slightly bigger forest than this number, for example there were landowners who owned between 250-570 ha of forest land. However, this questionnaire was anonymous for the sake of collecting information and opinions, not necessarily expecting them to allow me to work with their lands as base for my project, only if they suggested. I got the possibility of two landowners who allowed me to use their land as base, however they were too small area for this topic, and too far to visit.

Therefore, I chose a site that had major clearcuts/retention cuts based on Google Earth's Satellite images, and the picture taken couldn't be older than 2 years. I also downloaded Skogsstyrelsen's GIS maps (Skogsstyrelsen, 2023), where I could find an extensive inventory of all the fellings carried out. From what I saw on that GIS data is that most of the plots on the site I chose in Nybro municipality haven't been replanted straight away. Some of the plots that have been felled at 2003-2004, have been replanted and the change is clearly visible on the satellite image on Google Earth, however not all plots were handled in the same way – and has many clearcuts scarring the land like a big puzzle in an area that is bigger than 1000 hectares. For my framework to be carried out, it is beneficial to work on a site that is big enough for tourists to wander (400-600 ha) and where natural regeneration might not happen by itself due to the major size of clearcutting. Sadly, it didn't take much time to find this place, and it might be one of the biggest areas that is influenced by clearcutting in Southern Sweden.

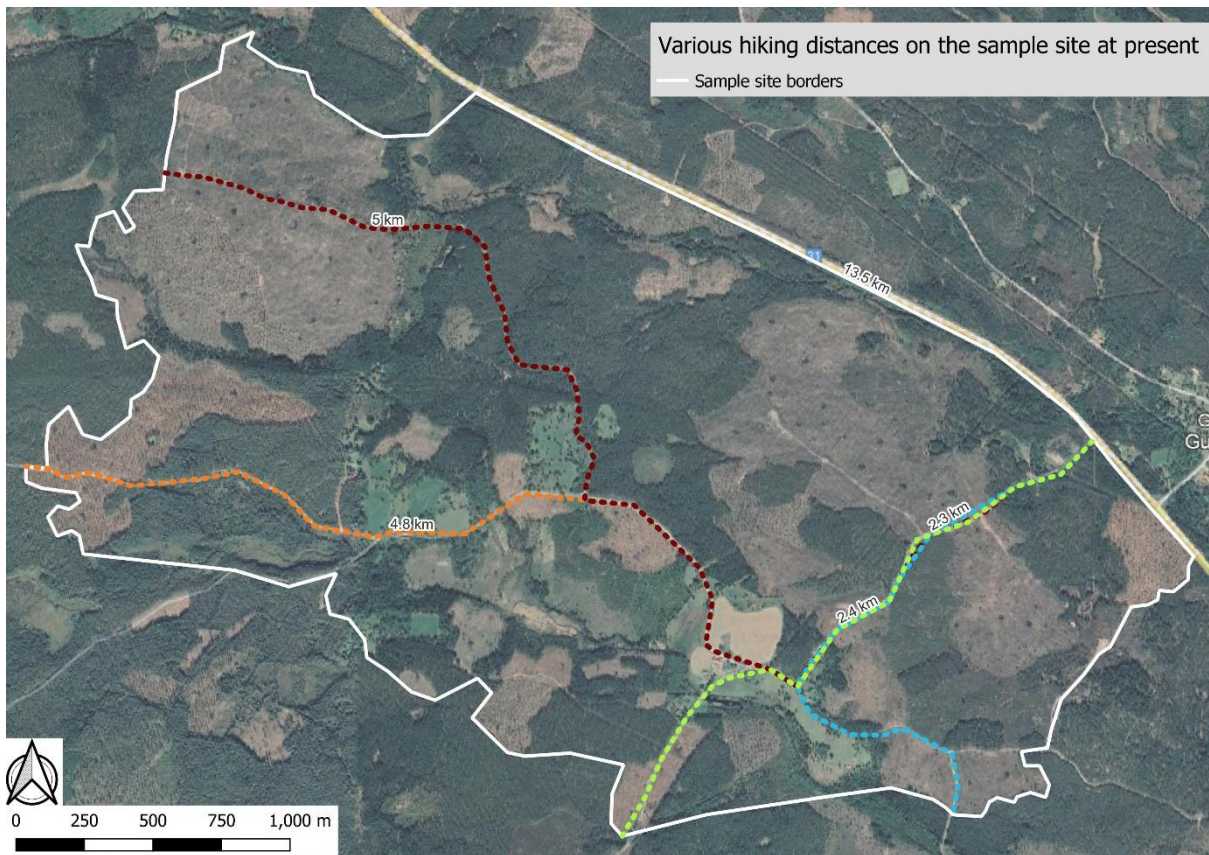


Figure 5: various hiking distances on site, base map source: Google Earth

Map illustrated by: Tamara Hadházi

The choice to work with an area that is at least 400 hectares was based upon the assumption that this place will be mostly hosting day-hikers (beginning and ending their hike on the same day), overnight hikers (those hikers who are out for more than one day (Kyle et al., 2003)) or people who are interested in nature-based- or ecotourism. According to Wilcer et al. (2019) the average distance of day-hikers is around 2.1 miles – which equals 3.37 kilometres –, in which case an area of at least 400 hectares is capable to offer a convenient short distance hike for those who are not interested in or not used to long distances. The sample site selected is 703,34 hectares, its perimeter is 13,5 km, and it's capable to offer various hiking distances of 2.3, 4.5 and 6.1 kilometres at the moment, following the existing forestry roads (Figure 5).

Disclosure: the establishing of the framework should NOT start with clearcutting an existing forest, rather work on an already clearcut land that exists in our present time, that can't be uncut and is not favourable for biodiversity and the environment.

HARVESTING METHODS

Today's forestry practices in Sweden

From the 1950s, Swedish forestry changed drastically in the direction of clearcutting, which expanded into installing wide forestry roads, replacing machinery for more efficiency and economic benefits, which resulted in not taking nature and its values on these plantations into consideration most of the time. Even-aged forestry became the standard, any undergrowth removed, deciduous trees wiped out via herbicides, and most forest lands planted with Norway spruce and Scots pine, not allowing a wide variety of species in the plantations (Skogsstyrelsen, 2020). This strategy later on resulted in the incline of employment in the forestry sector, and increased profit from timber forest products. Clearcutting was announced to be the only option for harvesting methods on low-altitude areas in the 1979 Forestry Act. Being in 2023 today, the Forestry Act has only been implemented 44 years ago, which means, most of Sweden's productive forest lands are still even-aged coniferous monocultures, with very little ecological value in them, being responsible for the decline of red-listed species and therefore creating an environment that will not be able to support us just in a few decades.

Although clearcuts not necessarily support biodiversity as much as a natural old-growth forest, some advantages of it are that the forest soil is not impacted several times by heavy forest machinery, only once when the final felling is carried out, therefore the soil damage is minimised (Oregon Forest Resources Institute 2020 see Bergenholm et al. 2020). Economically speaking, the method of this type of harvesting evolved in such a way over the past decades according to Magnusson (2020, see Bergenholm et al. 2020) that it is reliable and easy to use for most landowners. Furthermore, the Swedish timber market developed in a way that most landowners do not have any other choice of potential buyers for their timber products. If the market would expand in a way to support timber products which are harvested at an older age, perhaps more landowners would be interested in transitioning to single-tree-selection harvesting, but as of now, Swedish sawmills are not capable to handle more mature trees (Öhagen, 2022 – oral communication). Moreover, the study of Bergenholm et al. discusses that clearcutting creates favourable habitat for elk and deer, while giving more sunlight that

provides a faster growth rate and chance of survival for a new forest stock. These two statements might be true, however they can be contradictory: according to Kardell's study (2016), there is a constant incline in roe deer and moose population since the 1930s, and the browsing damage done by them started to become extensive, hence it is not clear, why the method of clear-cutting mentioning the advantage of creating habitats for deer, when it causes major economic difficulties in forest industries. Secondly, even though clearcutting does provide more sunlight for saplings which consequently are able to grow more rapidly, it also creates other conditions on the vegetation, e.g. bilberry (*Vaccinium myrtillus*) which is an important food resource for herbivores and insects, and a non-timber forest product to forest owners. Bilberry grows in much rougher conditions on clearcut areas due to the increased amount of sunlight, possible frost damage, the decreased water balance and dried humus layer. These all cooperate into a reduced amount of photosynthesis and growth, and low reproduction rates as opposed to them being in selectively-cut forests, where the conditions are far more beneficial to not only the bilberry but other types of understory too due to higher amount of moisture in the soil, less exposed areas and less damage done by heavy machinery (Atlegrim & Sjöberg, 1996).

Even though the Forestry Act was quite new, these ecological issues started to be discussed, which leads us to the 1990s, where large-scale implementation of retention cutting was happening, and in 2015 the Forestry Act was developed to allow selective cutting methods to be able to provide continuous cover forestry. However, as the report of Skogsstyrelsen states, these harvest systems have only been practiced in very small scales, as the state-owned companies are mostly profit-oriented, but some private landowners also practice clearcutting or retention harvesting. Having informal conversations about this topic with private forest owners, their opinions on what is the reason behind private landowners still practicing these methods of harvesting are the following: being used to this habit, the lack of education and the convincing marketing from state-owned companies who are willing to buy their wood which they harvest in big amounts. The companies buy the landowners' wood on a remarkably low price, and even though they are not pleased with the payment they receive, they feel like they have no other choice but to sell the companies their wood, due to its low quality that comes from extensive thinning which is encouraged by the state. To justify their actions, landowners answering my questionnaire about their harvesting methods (see in *Questionnaires* section) mostly answered to follow clearcutting because it is the only economical method, and only one answered that the conditions for their forest was not beneficial: e.g. the trees were unsuitable

for the soil they were planted in, or if they only thinned some of the even-aged stands, they would have been wind damaged, therefore the economic value of the stand would have decreased. With retention cutting, foresters would leave some number of seed trees behind to help natural regeneration, as well as high-stumps and dead wood for insects. Although retention forestry seems to be a step towards a more sustainable and habitat-friendly harvesting method, the percentage of retention can vary to a large extent. According to Cherubini et al. (2018) retention levels can be aimed from 3 percent (very low retention), through 10 percent (low retention) and 30 percent (mid retention) to 50 percent (high retention), which includes standing and dead trees altogether. The study shows in a comparison chart that between the very low and mid-retention levels, CO₂ emissions can significantly vary depending on many factors, such as how many hours the harvester machines had to work and the felled and retained volume of trees. Evidently, looking at the numbers, high retention levels correspond to notably lower greenhouse gas emissions in general.

Skogsstyrelsen's report also mentions that the single-tree selection method is rare in Sweden due to the long history of even-aged management, which justifies the truth in the conversations I had with landowners: even-aged forestry is a habit to most, and not even economically advantageous for the most part. Furthermore, according to them, the problem lies in the fact that it is not beneficial to nurture and grow old trees, because Swedish sawmills are not equipped with machinery big enough to handle old-growth timber (Öhagen, 2022, Lantto, 2022 – oral communication). Additionally, these sawmills are quite far from northern forest lands, therefore companies such as SCA will offer a very low amount of money for the forest products to balance high costs of transportation, which makes the net income of the forest really low to the landowner. If a landowner finds themselves being located so far from the sawmills, there is no option for a thinned forest but to be clear-felled due to the costs of transportation, in which case, neither the landscape nor the landowner is benefitted from clearcutting.

In conclusion: most of the ecological issues lie within the misconceptions that clear-felling and retention harvesting are economically the most favourable choice for private landowners. This is of the result of having no market within the country, and the industry is not adapted to handle old-growth, higher quality timber resulting from single-tree selection.

On the chosen sample site, using a GIS calculation on one of the recently harvested plots using a satellite image, the calculation suggests that the plot has around 9,14 percent retention (0,522 hectares out of 5,7) which is a very rough calculation because one cannot rely on exact

measurements using satellite images. This number tells us nonetheless, that it belongs into the “low retention” category, which is around 10 percent. Below, we can see a photo of the plot the calculation was estimated at (Figure 6). The picture also shows the wind damage these “retained trees” are suffering from, which makes the whole remainder of seed trees vulnerable and exposed while they are not able to provide a suitable habitat for forest species either.

Figure 6: Low retention cut area in Gullaskruv, potential additional wind damage, loss of forest biodiversity.

Image source: Tamara Hadházi



Ecosystem-based forestry as a solution

One ecosystem-based forestry method is called the Lübeck-model. It was developed between 1990 to 1994 in the village of Lübeck, Germany. Its goal is to preserve the natural feeling of the forest by using “low input” forest management – selective cutting. The goal of this management type is to create a diverse ecosystem with a random succession rate and stand structure without excluding wood harvesting.

There are **forbidden activities** in this management concept, which are:

- Monocultures
- Clear-cuts
- Exotic tree species
- Application of pesticides and fertilizers
- Skidding that is not specified in their skidding system
- Soil draining
- No other forestry activities that are outside the natural disturbance regime
- Feeding wild animals

Their monitoring consists of looking at development of carbon volumes in t/ha sorted by tree species, examining the growth in the diversity of species. There are growing populations of mammals like lynx, wolves, bat colonization since 2017, and otters since 2005. Birds are also monitored every five years and thus can be said that there are new species in the area as well as increasing populations of typical forest birds, like Middle spotted Woodpecker, red-breasted flycatcher, etc (Hansestadt Lübeck, 2021).

The management plan has compared its economic results of the last almost four decades, where we can see that even though the amount of sold cut wood is significantly lower (50 percent), the revenues are almost constant, and the whole value of the forest itself has doubled. Replanting costs have disappeared due to the natural management methods which allow the forest to naturally reproduce itself (Hansestadt Lübeck, 2021).

Advantages of the Lübeck-model:

Applying the methodology of the Lübeck-model will result in a diverse, uneven-aged forest, which is more adaptable to climate change and more resilient against pests, while also having

a higher growth performance than monocultures. In a diverse forest the amount of biomass and the ability to store carbon are both higher as well. Karlsson mentions as an interviewee in the study referenced, that the usage of the Lübeck-model does not require excavation to be done, which lowers the cost of logging, and prevents the soil of further oxidation and the increased emission of carbon-dioxide (Jentzen et al, 2014; Fichtner et al., 2018; Huang et al., 2019; Karlsson, 2020 see in Bergenholm et al, 2020).

Arriving at the question of which forestry type is more efficient in carbon sequestration, there are many uncertainties and contradictory information on the topic. Karlsson (2020) points out that extending the harvest cycles are allowing the trees to absorb more carbon whereas a report on Sustainable boreal forest management by Skogsstyrelsen and IBFRA (2021) states that “the sink is stronger in young to middle-aged forests, as compared to older forests”, while it also says that even though younger forest stands are bigger carbon sinks, it takes about 5-20 years after clearcutting for a plantation to be a sink again.

Another study discusses the uncertainty whether reforestation after deforestation creates carbon sink or source: they compared a 200 year-old forest in Siberia versus two managed regenerating spruce forests in Germany and came to the conclusion that the Siberian forest - albeit much older than the studied production forests - is a larger carbon sink than the younger ones and elaborates on the fact that maintaining an old growth forest with a 30-year ground fire cycle contributes more to reducing the amount of atmospheric carbon dioxide than logging a forest and re-establish it again (Schulze et al., 1999). Therefore it is no doubt, a difficult and complex subject for a landowner to decide what method is the best for their land, however, an old growth forest still is a carbon sink, even if a weaker one in theory, which by standing undisturbed and without drastic logging methods, will not emit as much carbon as much a clearcut does and still provides valuable habitats for many forest species.

PART II – GETTING INSIGHT

QUESTIONNAIRES

Tourism

I created an online questionnaire regarding the connection between tourism and social media (SM), to see whether there is a lack of emotional connection to our destinations due to SM behaviours?

The questionnaire was made both in English and in Hungarian and in total there were 119 individuals who filled it out.

The first section contained 4 questions, which gave me an insight into the pattern of what type of SM do people use and therefore how do they decide their next vacation destinations, since these two are strongly linked together nowadays.

The first question was: *which social media platforms do you use?*

The most popular were Facebook with 96,63 percent, YouTube with 75,63 percent, Instagram with 45,37 percent, Pinterest with 34,45 percent, TikTok with 13,44 percent, BeReal, Snapchat and Twitter with 6,72 percent each, and some others with very low percentage, such as LinkedIn, Wordpress, Vero, and one user who does not use SM at all.

The second question was: *How do you choose your destination when traveling?*

70,58 percent of the respondents chose their destination based upon recommendation given from friends and family. Second highest number was 39,49 percent chose their destination looking at local tourism sites, which can recommend places that are not as well-known. 18,48 percent of the individuals go to destinations based on media they saw on Instagram, 17,64 percent is inspired by YouTube videos, 16,8 uses TripAdvisor and 5percent chooses based on TikTok videos.

The third question was: *What type of tourism are you looking for when going on vacation?*

65,54 percent answered culture tourism (sightseeing, architecture, music festivals, etc.), 55,46 percent likes to go on adventures such as horse riding, canoeing, camping, 36,13percent goes for wellness vacation to relax, 20 percent likes going on glamping vacation and rural areas. Under 20 percent there are choices such as religious, sport and child-friendly destinations. These 3 questions were multiple choice questions, which gave me an insight of the SM usage

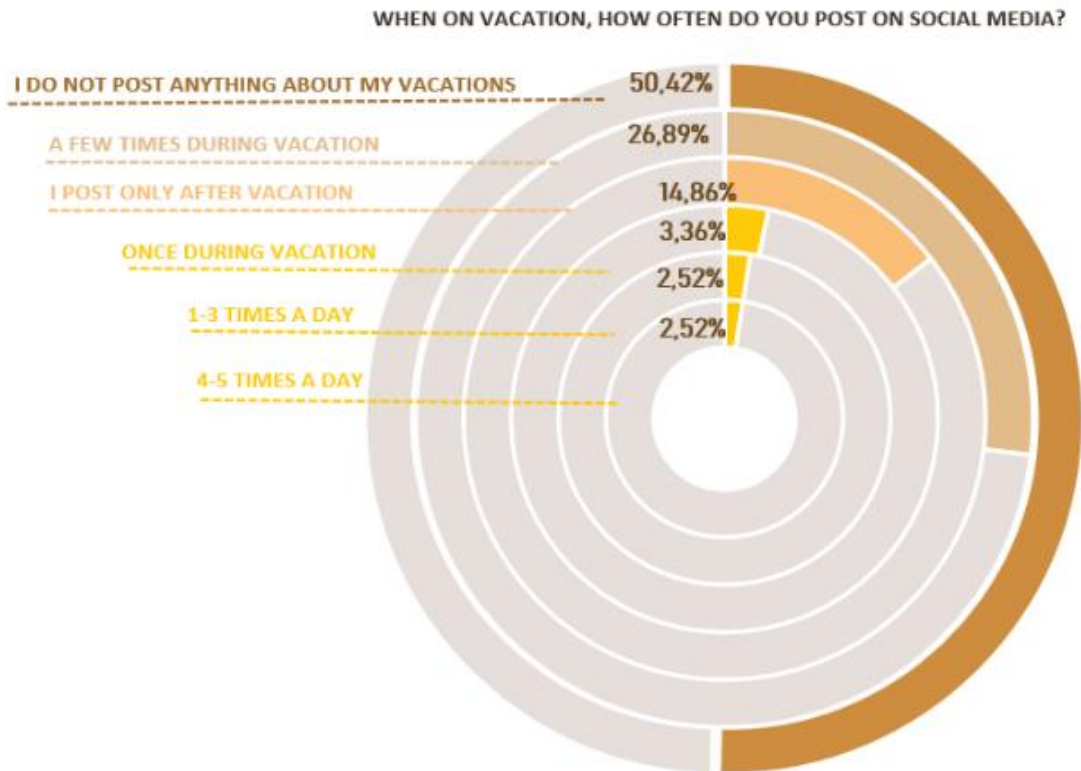


Figure 7: Questionnaire question: the frequency of posting on SM when on vacation

pattern, however, the last question in the first section decided whether the individual who filled the form will be taken on to answer more questions or finish the form.

The last question was: *When on vacation, how frequently do you post stories or posts on social media?*

50,42 percent do not post anything about their vacations, therefore the form was finished for them, since their answers would have not been relevant in the following sections. 26,89 percent posts a few times during the whole period of the vacation, 14,28 percent posts only after their vacation, 3,36 percent posts once during vacation, 2,52 percent posts 1-3 times a day during vacation, and another 2,52 percent posts 4-5 times a day on vacation (Figure 7).

WHEN POSTING ON SOCIAL MEDIA OR CONSTANTLY TAKING PHOTOS DURING YOUR VACATION, ARE YOU FEELING PRESENT AND CONNECTED TO YOUR DESTINATION?

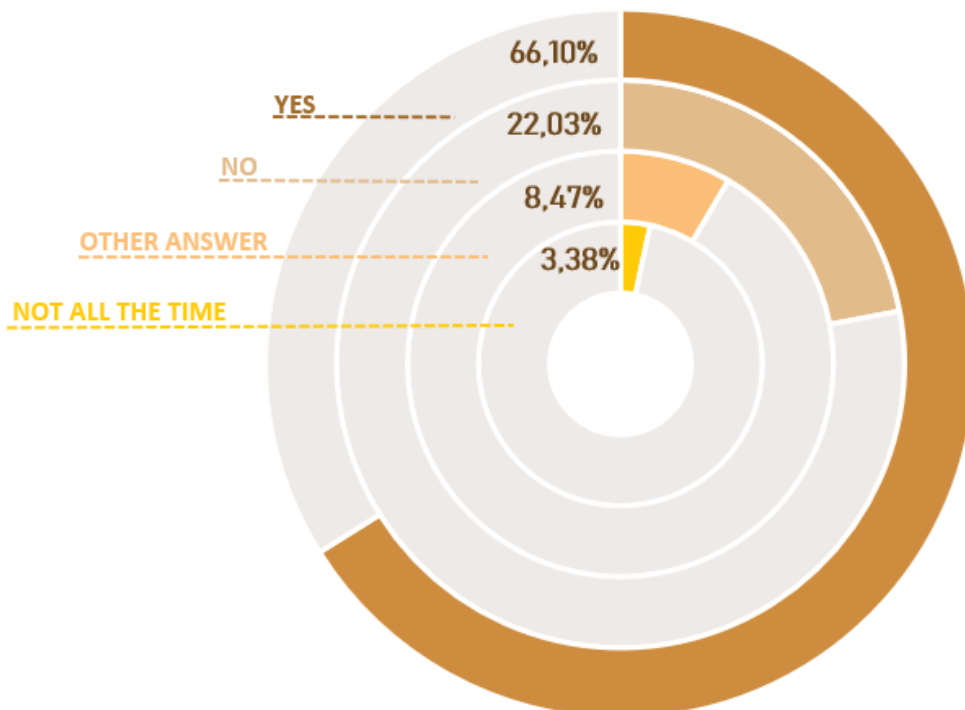


Figure 8: Questionnaire question: does the participant feel present on their vacation while posting on SM?

To summarise the first section: almost everyone who filled the form uses SM, but it does not completely influence their destination choices, since they mostly take recommendations from friends and family. However, there are some who are inspired by SM influencers or simply their social network online. The following section will be answered by the remaining 59 respondents who use SM during their vacation.

In the second section of the questionnaire, I was curious about the way people feel during the usage of SM when traveling. As it can be seen from studies mentioned above that SM can have a proven negative effect on tourists and on the destinations as well, I aimed to pose questions which can perhaps justify this theory. The first question therefore was: *When posting on social media or constantly taking pictures during your vacation, are you feeling present and connected to your destination* (Figure 8)?

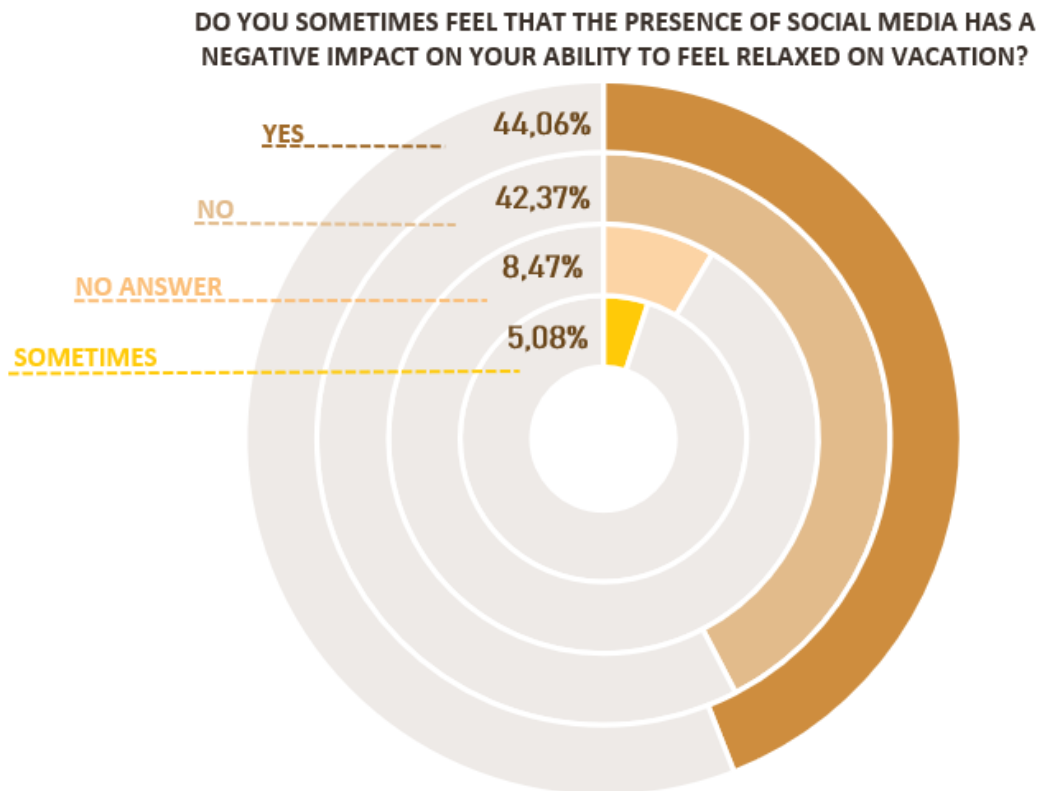


Figure 9: Questionnaire question: does the presence of SM negatively impact the respondent's ability to feel relaxed?

As it can be seen from the figure above, the majority of people who answered are feeling connected to their destination even if they use their phones a lot. However, those who answered they are not feeling connected, or not all the time, elaborated on this topic in the next question. One of them mentioned, that the “usual tourist destinations” haven’t excited them anymore as opposed to stumbling on a secret spot where they tried to communicate to a local person even without knowing their language, which contributes to a much more unique experience. Another mentioned that they always wanted to visit a particular festival but so many people posted about it on SM that it is not enticing anymore and that leads to that destination becoming emotionally empty for some. Other comments stated that they couldn’t live in the present moment because they tried to capture it on their phones exactly as they experienced it in real life, or they had other expectations based on what they saw on SM. These experiences lead us to the next question which was:

Do you sometimes feel that the presence of social media and your smart phone has a negative impact on YOUR ability to feel relaxed on vacation (Figure 9)?

The answers to this question indicating that people actually felt anxious or negatively influenced by SM on their holiday was proof that even though our “posting” habits are not that influential, the presence of it, and our subconscious habit to always try staying connected to our social network lingers and has impacts on our ability to relax and unwind.

Landowners

As a foreign student in Sweden, I was eager to get the most insight I could, therefore I posted another questionnaire specifically for landowners, which I shared on Facebook and Skogsforum.se. The questionnaire’s language was English.

My aim with this questionnaire was to:

- Understand how landowners harvest their forest stands and why they use those methods,
- To see their opinions on clearcutting and whether they think it is economically more beneficial or not,
- To see if they would be willing to change their methods if there would be a financial compensation to their efforts to protect and harvest the land,
- And to see whether or not they would be interested in tourism-based solutions combined with their forestry practices as a way of gaining additional income.

The number of answers as expected were much lower, only 12 individuals participated in it, but their contribution was incredibly helpful. The questionnaire had two sections: the first section had 8 questions; the second section had 3. The participant would only be taken to section two if they were interested in tourism-based solutions.

In the following part I will list the questions and describe the answers.

First section:

- **Question 1:** *In which municipality of Sweden do you own a forest?*
Not one landowner came from the same municipality, but 4 of them were from Central-Eastern Sweden, 3 of Central Sweden, 2 from the South-East, and 1 each from the Central-West, South-West, and Northern Sweden.

- **Question 2:** *What type of forest is it? (Monoculture or diverse forest?)*

9 people answered diverse forest, 2 people answered monoculture, one both monoculture and diverse on the same property and one just answered “Forest”.
- **Question 3:** *What size is your forest land (approx.)?*

All answers differed from 30 to 570 hectares. Knowing this number helped me understand that if this project would be realised it could either be on one single landowner’s property or shared between multiple.
- **Question 4:** *Is your main income coming from selling the wood you felled?*

11 answered “no”, 1 said “yes”.

Looking back now, I regret not asking what other types of income were if they answered “no”.
- **Question 5:** *Which harvesting method do you follow? (Multiple choice answer)*

8 people do clearcutting, 6 people do selective and shelterwood cutting each, and 5 people do patch cutting.
- **Question 6:** *If your answer contains clearcutting, why did you choose this harvesting method amongst others? (Short answer question)*

As it was a short answer question all of them differed a bit, but 4 of them referred to clearcutting as the only effective financial method, 3 of them claimed it was the only option at that place, 1 says practical reasons, 1 was referring to all trees had the same size and 1 was elaborating on several reasons regarding potential wind and economical damage, uneven stands or trees were planted in unsuitable soil conditions for their species.
- **Question 7:** *Clearcutting is responsible for a significant amount of GHG emissions. If you had the chance to make the transition to selective cutting in exchange for financial compensation, would you change your harvesting methods?*

5 people (45,5 percent) answered “Yes”, 1 person answered “No” and 5 people had other answers such as “yes if the economy was better” , “in some places I would, but other places clearcutting is more suitable”, “it is not suitable in the long run”, “not at places where I take away monoculture” and “it is very unlikely that compensation high enough would be offered to offset our costs”.
- **Question 8:** *If this financial compensation would mean to allow a controlled amount of tourists to come to your plot and help you regenerate your land to a diverse forest, would you be interested in that?*

5 people (45,5 percent) answered “Yes”, 4 (36,4 percent) answered “No”, 1 answered “not really interested in having tourists” and 1 answered “maybe, but that would depend on who the tourists would be. I would never give them a piece of land to play with, but competent people would be more than welcome”.

Second section:

- **Question 1:** *You either answered to allow tourists on your land as another source of income or chose the "Other" option. Allow me to explain my idea briefly. (Here I gave a long description of the idea I will talk about in the “Proposal” section)*

2 people answered it sounds interesting, 2 said they are not interested, 1 stated that their estate is too small and 1 suggested that it might work close enough to a city.

- **Question 2:** *If you got this far, you might be interested in transitioning to a more sustainable future. Would you perhaps like to participate in helping with my thesis, which is a theoretical example?*

2 answered “Yes” 4 answered “No”.

- **Question 3:** The landowners who wanted to participate had given me their contact details.

In question 3 I had the pleasure to receive Mats Öhagen and Rickhard Lantto’s contact details, and they were eager to share their views in informal interviews over the phone and given their consent to use the discussions as references.

As a conclusion, it can be seen, that majority of the landowners see clearcutting as either “the only option” or “the only economical way” when it comes to their harvesting methods. It is also visible, that they are hesitant and doubtful whether a new system would be more beneficial in the long term and many of them shy away from solutions that connects to tourism.

As to opinions: there always will be opposing views that regards an idea unfeasible and it is not different in forestry. There always will be landowners who prefer clearcutting over other methods, and when it comes to the time where is truly no other option left there is no more to debate about. However, an expansion of views is needed as Öhagen pointed out himself (2022 – oral communication).

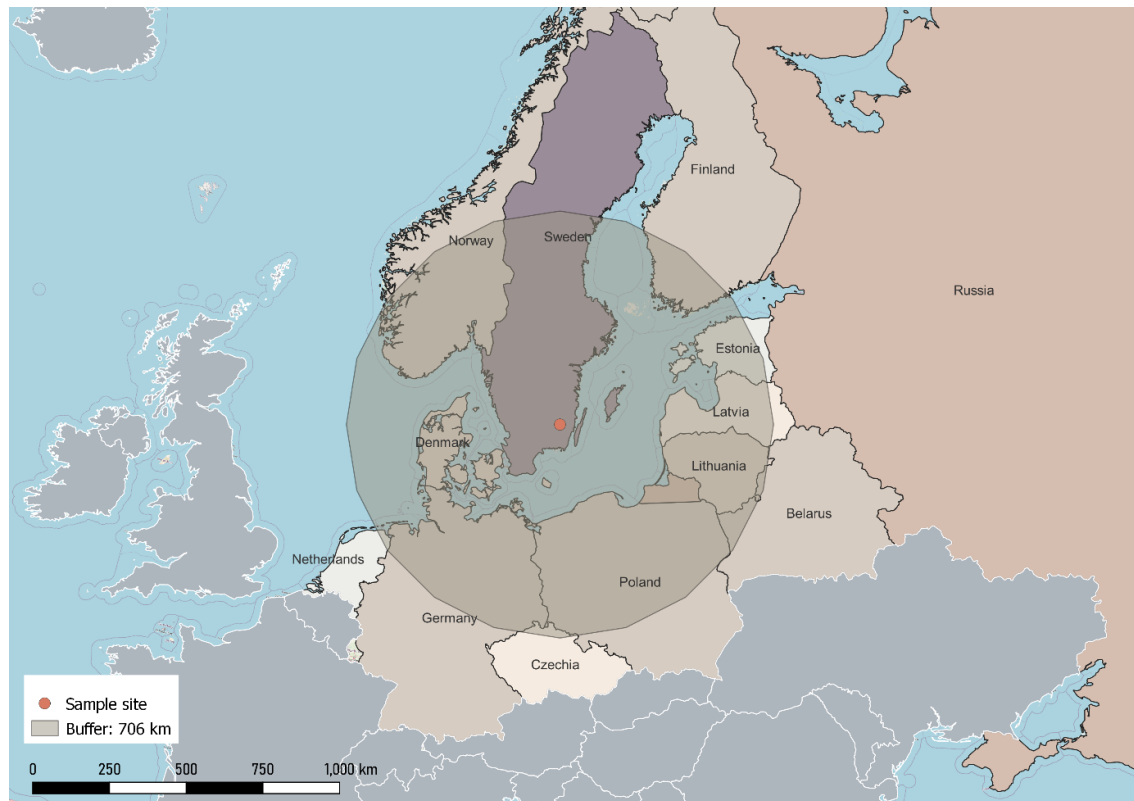


Figure 10: International visitors may possibly arrive to the site from a 700 km buffer zone.
 Illustration by: Tamara Hadházi

ANALYSES

Travel trends and patterns

In tourism, “distance desire” is greatly responsible to tourists’ travel destination choices, which is a positive influence that promotes traveling intentions and creates a certain travel attitude. Distance desire allows travellers to live through brand new experiences and satisfy aesthetic needs as well, while also there is a need in people to escape from their habitual environment. Therefore, they try to distance themselves from their home and find a place that has many things to offer far away, which creates a physical and psychological distance at the same time (Cao et al., 2020). According to a case study on traveller behaviour in the EU by LaMondia, Snell and Bhat (2010), the average trip distance for a traveller who goes on international, long-distance holiday is 706 km. According to this information, we can see on Figure10, that from the pointed sample site (Gullaskruv) visitors are most likely to come from around 13 countries: mid- and southern Sweden, southern Norway and Finland, western Estonia and Latvia, northern Germany and Poland, Denmark, Lithuania, and some small parts of Russia, The Netherlands,

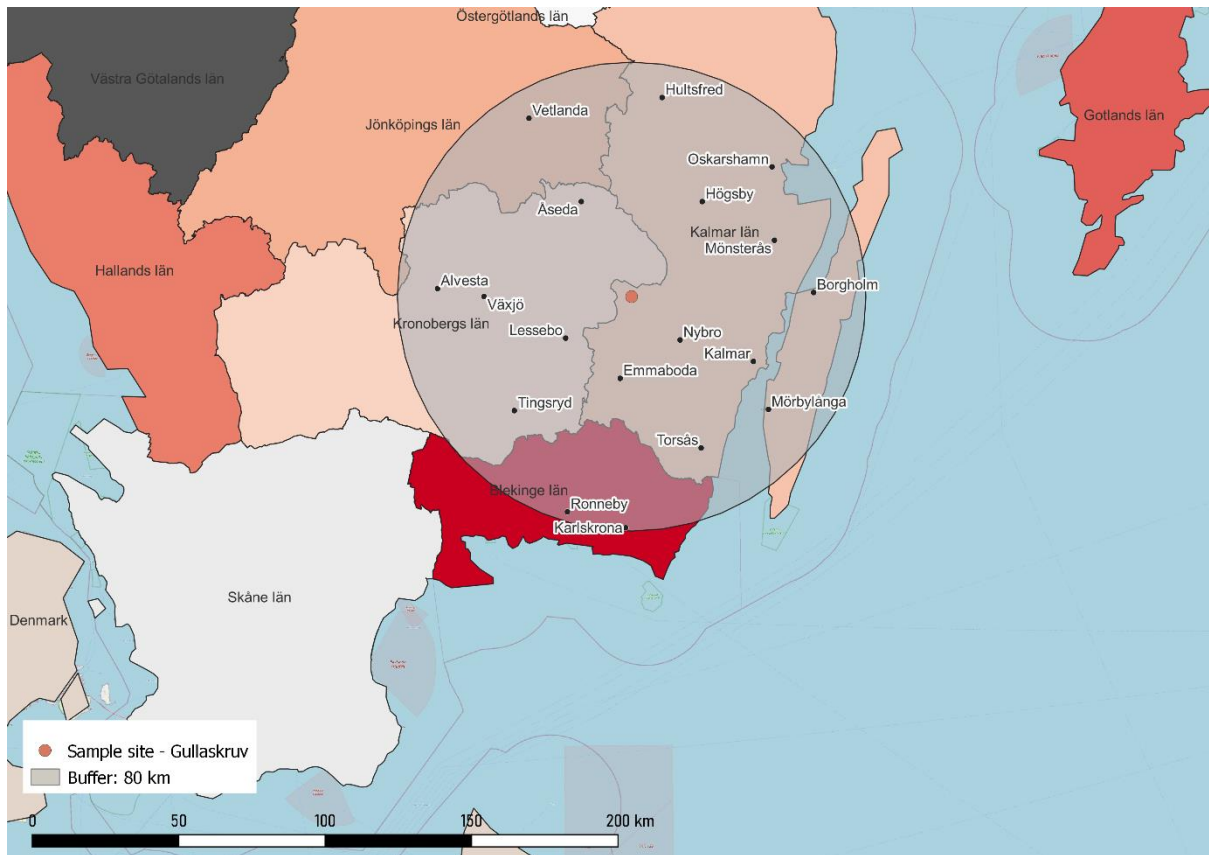


Figure 11: National visitors may arrive to the site from an 80 km buffer zone.

Illustration by: Tamara Hadházi

Belarus and Czechia, respectively. This buffer zone of course is merely based on research, therefore numbers can vary.

People are going on their holiday destinations mostly by car or other personal vehicles (64,9 percent), a much lower percentage takes public transportation (19,5 percent) and 15,6 percent goes by airplane. Destinations they choose usually must have beauty, entertainment, and the ability to connect with others. Entertainment activities are mostly connected to architecture amongst the respondents of the survey (73,9 percent) and the second most popular are nature reserves (51,5 percent), then museums and exhibitions (50,6 percent).

For inland travel, long-distance could mean anything between 50-100 km, but an average distance that people are travelling for mostly holiday purposes are 80 km one way (Brand & Boardman, 2007; Aparicio, 2016), therefore this destination is most likely to be visited by people living in Kalmar, Kronoberg, Blekinge and Jönköping counties (Figure 11). Brand and Boardman's study shows that at UK level, car and air travel is the most dominant (77 percent of annual kilometres), however the users' who are living in large urban areas travel less by air and car compared to those who live in more rural areas.

Perceived Sensory Dimensions (PSDs) analysis on the site

In the following section I am going to present Patrick Grahn's Eight Perceived Sensory Dimensions (2021), which is a powerful tool that can be utilized by landscape architects, designers, urban planners and perhaps other disciplines when it comes to planning outdoor spaces for human use. The dimensions lay a solid foundation for a design, hence it is a type of landscape analysis that gives us different perspectives on what the site is lacking, what we already have we can work with, and what can we improve to create a balanced environment.

Grahn presents the Dimensions very vividly and punctually, therefore I will be quoting some of his words and expressions which allows us to understand every dimension thoroughly and adding site-specific comments to each dimension.

1. Natural quality

"Existing in nature as a result of natural forces", i.e. not caused by "accident, human agency, or divine intervention", and that has not been "artificially cultivated or created" (Online Etymology Dictionary, 2020b). (...) vegetation seems self-sown, and there may be animals and plants associated with wildlife; mosses and lichens, large boulders, veteran trees or deadwood

“

Here, I haven't encountered any deadwood in the forest, mosses and lichens can be found on ground level due to the enclosed canopy and lack of light, vegetation is not self-sown, but planted in strict lines.

From the South-eastern to the south-western side of the sample area, runs two natural watercourses called Vapenbäcksan and Norra Flottbäcken. The latter drains lake Derasjö -a catchment area - into the sea after 57 kilometres (Wikipedia, 2021). Even though this watercourse may not seem to be an ecologically important item – due to the lack of information –, it is a *natural* watercourse according to VISS (2017), therefore it adds to the value of the land when it comes to designing with all the natural elements we can, to use the water body as an aesthetic and restorative element in the proposal. At its current state, it is the only natural item that can be marked on the analysis.

The proposal of this thesis is to involve tourists in reforesting this site. Therefore, in the first stage of being established, it certainly won't seem natural, however I wish to indicate, that Grahn writes "An environment that does not **seem** to be created by humans (...)" can be identified as natural quality. We have to accept, that there is little to no land left untouched by

humankind (globally only 2.8 percent on faunal level (Plumptre et al., 2021)), and definitely not in Europe. All we can do to improve in the matter is to strive to create a diverse and nature-like environment that can later take over and produce a more natural woodland.

2. Cultural quality

“From Latin cultura, meaning tillage, agriculture; from colere, to tend, to guard, to till, to cultivate (...) It can refer to spiritual or artistic endeavours, artistic or old artefacts, cultivated land, or socially trans-mitted living patterns. (...) in essence, it may be understood as perceivable traces of human efforts, (...) the man-made rather than self-made, the managed, rather than the wild, the cultivated rather than the natural”.

As mentioned before, this forestry land is meant for only production at the moment. To produce as much wood as possible from the land available, the land *looks* managed and cultivated rather than wild and natural. Even though forestry companies like to promote themselves as sustainable, biodiversity friendly, diverse and respectful, when I talked to a local woman in Gullaskröv and told her I just came out of the forest, that is 5 a minute walk from where we met, she asked back: *“What forest? We don’t have any forests here”*. This remark implies that however a solely production forest and the company that manages it strives to be looked upon as natural, it never will, because the approach is not nature-like. Even if a forest is managed by humans, which means it will be cultivated, it can *look* and *feel* natural, if we try with a different approach. Therefore, this site in its entirety – and beyond its borders - can be marked as cultural, meaning it is cultivated by humans.

3. Cohesive quality

“An environment that supports the sense of spatial unity, (...) experiencing a unified space rather than observing it from the outside. A place that gives the sense of “being in another world””.

According to Grahn, a cohesive space is sensitive to objects cutting through the area such as roads, that disturbs perhaps the natural feeling of the area. Sensory dimensions are linked so close together, that some qualities can hardly be separated to be existing on their own, in which case, in my opinion Cohesive goes hand-in-hand with Natural quality: if the unity of the space is disturbed by a human-made object, or plots that carry man-made interventions, it can ruin the feeling of a space being a world of its own. It is a long process to establish a place like this,

because of the growth of vegetation and the reestablishment of biodiversity, but it can be achieved.

The site currently has wide and defined forestry roads, made for robust machines that are designed to carry out the heavy-duty work of wood production. However, it would be almost destructive when it comes to the design proposal part to get rid of these roads, because it gives the site a clear network to follow, and the soil is compacted due to the frequent usage too. Mitigating interventions can be done, to make sure that the cohesive quality can be improved on the whole site. Even though cohesiveness is linked with natural quality, if we walk deeper in the plantations, we get an almost other-worldly feeling, since our perception will only see a dark green hue and structural unity. Therefore, cohesive quality will be marked on the more mature existing plantations which are already grown. These plots later can be transformed into a more diverse quality as well by not cutting them down, just thinning it to such a low degree to be able to plant broadleaf trees in the stand.

4. Diverse quality

“Meaning differing, of various kinds (...) it describes a sense of variation in the environment of complexity and sometimes liveliness, while it also experiences of richness and abundance, different shapes and colours, smells and textures. (...) In general, the PSD is strongly linked with perceptions of biodiversity and species richness, (...) and combination of different elements such as stones, water features, vegetation etc.”

As discussed before, the chosen sample site is a production forest mainly consisting of Scots pine, Norway spruce and birch with very little understory, therefore the biodiversity is quite low. The only diversity that could be described is perhaps the sight of changing plots of standing trees and heavy retention cuts, therefore diversity could neither be marked on the analysis map.

5. Sheltered quality

“An environment that offers shelter and protection, (...) a sanctuary where one can relax in solitude or spend time in smaller social settings. The ability to “see without being seen”, a relatively enclosed space or hideaway.”

Throughout my wandering in the site, there were little or no places that could be called a solitary sanctuary. Many plots are bare due to cut down trees, overgrown grass, and scarified soil, while the still existing plantations are almost completely see-through due to the even-aged stand structure, lack of lower canopy layers.

6. Open quality

As balance is needed in outdoor spaces, openness is as required as finding shelter. Grahn describes it as *“a demand for views, prospects, vistas, and panoramas: to be able to see into the far distance and to have a sense of overview of the surroundings”*. There are different aspects of this quality, such as *“a place from which one has a great outlook over the surroundings, but also an area where one can enter an open space to roam freely or engage in various other activities”*.

On the site, there is one field that is not meant for wood production purposes, and there are a few buildings that seem to be private holdings (Fröneskruv, Jordanstorp) which also have smaller surrounding private green spaces around them. These are the open qualities one is looking for in a landscape, however the retention cuts also create open areas / open wounds in this landscape which needs to be marked for presentation purposes. These cuts are defined on the map by combining the Google Earth's Satellite pictures and the available GIS data from Skogsstyrelsen (2023).

7. Serene quality

“It describes a calm, tranquil, and safe environment, unruffled and unaffected by noise and disturbances. However, it does not describe a vacuum or complete silence. For instance, tranquil sounds of nature that reassure a sense of peace and safety are welcome, while the level of maintenance is also good: no litter, no weeds.” A place, where one can reflect, daydream and be in peace. According to Grahn, this is the most important quality, as its existence is crucial for a restorative place, where anyone can let go of stress and wind down. It is best to utilize this quality with Natural and Cohesive dimensions, to create a tranquil and relaxing environment. This quality doesn't really exist on this area, because wherever one walks, one could be reminded that the existent plots one sees today might be clearcut tomorrow.

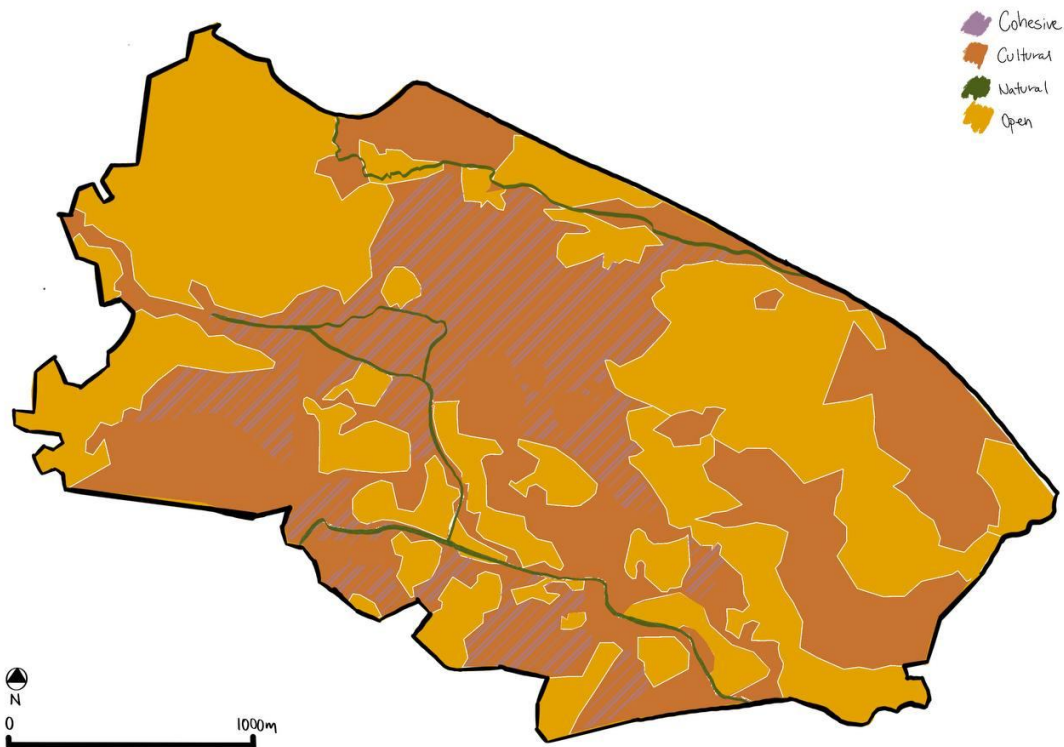


Figure 12: Existent Perceived Sensory Dimensions on the sample area in Gullaskruv based on P. Grahn's method.

8. Social quality

“A place where we can meet and interact with others. (...) It may be about social interactions and meetings, but also about just being able to watch and enjoy the presence of others at some distance. It may describe an environment where it is possible to hide in a crowd, to feel surrounded by others. It may also describe opportunities to actively engage in social interactions: to talk, eat, drink, dance, play, etc. In urban context it can be parks, city squares, cafés or restaurants. It is closely related with dimensions Cultural and Diverse, with the latter focusing on liveliness and an abundance of sensory impressions.” This is also a quality that is non-existent at this place.

Existent Perceived Sensory Dimensions – Conclusions

To sum up, the sample site currently only has 4 PSDs: the only *natural* are the creeks Norra Flattbäcken and Vapenbäcksan, *cultural*, which is the whole site used for cultivation and two types of *open* qualities, which are mostly the low diversity retention-cuts, and the minor ones are small fields with a few *cohesive* plots which are the more mature stands (Figure 12).

Discussion about potential arguments

Although we are not at the end of this thesis, the reader might think about the motive behind this grave example, and the fact that the site in Gullaskruv is a company-owned state land that is merely focused on production. The question may arise then, how is this paradigm good for landowners?

The PSD analysis can be an eye-opening example for landowners of how unnatural large-scale wood production is, and how it does not support the survival of certain forest ecosystems. The amount of the impact is dependent on the scale of the site a landowner owns of course, but it all adds up to the global and local loss of biodiversity, loss of carbon sinks and the large amount of carbon emissions and consequently rapid global warming by following a retention- or clearcut forestry method, which are not able to restore themselves quickly. Therefore, using this site allows me to present a visual comparison between an intensively working production site and a multiple-use forestry site by changing the method of harvesting and land use.

PART III

POSITIVE INFLUENTIAL SHORT CASE STUDIES

Alladale Wilderness Reserve, Scotland

In Scotland there is an ongoing battle, that prevents the re-establishing of the Caledonian Forest Scotland once had, and this vicious circle goes on partly because of the overwhelming number of grazing herbivores, such as deer and the absence of natural predators, like wolves and lynx. Scotland's Highlands once have been densely covered with a lush forest mostly dominated by Scots pine mixed with juniper, birch, willow, rowan and aspen (The Woodland Trust, 2022), which are missing nowadays, replaced by heather dominated grasslands with no trees to prevent erosion or host habitat for a diverse flora and fauna.

Alladale Wilderness Reserve can be found 70 kilometres from Inverness, on the northern part of the Highlands on Scottish mainland. The vast Highlands we believe to be natural nowadays, were far from what we see today: the above-mentioned Caledonian forests covered 70-80 percent of the Scottish Highlands until the “Highland Clearances” happened between late 18th – early 19th century, when the lands were started to be used mostly for agriculture and sheep husbandry (Featherstone, 1996). Before that, forests were burned in the efforts to get rid of the wolves thus protecting the sheep, therefore ending up in our present time, where some landlords are trying the exact opposite and bringing back predators to control the grazing of ungulates. Alladale's primary vision is restoring first and foremost the forests so that later it can support its natural ecology with lichens, shrubs, insects and forest fauna.

Their Rewilding project started with drawing up 35 kilometres of fencing around the reserve, to protect the almost 1 million saplings that were planted in the span of 3 years between 2009-2012 (Alladale Wilderness Reserve, 2021). This might be considered as an unreasonable step, hence as it will be later mentioned in Södra's report in the *Challenges&Solutions - Grazing* section, fencing is not the most appropriate and best measure to protect a newly planted forest. However, Scottish deer population was known to be around 300,000 in 1989 (Clutton et al., 2004), and has risen to around a million to our current day (Forestry and Land Scotland, 2021), therefore hunting measures are no longer enough and economically not sustainable, which is why their rewilding and reforestation efforts go hand in hand. A second reason for why fencing is questionable is the Scottish “Right to Roam” which can also be found in Sweden as “The Right of Public Access” or “Allemansrätten”. This right allows people to trespass on any land because of the enormous rural areas found in these countries. However much this rule gives

hikers and tourists to be able to freely discover nature's beauty in the area, there are times when it is ecologically more important to fence off a piece of land in order to protect a developing ecosystem.

Their reforestation program has two initiatives: a native woodland enrichment planting and an alpine planting. The first is aimed at increasing the number of birds in the area and the latter is aimed at the altitude of 450+ metres on the glens. These planting schemes are realised via an alumni initiative, where anyone can support their planting efforts through donations, and by doing so, receive information and geo-tagging of "their" trees that have been planted, in a fence-protected area for 25 years, after which these trees will be big enough to not be threatened by grazing and possibly that's when the wooden fencing's lifetime shall end.

Alladale also has 4 accommodation options for visitors to enjoy scattered around the reserve, all delivering the British charm and breath-taking views of vast mountains, cascading rivers and heather plains. 7,5 percent of the booking fees are also going to The European Nature Trust, who are supporting Alladale Reserve in their mission of native forest restoration, rewilding and conservation research (Alladale, 2018).

Wildwood EcoForest, Canada

Wildwood EcoForest in British Columbia, Canada is a cherished and honoured legacy of ecoforester Merv Wilkinson. Wilkinson bought Wildwood in 1938 to farm the land, however due to some advice from his university professor, he decided to keep the forest and practice ecoforestry which he began in 1945 (EIS, 2019). His way of harvesting was single-tree-selection, which resulted in an uneven-aged forest, in which the estimated oldest trees are around 127 years old as of today (Ecoforestry Institute Society, 2016).

According to Wildwood's management plan, their goals are to harvest timber and non-timber forest products while maintaining the forest ecosystem's structure and function. To achieve these goals, they have their base principles lined up, such as:

- Leaving 61 percent of the forest's trees to grow for more than 100 years, whilst leaving 29 percent to achieve 250 years of age.
- Perhaps their most admirable objective is achieving and maintaining a standing volume of 85 percent of the old growth forest. If we compare this number to retention forestry (mentioned in the *Today's forestry practices in Sweden* section previously) which

Sweden mostly follows, we can see a massive difference in the percentage of retained trees (from 3 percent-50 percent), or moreover, looking from the other direction, the trees that are meant for cutting and those that are not. This percentage can be maintained via single-tree-selection harvesting methods.

- Their harvesting method is based upon natural disturbance-based forestry, and the harvested trees should be selectively chosen, old-growth, high quality trees with a maximum of 46 m³ harvested wood annually. For them, this is a low volume, high value forest product management strategy.

Wildwood offers accommodation in The Homestead, a log cabin which was Merv Wilkinson's private house. Events can be organized, such as corporate retreats, private holidays, or educational events at Wildwood. The organization can also be supported via donations or joining as a member to protect the old-growth forest.

Laphroaig

The *Friends of Laphroaig* programme was created by the Scottish Laphroaig whisky company, located on the Isle of Islay. Their *Friends* campaign is a unique platform for whisky lovers, since there are different benefits of joining: after gaining certain number of points, Friends can receive tasting masterclasses, early access to exclusive products, and the ability to purchase the company's C airdeas single malt whisky which is only crafted once a year, only available to Friends.

The main reason though of why I put this company into the references, is the fact that with every bottle one purchases, that person receives one square foot of land near the distillery on Islay. This is a clever marketing campaign, which creates the illusion that we in fact own a piece of land in Scotland, therefore a connection has been created via buying a bottle of whisky. Now that we have land there, we can go there, take a look, and stick our nation's flag into that plot, to really show, we own it.

Mossy Earth

Mossy Earth is an organization who are focusing on preserving our natural world, and therefore running projects which help restoring wild ecosystems, supporting wildlife and biodiversity and mitigating climate change. They have projects from restoring wetlands in the Carpathian Mountains, to reforest Iceland with birch woods and re-establishing forests in the Scottish Highlands too. Their funding comes from their members through a membership, where they can choose how many trees are planted in their name by choosing a type of subscription (Mossy Earth-1, 2021). Mossy Earth has passionate team members who are eager to contribute to the preservation of many keystone species, and some of their team members are conservation biologists, who make sure to not just holistically approach every project but educating their members and the public whilst doing so.

On their website and their YouTube channel we can always meet with their transparency in methodology and just generally get valuable lessons on how ecosystem services work, why certain tree-planting projects are not specifically the most beneficial to the environment, and showing us that a small team, if determined can achieve many global goals that are truly supporting our diverse ecosystem (Mossy Earth, 2021).

Forestry practices in Hungary

Even though Hungary is sometimes a country that is more modest in its economics and has controversial politics, its forestry practices are to be followed and cheered upon. Hungary, being quite a small country is covered by 20,8 percent forests, which is around 1,93 million hectares, out of which 36 percent is formally protected (NÉBIH, 2014). According to the NÉBIH's (National Food Chain Safety Office) Forest Map system, there are many areas which are to be clear-felled but also just as many which are either following single-tree-selection, are to be modified or not used for wood production at all (NÉBIH-1). To be quite transparent, we have hiked many places in our neighbouring forests and other parts of the country as well, and never really seen a clearcut area in the last two decades, which is the reason why I was surprised to see the management plan in map format.



Figure 13: Hidasi-völgy (Valley Hidasi) in the Eastern-Mecsek Landscape Protection Area, 2022 spring.

*The ground is covered with Wild garlic (*Allium ursinum*) under a dense oak canopy (*Quercus spp.*). This forest has many dead wood in it and a meandering creek which gives a truly diverse ecosystem to the area. Traces of wood harvesting can be seen but in such a small percentage that their absence is barely noticeable and only because the harvested wood is left at site for a short period of time. Photo taken by: Tamara Hadházi*

Hungary's forests are owned by private landowners in 43 percent, 1 percent by communities and by the government in 56 percent where these lands are managed by 22 different closed joint stock companies. Coming from south-west Hungary from the Mountains of Mecsek, we always stood very close in heart to the forest: every weekend we'd go with the dog for a hike with the family to wander in the ever-changing colours of trees.

This part of the country has a very diverse ecosystem and is managed by Mecsekerdő Zrt. (translation: Mecsek forest closed stock joint company). Most of the forest here consists of almost 50 percent different types of oaks, then various percentages of beech, hornbeam, linden, ash, poplar and pines. Pines only make up around 2 percent of the forest stand (Mecsekerdő, 2019). Mecsekerdő Zrt.'s goal is to convert fully to continuous-cover forestry methods, from clearcutting, which they admit in their management plan is a long-term goal that can take many decades to a century to adjust to but is for the better. Those areas, which are to be managed by single-tree selection after a clearcutting is called "Temporary" management type in the Forest Law of Hungary. Even though the forestry practices are not perfect yet in every part of the country, I can confidently say that it is improving. We have walked many times in production forests as well which didn't feel like a bare land that was stripped from its ecosystem at all.



Figure 14: Hidasi-völgy, January 2023.

Various natural new growth of oak seedling can be seen on the ground level, a natural creekbed and a generous amount of dead wood for a diverse ecosystem. Photo taken by: Tamara Hadházi

Walking in these forests is deeply grounding: natural regeneration can be seen everywhere with various canopy layers, bush layers, ground-covering plants and all the new seedlings popping up everywhere we look (Figure 13,14).

In these woods wild boar, deer, various types of bats (Natterer's and Bechstein's bat, Western barbastelle – *Myotis nattereri*, *M. bechsteinii*, *Barbastella barbastellus*) can be found, alongside with Alpine longhorn beetle (*Rosalia alpina*), cicadas (*Tibicina haematodes*) and various types of birds (DDNPI, 2023).



Figure 15: A marvellous example of old growth trees that are preserved in Hungarian forests.

This tree is an ash (Fraxinus spp.) in the Bakony mountains, north-western Hungary, July 2021. Photo taken by: Tamara Hadházi

Payment for Ecosystem Services (PES)

According to the IPBES (2019), PES is an instrument that finances nature conservation to those, who own or manage natural resources. It can happen in a way, that the government is financing for example forest landowners for their conservation efforts, as it happens in Costa Rica, presented below.

Costa Rica

Between 2008-2012 13,077 hectares were reforested through more than 500 contractors, with an average of 29,9 ha planted per contract, with an annual 7,5 ha reforestation rate per contract. While contractors do thin their forests, around 95 percent of the people surveyed in this program are more likely to prune their trees, which helps with the quality of their stems at the age of 2 (FONAFIFO, 2019).

FONAFIFO: main source of income comes from 3,5 percent of fuel tax, to be given to forest owners for environmental services, mitigation of GHG emissions, protection and development of biodiversity, conservation and management of natural forests and forest plantations. Landowners, who participate in this programme, receive around 80 dollars a year for every hectare of forest land replanted or conserved (FONAFIFO, 2019; The Economist, 2022).

According to their statistics, most silvicultural activities in these forests are thinning, pruning, fertilization and vegetation control via herbicides. As the Forestry Law 7575 was created in 1996, where the National Fund for Forestry Financing and therefore the PES was installed, logically there would be no other silvicultural measures yet, such as harvesting due to the young age of the trees. It is not clear whether this framework allows for example single-tree-selection felling or any type of sustainable harvesting or just controlling silvicultural activities listed above to be able to fully conserve a diverse forest suitable for many species.

A similar programme to Costa Rica's efforts is the Forest Biodiversity Programme for Southern Finland or METSO. This framework was presented as a case study in *TemaNord* 2009:571 where landowners can enter voluntarily to receive compensation for foregone revenue. The price to be paid was negotiated depending on the case, which, if agreed on, was made into a fixed term contract, that lasts 10-13 years. However, when this period ends, the owner can manage the area as they wish – when we might question, whether the landowner can apply again for the same protection and continue the work, or decides not to, in which case the question arises if they will continue the conserving work, or manage the forest in a way that decreases habitats and biodiversity?

Ecosystem services applied could be the following: biodiversity, carbon sequestration, water purification, reindeer husbandry, game, berries, mushrooms, lichens, recreational and spiritual services. The METSO framework also introduced competitive tendering, where voluntary conservation of ESS could be supported financially by the government (through beneficiaries, who are the Finnish population, and financing it via the national tax system), if a landowner applied to conserve certain ESS, however these areas would ultimately become nature conservation areas, which supposedly means, that no forestry methods can be done in them. This scheme has one weakness that needs to be improved, which is the fact that even though the forest owner can decide to conserve some part of their land, due to property rights and the nature of the signed contract, there is little control over other parts of their land, where they might carry out bigger clearing than usual (Zandersen Grønvik Bråten & Lindhjem, 2009).

There are two types of conservation options, which are calculated on METSO's website according to site preferences:

- Permanent protection (on an 80 years-old area of 5 hectares with mixed forest):
 - the forest owner can either sell the forest land to the state for 43,000 Euros

- or keep the forest and sign a contract for permanent protection, for which the landowner will receive 40,600 Euros (METSO-1, 2022).

- Temporary protection:
 - Applying for 20 years of protection on the same example site would be 15,000 Euros compensation for the landowner, however the given amount can differ according to site specifics.
 - Applying for a 10-year long temporary protection is calculated by METSO according to the conserved site's size and logging value. In an example which is calculated on a 1,2 hectares land with the existence of the valuable habitat of a natural stream is an estimated 1764 Euros of compensation (METSO-2, 2022).

Temporary protections within METSO's framework can be found slightly vague: the 10-year protection states that there should be no forestry measures happening on the land, which was granted the compensation, however the 20-year protection does not exactly say what the protective measures are, or if the landowner is allowed to do some sort of harvesting (METSO-3, 2022).

Both FONAFIFO and METSO are quite new frameworks in regards of a forest's lifetime and therefore there are limited amounts of results to present in regards of restoring habitats and red-listed species completely, especially in the case of METSO, which started around 2003, however, both are showing a way of forestry that allows nature to thrive while still providing income for the owners.

Nokås – Support for natural and cultural environment conservation measures in the forest, Sweden. This example is included, because it is a PES scheme in Sweden, albeit it is quite limited.

Skogsstyrelsen has an initiative called Nokås, where a forest landowner can apply for financial support for providing or protecting certain ecosystem services, which can be the following (Skogsstyrelsen, 2022):

- First afforestation with deciduous trees on formal agricultural land – these measures must contribute to the environmental goal “Living forest” (Levande skogar) which promotes natural or cultural environmental values, or recreation and outdoor life.
 - The support for deciduous afforestation is 50 percent of approved costs, with a maximum of 30.000 SEK/ha.
- Installing fencing around the area where deciduous trees should regenerate, the support is 100 SEK / running meter.
- If the measures contribute to the Living forests objective, the landowner shall receive 70 percent of approved costs
- The Living forests has nine specifications, one must bear in mind when applying for bigger support from Nokås (Naturvardsverket, 2022):
 - Forest soil: physical, chemical, hydrological and biological properties of the forest soil are maintained
 - Forest ecosystem services are maintained
 - Green infrastructure: the forest’s biological diversity is preserved and species have the opportunity to spread within their natural distribution areas
 - Favourable conservation status and genetic variation: naturally occurring species linked to the forest landscape have favourable conservation status and sufficient genetic variation
 - Endangered species and restored habitats: endangered species have recovered and habitats have been restored in the forest
 - Alien species and genotypes are not threatening the forest’s biological diversity – using mostly or exclusively endemic species
 - Genetically modified organisms that may threaten the forest’s natural biological diversity shall not be introduced
 - Preserving and developing of natural and cultural environmental values
 - Outdoor life: The values of the forest for outdoor life are protected and maintained

Even though this initiative would be able to work, this year’s report states that the measures that already have been implemented are not sufficient to stop the loss of important habitats of the forests and continues that there were not enough developments. It also points out the importance of strengthening actions that are aimed at restoring habitats for endangered species. However, even though their efforts are to be increased further on to protect biotopes and create

nature conservation areas, the report says that “areas cultivated with clear-cut methods are expected to contribute to increased variety in the landscape” (Skogsstyrelsen 2022). Perhaps forestry industries would like to stick to the idea that complete rejuvenations can be beneficial caused by natural disasters in some cases (like wildfire), therefore imitating it via clearcutting can also be beneficial to the industry and the ecosystems as well. However, wildfire for instance creates a nutrient-rich soil with reduced forest floor depth, which allows early successional species to be established, while clearcutting leaves the forest floor mostly undisturbed (minus the heavy machinery), which leads to a different, perhaps slower rate of early succession. Even though both clearcutting and wildfire caused disturbance create a sort of acceleration in succession, the intensity will always be greater of wildfire against clearcutting (Simard, Fyles, Paré & Nguyen, 2001).

Ecotopia Österlen

Perhaps Ecotopia shares the most similar vision to mine when it comes to social contribution to a more sustainable future, but in permaculture rather than forestry. I have found Ecotopia as the very last reference when I was deep in my analysis and design ideas already.

Ecotopia can be found on the Eastern side of Skåne, Southern Sweden, a local and likeminded already running business.

To quote them, they are “Social Entrepreneurs with a focus on ecological community development in order to pave the way for others (...)”. Their motto is: “Never doubt that a small group of thoughtful, committed citizens, can change the world. Indeed, it is the only thing that ever has.” – quoted by Margaret Mead (Ecotopia, 2022)

When they talk about permaculture on their website, they mention, that permaculture should be a way of holistic agriculture that is also a social environment which is in harmony with nature.

Their guiding principles are:

- diversity rather than monoculture
- sustainably optimized instead of short-sighted overexploitation
- cooperation instead of competition

The cleverest attitudes and strategies of course can always be found in the details: when confronting with natural disturbances, such as insects attacking their crops, their strategy was to plant colourful flowers to attract them there rather than on the cabbages, similar to what should be done in forestry when planting trees to be kept, plant other trees that are more digestible for moose to eat, rather than only plan for wildlife management via hunting.

They also give workshops, such as building eco-houses, like straw bale buildings, forming clay bricks, and creating permaculture design plans. They are not only providing these experiences as one-off events but approach it with mindfulness and give educational purposes to all their projects concerning visitor arrivals and community building.

They also offer accommodations in eco-cabins, which are all made of eco-friendly materials and built with different types of construction methods. Those, who do not wish to stay overnight can book study visits as well, where a guided tour of the grounds is provided.

To lead with example, they have a total page dedicated to sustainable solutions, and morals out of which just a few are:

- to transmit research results to a building process
- to live and build with unison with nature
- to become self-sufficient on renewable energy – heating and electricity provided by solar power, planting and using ecological food, water management etc.
- harvest available energy resources – wind power, solar cells, eco-cycle sewer
- and most of all: have confidence in one's ability to make a change towards a better future just by contributing and putting in effort.

CONCLUSION PART III: HOW WILL THE FRAMEWORK COMBINE THE REFERENCES ABOVE?

Reading through these references we can see different schemes, different “packages” so to say:

- Buy a one-time contribution and we will plant X number of trees for you once (Alladale)
- Pay a monthly subscription and we will plant X number of trees for you per month (Mossy Earth)

- Donate, or become a member, and we protect the old-growth forest (Wildwood)
- (Buy,) regenerate and protect land and the government will pay you for your efforts (Costa Rica, Finland)
- Sell a product with the intent of connecting your buyers to your brand and land by offering different types of advantages of being a consumer of your brand (Laphroaig)
- Give access to and do not destroy nature by overharvesting it (Mecsekerdő, Hungary)
- Encourage visitor participation in creating a sustainable future (Ecotopia)

The *Silva Renatus* framework intends to combine some of these characteristics with changes of course in one package:

- rather than entrusting a company or an organization to plant the trees for the individual, the individual will plant the trees themselves with the help of additional educative information beforehand
- This activity ensures the establishment of connection between the landscape and the visitor
- the hands-on achievement of contributing to the reestablishment of biodiversity in a disturbed area
- encouraging landowners to combine their forestry methods with nature conservation to receive financial support

PART IV – PROPOSAL

- Legend
- Clear/low retention cut
 - Open areas
 - Conifer-dominant plantation
 - Diverse forest land

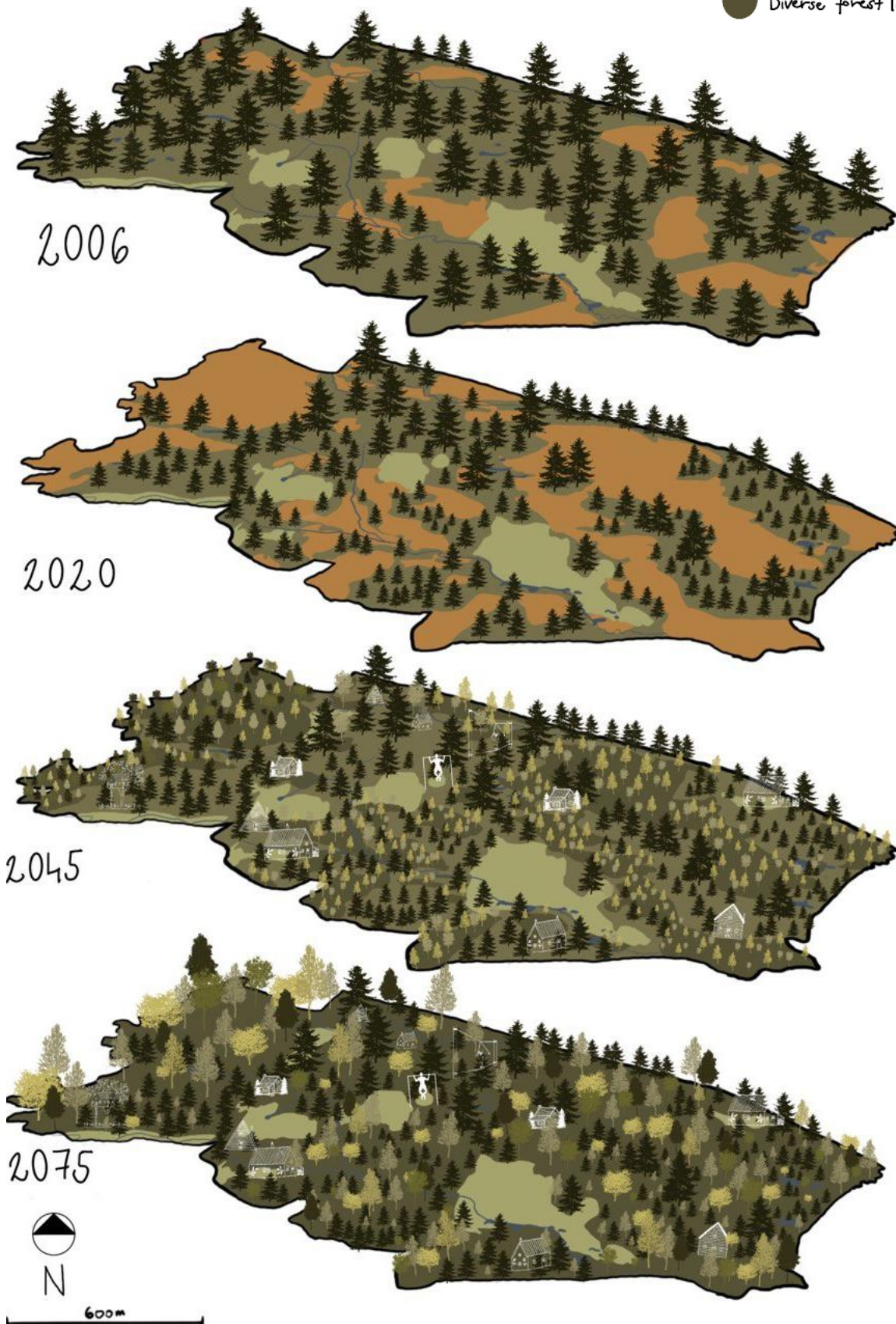


Figure 16: Vision of the site's overall change after implementation of the framework.

Illustration by: Tamara Hadházi

FRAMEWORK



Description

This theoretical framework is named Project *Silva Renatus*, which translates from latin into *Reborn Forest*. The name itself suggests a nurturing and caring environment that as the phoenix arises from its ashes, turns into a vivid, brilliant creature once again. A forest can be viewed as an entity on its own yet not entirely, as all trees carry their own unique value to the numerous amounts of plants and animals who depend on them.

Project *Silva Renatus* is aimed at private forest landowners, who are willing to make a change in their harvesting methods in order to protect and enhance forest biodiversity, reduce atmospheric carbon emissions and increase the value of their forests by pairing sustainable tourism with sustainable forestry. This framework is also applicable if a private person, company, or investor would like to start a sustainable tourism business with a focus on re-establishing biodiversity on forest land.

A project like this has many challenging attributes which need to be solved: these aspects will be mentioned in the *Challenges & Solutions* section.

As landscape architect students, we are taught that in our profession we mainly deal with tapping into and combining different disciplines, such as engineering, botany, geography, environmental psychology, and art history (van den Brink & Bruns, 2014; ASLA, 2018). This framework therefore aims at creating a proposal by combining certain factors of different disciplines, such as tourism (ecotourism), environmental psychology (environmental education), forestry and spatial analysis.

The main aim of *Silva Renatus* is to strengthen and encourage sustainable forestry in Sweden, by replacing the high intensity harvesting that clear- and retention-cutting brings, with a more holistic way of managing the land and resources. The Lübeck model in Germany shows us that it is possible to have income from timber products by introducing lower impact harvesting methods such as single-tree-selection.

The uniqueness of this framework is to involve common individuals such as tourists, hikers, students, children etc. in the reforestation activities. Intensive forestry is known for its



Figure 17: Clear-background sign showcasing how the forest should look like comparing it with the low-retention cut background.

Illustration by: Tamara Hadházi

efficiency due to the quick and productive harvesting methods which is eventually followed by a mass planting on the cleared site usually with coniferous monocultures, thus creating a new cycle that lasts for half a century with low biodiversity, low quality of wood and a new era of greenhouse gas emissions. There is no questioning this method's high productivity, which is the easiest and most beneficial to the economy whilst it is equally destructing for the ecology.

When visitors would start coming to the site, the already cleared plots going to be planted by the visitors themselves, which will contribute to the following advantages:

- Various types of trees will be planted that are specific to the hemi-boreal forest type, such as aspen (*Populus spp.*), alder (*Alnus spp.*), rowan (*Sorbus aucuparia*), willow (*Salix spp.*), oak (*Quercus petraea*, *Q. robur*) and beech (*Fagus sylvatica*) next to the already existent ones on the site such as Scots pine (*Pinus sylvestris*), Norwegian spruce (*Picea abies*) and birch (*Betula spp.*) (Drössler, 2010).
- The resort will have educational signs and boards which shares information about ecosystem-based forestry vs. clearcutting and showcases how the forest should look

like if it would be harvested selectively while also showing what is the initial goal of the project (Figure 17).

- Allowing the visitors to plant these trees will create an instant connection to the land, which is more and more likely to disappear from tourism nowadays, when we constantly want to show off our travels on social media platforms and not live through the present moment. Visitors thus will be encouraged to be more mindful while being on vacation for the environment's benefit and for their own mental health.
- The planting will not happen all at once but gradually as visitors arrive, thus creating an uneven-aged forest which will have various canopy layers and will carry more natural characteristics.
- Many planting schemes are done by collecting funds, and trees being planted by professionals with the help of volunteers, as we could read in the *Short Case Studies* before, however it would be different here. As scary as the notion can be to some landowners that people without proper background will plant the new forest, it is also beneficial in regards of collecting financial resources via tourism and creating a unique experience without much physical effort.
- To achieve a high survival rate of saplings and reforesting clearcuts, the visitors who are planting will be assisted by short written guides which educates them of why this scheme is beneficial for the environment, what are the best techniques to create a well-working ecosystem and how their contribution helps the environment locally and globally.
- Visitors will receive a simple GPS with which they can mark the saplings they planted. These coordinates will be installed into *Silva Renatus*'s own GIS system, in which visitors can track their tree's wellbeing, occasionally receive notifications or updates in pictures, biodiversity activity around their trees and so on.

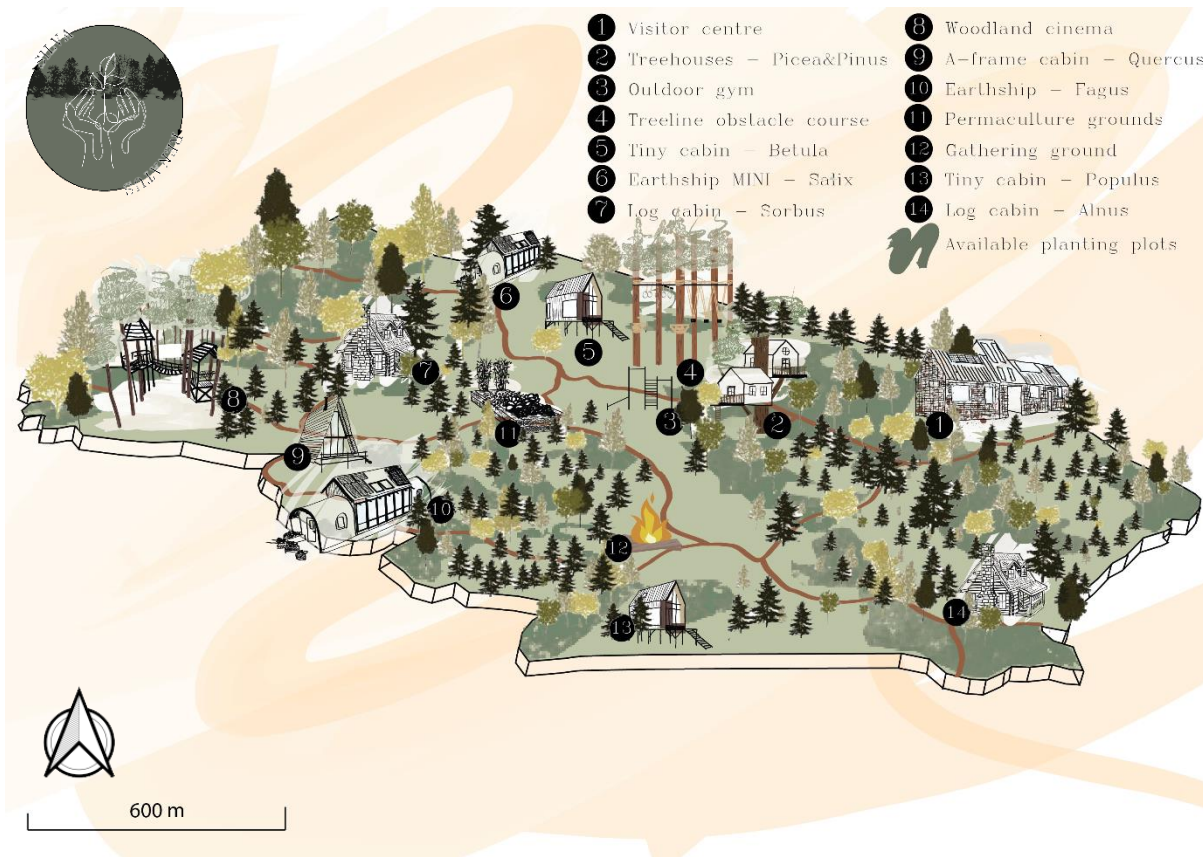


Figure 18: A map of the resort showcasing different accommodations and activity points.

Illustration by: Tamara Hadházi

Map of the resort

All buildings on the site ought to reflect connection to the land which connects us to the idea of sustainability and thrift – meaning, we are aiming to use materials that can be found locally or on site directly, and it doesn't look outlandish in the surrounding landscape -.

The site has several planting plots, marked with dark green on the map (Figure 18), cabins for overnight stays, which will be described in the *Accommodations* section, outdoor gym area, with a nearby obstacle course in the canopy and ground level (Figure 19), and a plot for permaculture for educational and providing ESS purposes as well. At the southwestern corner of the site is a Woodland cinema with treehouses based on the inspiration of Nelson Treehouse (2018) (Figure 20) and a gathering ground for social events.



Figure 19: A part of Treeline Obstacle course at Silva Renatus

Illustration by: Tamara Hadházi



Figure 20: An outdoor cinema made by Nelson Treehouse is an amazing inspiration that could add a lot of restorative value and attraction to the site. Image source: Nelson Treehouse (2018).

Silva Renatus should be a place that is not merely educational, because it can be too overwhelming, especially for children. Pairing education through experience with free-time activities that they can enjoy, creates an event that one will look back gladly to, and form subconscious connections in the mind with the use of the forest and the consequences of how its harvested.

Accommodations

Accommodations on the site should be various types, as the optimal goal is to make the visitors shift to new cabins approximately every second day to ensure a broadly planned area.

This area, although large enough to have more lodgings, should carry 8 cabins in total due to possible financial restrictions upon establishing. Most of them shall be placed in the already existing coniferous forest stands, as it would create a sheltered and secluded feeling, where one can relax and enjoy the peace of the woods. All cabins are named after tree species that will be found on the site, regardless of their position, hence most buildings will be placed in existing coniferous stands.

The location of the cabins can be seen on the previously presented site map (Figure 18), however it is worth to mention the different types of structures that are advised to use:

- Treehouse (Picea & Pinus): placed amongst the pinecones and branches, approachable through a ladder and made of wood, this house is a dream accommodation in many people's hearts. As all of us wants to nurture their inner child and wake to the bird chirping in our window, whilst we sip our coffee is the perfect weekend treat. A small greenhouse can be found underneath the house to equip ourselves for the planting activities.
- Tiny cabins (Betula & Populus): two cabins that carry a bit more modern exterior, with big windows for soaking in the sights, and an attached winter-garden styled greenhouse (Figure 20,21).
- A-frame cabin (Quercus): a lightweight structure A-frame cabin made of wood with a porch and small greenhouse.
- Log cabins (Sorbus & Alnus): a rustic getaway close to the creek with a small greenhouse nearby
- Earthship: made from mostly natural and reclaimed materials such as tires, clay, brick, bottles etc, the Earthship is the largest building that can host a class of students or a bigger group depending on the event. An Earthship's purpose is to repurpose used materials and incorporate as much natural ones as possible. Use renewable energy and take advantage of all natural resources available, hence its basic component can be a south-facing greenhouse part, where saplings or even crops can be grown.



Figure 21: Cabin “Betula” – a more modern tiny cabin with a greenhouse for the seedlings in a coniferous forest stand. Illustration by: Tamara Hadházi

- Earthship Mini (Salix): let’s not keep the fun experience of the Earthship to bigger groups only, but a smaller Earthship is to be made for a smaller group of people to enjoy. Same idea, same advantages, smaller size.

All lodgings are to be put into existing forest stands: even if the stands look man-made and were meant for production, these are the only places to put the cabins, as the harvested areas are no fit environment for this purpose yet. The only exception is the Earthship which would enjoy a more open area, where group activities can be planned for bigger teams of visitors.

The most beneficial way to build eco-friendly and sustainable houses is to build them from felled trees that were done for thinning and use recycled or more lightweight materials, such as beams, wall structures using I-beams from Masonite Beams as an example (Masonite Beams, 2023). It is a Swedish company, which creates light weight yet durable building materials made from timber, but almost all parts of the wood are used, even sawmill by-products. The beams themselves are quite thin, to make the least environmental impact possible. They use 47 percent less raw materials due to the light construction technology, yet the structure allows the beams to carry the same amount of weight as a normal beam would.



Figure 22: An example of the interior of the greenhouses at each cabin: raised beds for the saplings, a pegboard wall at the back for the planting tools and other equipment.

Illustration by: Tamara Hadházi

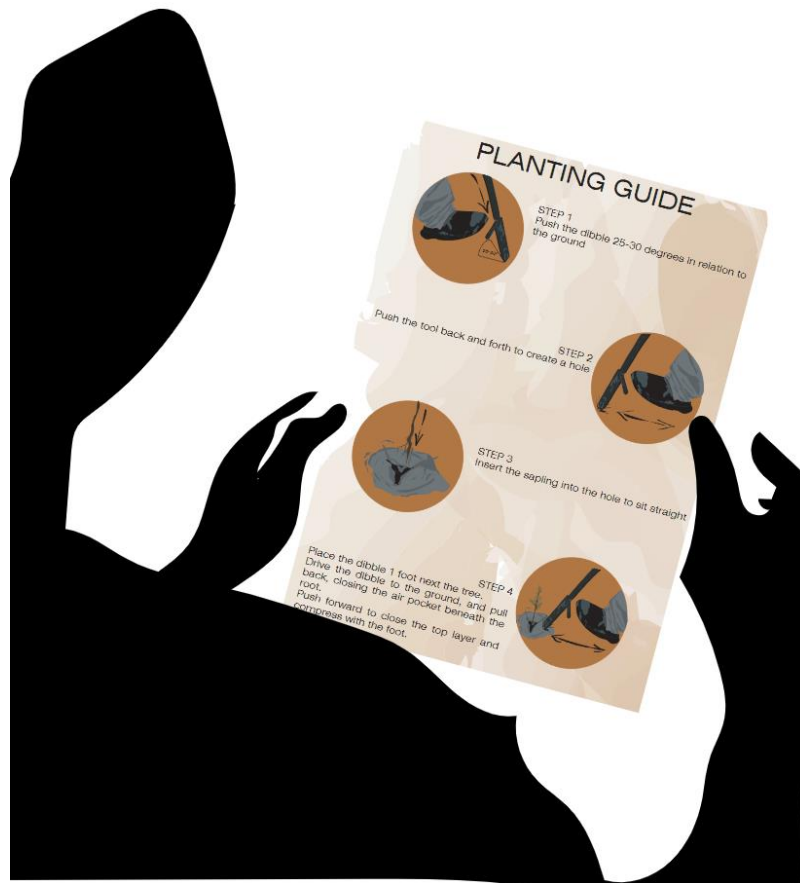


Figure 23: Planting guide for educational purposes and for correct installation.

Illustration: Tamara Hadházi

Planting system and planting kit

When arriving, everyone will receive a GPS in the visitor centre and several stainless-steel name tags engraved for the trees to be kept. Different types of tree seedlings to be planted will be chosen and prepared by the landowner (or employees), waiting in the greenhouses for the assigned visitors marked with their codes and names. The visitors then will receive a user guide for the GPS with instructions and codes of how to mark their trees. For example: *Quercus robur* (English oak) – QR23Y0001 – QR= *Quercus robur*, 23Y – year 2023, 0001-tree's own number. When they hand back the GPS, the coordinates will be uploaded into an online GIS system, which will be shared with the visitors, and they will get updates on the tree's growth every year, then as time goes by, every 5 years, in hopes of the ones who planted them, will come back.

Visitors will also be equipped with a “Planting kit” which they can pick up in their assigned accommodation, or if it is a group of students, they will get it when arriving at the visitor centre.

The kit will include the following:

- A tree planting dibble to easily create a hole in the ground for the seedling
- The assigned seedlings in the small greenhouses next to the accommodations
- “Strategic” seedlings to plant next to the trees that are meant to be kept – these trees will be planted mostly for the wildlife such as deer or moose to be able to graze on them rather than the “eternal” trees
- A small booklet that explains why and how this procedure is beneficial for the environment and forests / inventory
- Seedling covers / tubes for protection to the eternal trees
- Gardening gloves
- GPS for the GIS system
- A functional tool holder vest to be able to hold all the necessary things mentioned above, even the seedlings
- Planting guide (Figure 23)
- Stainless steel name tags (Figure 24)



Figure 24: Stainless steel name tags applied on the “eternal trees”, to mark the contribution.

Illustration: Tamara Hadházi

Maintaining the connection

The importance of legacy is essential to most people in their lives: adding our name to something we believe in that makes us live on after our passing of this Earth has always been a focus to most individuals. Legacies can be material, biological, or a legacy of values, which according to Hunter and Rowles’s study (2005) is the most important one. Values here can be defined as one’s belief in education, helping people, being kind and unique. Future generations can look back upon these values and if they are found to be positive to our society, leaving a legacy of generosity towards the environment is one, we must strive to do.

Creating a connection to places should be an easy task, but as Richardson, Hussain, and Griffiths (2018) point out, with the ascend of smartphone usage, nature connectedness has started to decline and can in fact be linked to anxiety. As the technology improves, we are getting ever more distant from nature, as we move to cities, urban areas, spend our lives in offices, and at the end of a rushing day, we are sitting down to scroll on our smartphones.



Figure 26: Creation of wooden name plaques to apply to the Wall of Contributors

Illustration: Tamara Hadházi

One can say that these are too small impacts to make a change on an environmental scale, but the “individuals cannot make a change” mindset is what sets us back from sustainability. Everyone’s contribution should be honoured in this way, by leaving their mark on the site, which many generations can later read and cherish.

The wall of Contributors is a wooden wall that represents the connection to the forest and uses local materials. The square-shaped boards are put together of five wooden slats for easy application after burning the name of the contributor into the wood with a pyrograph (Figure 26).

An equal distribution of forest stands

To ensure an even forest coverage all over the site, there is one rule that must be followed: overnight visitors will receive a defined number of seedlings according to how many houses they stay in.

The reason for this is that a bigger site cannot necessarily be discovered at its entirety in one day, and visitors might not reach every part of it. If they don't have time to reach them, it means that the seedlings are not going to be spread evenly, but perhaps in one big group, whereas other parts of the site might remain completely bare. It also encourages the visitors to not rush through the site in one go.

The minimum number of overnight stays should start from at least 3 nights (see later in *Negative impacts of tourism*) where the visitors would be required to shift to another cabin every day, where they can pick up a new set of seedlings to plant (Table 1).

A set of seedlings (6 in total) that comes with the assigned cabin looks like this:

- 2 seedlings to be kept as “eternal trees” that visitors can come back to. They will create the core of the forest for at least 100-150 years,
- 2 seedlings for animals to graze on,
- 2 seedlings for the owners to harvest.

With every cabin they stay at, the number of the *eternal trees* will gradually rise. The higher the number, the higher the probability that at least some of them will survive and therefore maintains the link between the visitor and the site. If all or most of the *eternal trees* survive, a few years after planting, the visitor will be given the choice to give some of them (maximum 50 percent) over to the owners to be harvested after at least 60 years of following ecosystem-based forestry methods.

Day-visitors will also be allowed on the site with registration. Their contribution will consist only 4 trees in total: 2 eternal trees, 1 for grazing, 1 for harvesting. Limiting the number of their contribution perhaps will encourage some of them to come back for overnight stays and contribute more, or to plan a minimum of 3 nights there in the first place. Four trees in total might not seem a big amount, but the assumption is that people will visit this place in smaller groups or couples, which then add together.

Length of visit	Seedlings per accommodation	Number of cabins	Number of seedlings	Total contribution
3 nights (min.)	6 in total	3	3x6	18 seedlings/person
4 nights	2 for grazing	3-4*	3x6; 4x6*	18-24 seedlings/person
5 nights	2 for harvesting	4-5*	4x6;5x6*	24-30 seedlings/person
7 nights	2 "eternal"	5-7*	5x6;6x6;7x6*	30-42 seedlings/person
Day-visits	-	-	4	4
*number of cabins and received seedlings depend on prior agreement				

Table 1 – the rate of visitor contribution based on the length of their visit.

The received number of seedlings depends on how many nights are the guests staying for. One cabin comes with a set of six seedlings per person, therefore if the minimum stay is 3 nights, they stay in 3 cabins, thus one guest is getting 3 times 6 seedlings (18 seedlings) to plant. If the guests are staying longer, the number of seedlings will gradually rise with the number of cabins they stayed at with plus six seedlings per cabin.

CHALLENGES & SOLUTIONS

Harvesting methods

Challenge

Even though many studies confirm that clearcutting is ecologically unsustainable due to the constant disappearance of forest flora and fauna, today's market in Sweden has a large demand for timber forest products, therefore the industry must provide material to satisfy the growing need (Bergenholtm et al., 2020). Many landowners believe that economically this is the best method because when clear-felling is done at once, the production is the most efficient and low-cost and it doesn't demand foresters to invest more time, money and effort to selective logging. Despite the truth that selective logging is less efficient in productivity on the short term, the fact remains that the quality of the final wood product in monocultural forests are so low and distances between the forest and the sawmills are so big that a forest owner might not benefit financially more from clearcutting than they would from another type of forestry method (Öhagen, 2022 – oral communication).

The challenge therefore is great:

- the industry must change in a way to support ecosystem services - and not the loss of habitats - to meet the UN's Sustainable Development Goals:
 - Goal 12: ensuring sustainable consumption and production patterns – develop sawmills to be able to handle bigger trees, develop the market to consume better quality wood, develop the industry to acknowledge the value of forest ecosystems during harvesting.
 - Goal 13: fight climate change and its impacts – allow forests to grow into old ecosystems and nurture them accordingly, to sequester more carbon in order to slow down global warming, to decrease the growth of red-listed species.
 - Goal 15: protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, halt and reverse degradation and biodiversity loss (United Nations, 2015).

Solution

Ecosystem-based forestry / The Lübeck model

As it was discussed above, many landowners stick to clearcutting because the industry has evolved in a way that there is very little alternative to follow. The challenges have been listed

above of what they face in terms of environmental goals, as well as profitability was also mentioned.

Clearcutting might have a higher cash-flow, but it isn't necessarily more profitable: an ecosystem-based forestry, such as the ones that are managed with the Lübeck-model are diverse forests, not allowing monocultures to be planted. Therefore, the forest has a higher protection against pests and injuries, which keeps the forest products safe from damage. The profit does not come once, as opposed to clear-felling, where money is being spent up to the point of harvesting, but the income is continuous as the trees are selectively cut according to their quality. The production focuses on lumber and not pulpwood which is a big difference in today's industry. Because the forest is managed to be kept an intact ecosystem unlike clearcutting, it provides recreational benefits for users such as tourists and locals alike, from which additional income can be expected as well (Bergenholtm et al., 2020). Although the model does not allow monocultural plantations, talking about it with Mikael Karlsson (2022 – oral communication), to avoid further destruction of habitat and erosion of forest land, a landowner who decides to move towards ecosystem-based forestry can start on an already existing monoculture: a slow transition will take place, hence the owner is advised to do (a smaller amount than usual) thinning or create small gaps in the monoculture, and replant the gaps with deciduous trees to start enhancing biodiversity and avoid clearcutting.

Finances

Challenge

Most landowners insist that the only economic way to harvest trees is clear- or retention cutting. As mentioned before, clearcutting mostly younger stands of monocultural plantations that were heavily thinned before, decreases the value of the wood and end up being sold for around 50 SEK/m³ for pulpwood whereas one can sell firewood for example for 1500 SEK/m³ according to the experiences of a Swedish forest landowner I had the chance to talk to, who sold the last harvest of a clearcut to SCA (Lantto, 2022– oral communication).

It can be seen now that it is not necessarily beneficial to do clearcuts for merely economic purposes, for which reason a mindset change is needed amongst landowners. That is why alternative harvesting methods and ways of revenues must be considered for keeping up a healthy ecosystem that supports the wellbeing of our direct and indirect environment.

The project *Silva Renatus* is admittedly a costly one to implement. The amount of expense depends on many components:

- Are the expenses shared between multiple landowners or just one?
- Are there sufficient fundings from the government to support the conservation of ecosystem services (PES)?
- The size of the area to be developed
- The amount of development (infrastructure, accommodations, employees etc.)

... and many more.

The *Limitations* section at the start of the thesis mentioned, that there will be no detailed financial plans included in the proposal because it is too broad of a subject to fit into the borderlines of this work and has too many factors to consider.

However, a useful tool to use when it comes to investing into conservation, sustainable forestry and development is the Benefit to Cost Ratio (BCR) or otherwise known as Cost Benefit Analysis (CBA).

The IUCN has developed a *Cost-Benefit Framework for Analysing Forest Landscape Restoration Decisions* (Verdone, 2015) to help decision-makers understand different sides of investing into restoration. This framework says, that “The results can be used to set prices for payment for ecosystem services, identify sources of restoration finance, identify low-cost/high-benefit pathways towards carbon sequestration, and identify priority landscapes for restoration based on return-investment analysis”. The document also draws attention to the misunderstanding of forest restoration activities: many shy away from the task because of its “high up-front costs and low rates of return” since objective evaluations haven’t been done before the investment.

Their Cost-Benefit Analysis consists of several steps, which can only be used if we are aware of all the factors of the land we work with: the elements where the revenue comes from and its current amount, stakeholders affected, impact predictions, net present value of each alternative, defining the restoration transition, just to mention a few.

To demonstrate one small aspect how this framework could be applied to *Project Silva Renatus*, I will follow a cost categorization from the IUCN framework (*Table 2*):

Step 3: Which impacts matter most to the stakeholders who will be impacted by restoration and what units of measurement are most useful for measuring them? (Verdone, 2015)

The costs of restoration can be categorized into 3 groups:

- Implementation costs: investment in land, building and the establishment of the project,
- Transaction costs: costs that goes into identifying the ways to ensure that restoration is beneficial on a local and national level,
- Opportunity costs: “tangible goods and services that are foregone to make restoration possible”

These costs can be applied briefly to this project as follows:

Opportunity costs	Transaction costs	Implementation costs
Revenue from pulpwood	Land purchase	Monitoring
Revenue from biofuel	Building accommodations	Maintenance
	Management planning	Setting up digital infrastructure
	Infrastructure	Seedlings
	Labour	Equipment
		(Hiring employees)

Table 2: Cost categories of restoration activities applied on Project Silva Renuatus

The original CBA framework focuses only on restoration activities which does not consider harvesting. In this case though, the main goal is to reforest the area, but gradually allow selective logging, as forestry in all its form should not be taken out of the picture as revenue, only a change of method is advised.

As we can see, the Opportunity costs – bigger revenues that would be compromised – are coming from pulpwood and biofuel. As the forest stand would gradually become more mature, the quality of the wood will also increase, thus allowing a bigger revenue from selectively cut lumber instead.

Solution

Sustainable forestry development must move forward nation-wide. The WWF (2017) mentions in an article, that “It is unfortunate that the term sustainable bioeconomy is used too lightly today. It is not enough to create new products, services and energy from forest raw materials

to call it a sustainable bioeconomy. It is also important to ensure that the forest we use has also been managed in a sustainable way - and we do not share the Forest Industries' view of how the Swedish forest is managed today". Sustainability in forestry cannot go onward with a greenwashing mindset.

As we could see from the example of Costa Rica, a Payment for Ecosystem Services scheme can be more than beneficial to a nation's economy, industry, ecosystems and reputation as well. Although a strategy plan was released by the Swedish Government Office, called Sweden's national forest program (Regeringskansliet, 2018), there are little to no mentions about funding landowners to conserve ecosystem services *while* being able to harvest wood selectively. If there are no schemes that support sustainable forestry management and no market for forest products resulting from ecosystem-based methods, most landowners might not be able to change their ways at all due to the magnitude of preliminary expenses. The change in the industry must happen on a national initiative, that makes it easy and not impossible to maintain a healthy ecosystem on private forest land.

Furthermore, it is helpful to demonstrate the economic results of the ecosystem-based forestry management in Lübeck in a 40-year time-period (Table 3). Unfortunately, it is not described in the resource used what year's currency do they use. When we look at the figures of forestry, we can see, that even though the revenues have decreased slightly – which is to be expected – the expenditures have also decreased with almost 50 percent. The amount of wood that has been sold has also been halved, however the standing volume has increased, which allows more selective logging to be done in the future. Overall, the estimated value of the forest has doubled.

Economic results of the Stadtwald Lübeck 1985 - 2018

HH Year (numbers in €)	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2018
Revenues for Stadtwald	1.987.693	1.474.569	1.519.149	1.432.220	1.875.912	1.906.052	1.674.432
Expenditures for Stadtwald	2.189.314	2.220.281	2.344.932	2.488.083	2.719.588	2.325.401	2.182.790
Result for Stadtwald	-158.395	-745.712	-825.783	-1.055.863	-843.676	-419.350	-508.358
Revenues for forestry	1.689.539	1.253.384	1.291.277	1.217.387	1.594.525	1.435.311	1.132.013
Expenditures for forestry	1.313.588	999.126	1.055.219	1.119.637	1.223.815	966.635	714.387
Result for forestry	375.951	254.257	236.057	97.750	370.711	468.676	417.626
Sold wood in cut m ³	24.200	18.900	15.800	13.800	15.200	11.500	11.140
Standing volume in m ³ /ha	301	310	325	335	365	397	435
Estimated value of forest	60.800.000	66.500.000	70.200.000	81.700.000	95.000.000	105.000.000	124.000.000

Table 3: Economic results of ecosystem-based forestry management in Lübeck

Source: Hansestadt Lübeck (2021)

Grazing

Challenge

During my informal interviews with landowners as well as researching forest regeneration, the first question that comes up from researchers and landowners alike: but what should we do about the grazing damage on newly planted trees? As the framework focuses on regenerating a previously clear-cut area, it needs to be prepared of the possible damages that for example ungulates cause to the newly planted forest (*Swedish Environmental Protection Agency, 2018*).

Solution

In the establishing period of the new biodiverse forest, it is crucial that both the landowners and the visitors are putting in the effort to protect the seedlings from extensive grazing. For the visitors, their planting kit will contain seedling covers that are essential in the beginning, as a policy of Södra states, that fences and game deterrents alone are not accepted as general measures to protect the regeneration of the forest (*Södra, 2018*), nor is it reasonable to implement on larger pieces of land. It is then advised that landowners are responsible of introducing protective hunting if there is the possibility of major game damage on the seedlings.

Furthermore there are other strategies, that introduces forest flora which can be sacrificed to the ungulates' grazing in order to protect the trees we intend to grow as the main body of the forest. According to Bergqvist et al. (2014) moose mainly feed on woody plants in winter, which are mostly rowan (*Sorbus aucuparia*), aspen (*Populus tremula*) and willows (*Salix spp.*). These are followed by silver and downy birch (*Betula pendula*, *B. pubescens*) and finally Scots pine (*Pinus sylvestris*). This method worked for Öhagen (2022 – oral communication), who states that by allowing herbivores to graze on deciduous trees – that are planted as fodder and other biodiversity maintaining purposes –, helps to keep coniferous trees as harvestable timber products for the future. Kardell (2016) also mentions it in a study, which discusses that in the late fifties damage on production trees could be avoided if “the moose were supplied with other fodder than pine” – though the fodder in question is not specified in the text –. Moreover, the research by Bergqvist (2014) mentions that out of aspen, birch and Scots pine, aspen was the mostly browsed, which could lead us to a strategy of planting aspens and rowans next to trees we want to keep as “connection trees” for the visitors and for fodder, as this method worked for Öhagen (2022 – oral communication).

Attractiveness

Challenge

Connection to nature might awaken interest and a feeling of personal responsibility, a kind of enlightenment that climate change is real, and we as individuals do have the power to initially try to mitigate it (Clayton et al., 2013).

Why would people come to stay to a former forestry / clearcut area, might be the question many pose to themselves. However, according to a study by Clayton et al. (2013), where they examined reactions by people to the (indirect) effects of climate change by visiting zoos, they point out – based on other researchers’ studies – that direct experience is an important factor when it comes to visitors recognizing and acknowledging the reality and consequences of climate change (Hinds and Sparks 2009; Wells and Lekies 2006). Therefore, even though it seems an unappealing idea to visit a clearcut area as a free-time activity, it is essential that people recognize the loss of habitats and biodiversity by seeing vast lands that were previously lush forests.

Solution

As mentioned, there might be general concern of the feasibility of the idea to start a sort of “clearcut-tourism” merely because of the unattractive nature of a site that has barely any trees left behind, no lush vegetation, no birdsong, no animals, and a sad sight for a visitor.

Encouraging people to visit such sites allows them to shift their previous perspectives of climate change – as some can be dismissive and doubtful about these effects (Clayton et al., 2013) – and how the forestry industry contributes to it. The best and perhaps most useful thing to do is to use these already existing sites to environmental education purposes for hikers, children, and adults alike.

The harshness and unattractiveness of the site is what might kindle certain feelings and responsibility in those, who visit it, and the willingness and eagerness to contribute to its regeneration in some way.

In order to attract visitors, there must be areas of the site where the unappealing sight of the clearcut area is balanced out by other types of beauty: this can be the quality of the accommodations, forest land that is retained and thoroughly cared for – which can show possible outcomes of the initiative this project is about to do –, and certain activities, that makes the experience in visitors’ minds memorable and unique.

Negative impacts of tourism

Challenge

Tourism can have many negative effects to its environment, such as the destruction of an area's ecology, noise pollution, wasteful water management, soil erosion, driving the wildlife away from their habitats, littering, fire potential and many more (Rabbany et al., 2013). Though tourism has these effects on the environment, so does intensive forestry, which might have an even greater impact than unmanaged tourism. However, a solution for controlling the negative impacts of the tourism industry will be described in the following section.

Solution

As landscape architect students, we are always reminded by the fact that tourism can be a double-edged sword: while it may provide economic benefits either for individuals or even the municipality, if not controlled, it can lead to environmental degradation.

As this framework tries to combat environmental degradation, it is of utmost importance to prepare with guidelines when it comes to the given site's Tourism Carrying Capacity (TCC). Although Nybro municipality (where Gullaskruv is located) is not necessarily amongst the most popular destinations in Sweden, should people be enticed of the unique value of visitor participation in restoring ecosystem services, there might be a higher number of visitors than expected.

A documentation done by the University of the Aegean (2002) defines TCC in the following manner: *“the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic and socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction”*.

If the TCC is discussed in context with recreational spaces, the TCC should be managed to ensure that the visitors' recreational experience will not be disturbed.

However much we might strive to look for the perfect *amount of people per hectare* limit of carrying capacity of a site, the document from Aegean continues to mention that there is no single threshold of the exact numbers of visitors, as this value can greatly depend on various factors. The best way to control the number of visitors, is to set an upper and lower limit that is beneficial for both the environment and the tourists as well. The TCC can evolve with time, if we carefully monitor all the impacts that influences the site, while it also can change according to management techniques and the development of forest stands.

As many nature-based tourism destinations are starting to implement a maximum number of visitors per day by ticketing or registering system (e.g. Plitvice Lakes, Croatia), there are two recommended types of visitor control:

- For people who wish to stay several nights, it is advisable to set a minimum length of holiday periods, for example a minimum of 4 days, which has the following benefits:
 - Not allowing short weekend stays will decrease the emissions that are coming from transportation,
 - Depending on how long the visitors choose to stay, they have to change their accommodations every second day (longer period) or everyday (shortest period). This rule ensures that the visitors will cover most of the area of the site and therefore plant in multiple places, not just one.
- For people, who are only coming for day-visits, they need to register prior their arrival.
- This site is encouraged to be used for environmental education purposes, thus if classes, and other groups would like to visit, they count as day-visitors, but the amount of contribution will depend on the group – e.g. if it is a bigger class, or a smaller set of colleagues for teambuilding, the number of seedlings can be discussed to fit to the groups' needs.

DEVELOPMENT OF LANDSCAPE VALUES

Change in the landscape – PSD analysis update after implementation

Recap

As we could read in Part II, the PSD analysis describes that the site – given it is only used for high-production forestry purposes – had no *natural* characteristics aside from the water courses running through it. The other remaining qualities were mainly *cultural* – as it can be seen the plantations are human-made –, and *open* due to the major clearcuts done previously, and some *cohesive* in the more mature stands if we went deep enough further from the forestry roads. Figure 27 showcases each dimension currently available in Gullaskruv.

Figures 28 and 29 will showcase the changes in these Perceived Sensory Dimensions after the implementation of the framework. The Dimensions are here to guide us and showcase how a site can be changed to the better for both nature and users by analysing the current and potential functions a site can have.

Year 0

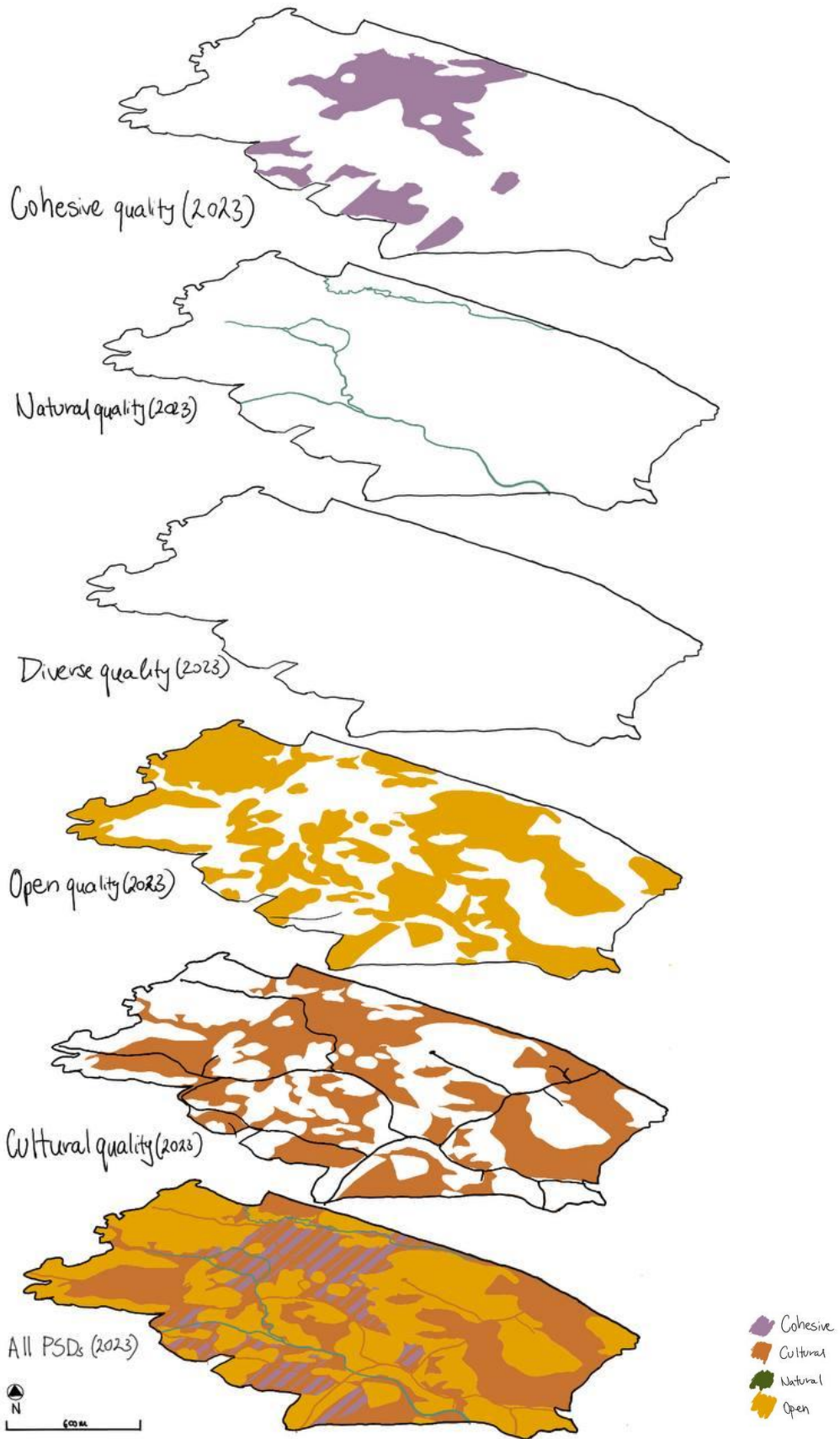


Figure 27: Perceived Sensory Dimensions in Year 0.

Illustration: Tamara Hadházi

In the twentieth year we can see potential changes in the landscape and its dimensions, compared to its extent today (Figure 28).

As the very first years are focusing on reforesting the areas that has been retention-cut with a low amount of retention, the *cultural* areas – which are the plantations of mostly coniferous hemiboreal forest types – are still being kept in their current form, which means that the sample site still carries many human-influenced qualities.

The *open* dimension is more aimed at creating natural open spaces, such as meadow lands with wildflowers and grasslands that can support butterflies and bees to thrive. One open plot should function as permaculture grounds for further environmental education activity purposes. Otherwise, it has reduced significantly due to the replanting of the harvested bare plots. Those plots in question consequently have started to become more *diverse* and *natural* (or rather following a nature-like random stand structure due to the unplanned nature of the planting scheme), that even though are young and uneven-aged stands will be a perfect foundation for future habitats or habitats developing at this time already, which is the overall goal.

As it is still a developing forest at this point in time, serene qualities are quite few and can be found at assigned points: there shall be “Zen-zones” where one can relax peacefully without disturbance, therefore those are the ones called *serene*.

Shelter areas can be found anywhere where cabins stand, hence they are the obvious shelter zones.

Social areas will be those which are designed for group activities to be done together. If we want to be open-minded, the whole area could be of Social quality, because one would come here to be connected to nature and their friends and family, however assigned social places are the following: the Treeline obstacle course, Outdoor Gym, Woodland cinema, Gathering Grounds, the Visitor Centre and the Big House (Figure 17), which can host company groups for team building purposes or student groups for educational reasons.

In conclusion, by Year 20 into the project, the functions of the site have improved significantly, more in the direction of reaching a natural and diverse quality rather than solely social ones designed for humans. The nature-like conversion will allow visitors to use this site to recreational purposes as guests in a forest that is meant to be kept for biodiversity.

In year 50 we still see the bottom layer as the starting point of the project to be able to compare the changes (Figure 29).

Cultural quality has decreased to a level, where the forest stands might have achieved such a random structure and uneven-aged look, that only the remaining roads and the smaller built-environments are tell-tale signs of human impact. Of course, in order to easily navigate on the site, there will be signs and boards all around, but the forest stand should be as nature-like as possible. However, there is one forest stand that has been kept monocultural for educational purposes on the northern side of the reserve (marked with ✦ on Figure 28). This stand will serve as a good ground for comparison: how forests were and are mostly managed throughout the country, and why is it less beneficial than ecosystem-based forestry.

The *open* dimensions haven't changed since Year 20, as the grasslands should be kept for even more diverse habitats and some buildings already had open grasslands next to them.

By Year 50, the *Diverse* quality took over except at areas where *Cultural* is present, as well as *Natural* quality. Nevertheless, I have added a *Semi-natural* dimension, which is not classified by Grahn, but as further destruction of existing forest land is to be avoided, the coniferous monocultures that can be found on the site today will possibly not look completely natural at Year 50. Rather than cutting them down, low percentage of thinning is advised to create an understory of broadleaved trees and bushes that can inject diversity into the strict stands.

Cohesive dimension is a quality that describes "A place of its own". Perhaps *Silva Renatus* will never get rid of the perception of once being an overly productive forest land, but it might be a meaningful place to some, by carrying fond memories of making a positive change in our society and industry.

Serene, shelter, and social qualities have stayed the same as before.

In conclusion, by Year 50 the area of *Silva Renatus* should be a diverse forest on a once overexploited land, where locals can say, instead of "There is no forest here", "Yes, we live next to a lush and diverse forest, created by dedicated people".

Year 20

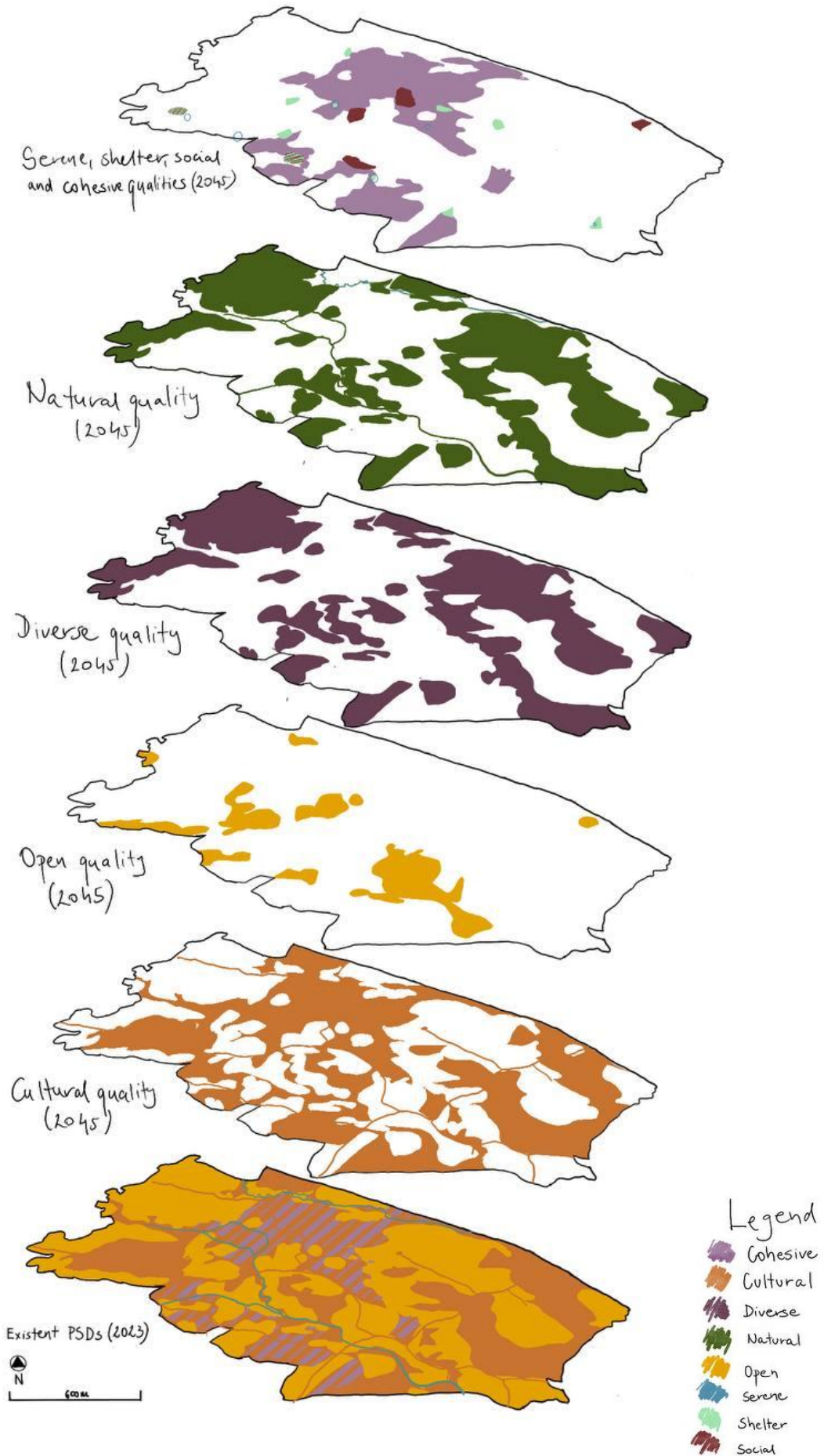


Figure 28: Perceived Sensory Dimensions in Year 20.

Illustration: Tamara Hadházi

Year 50

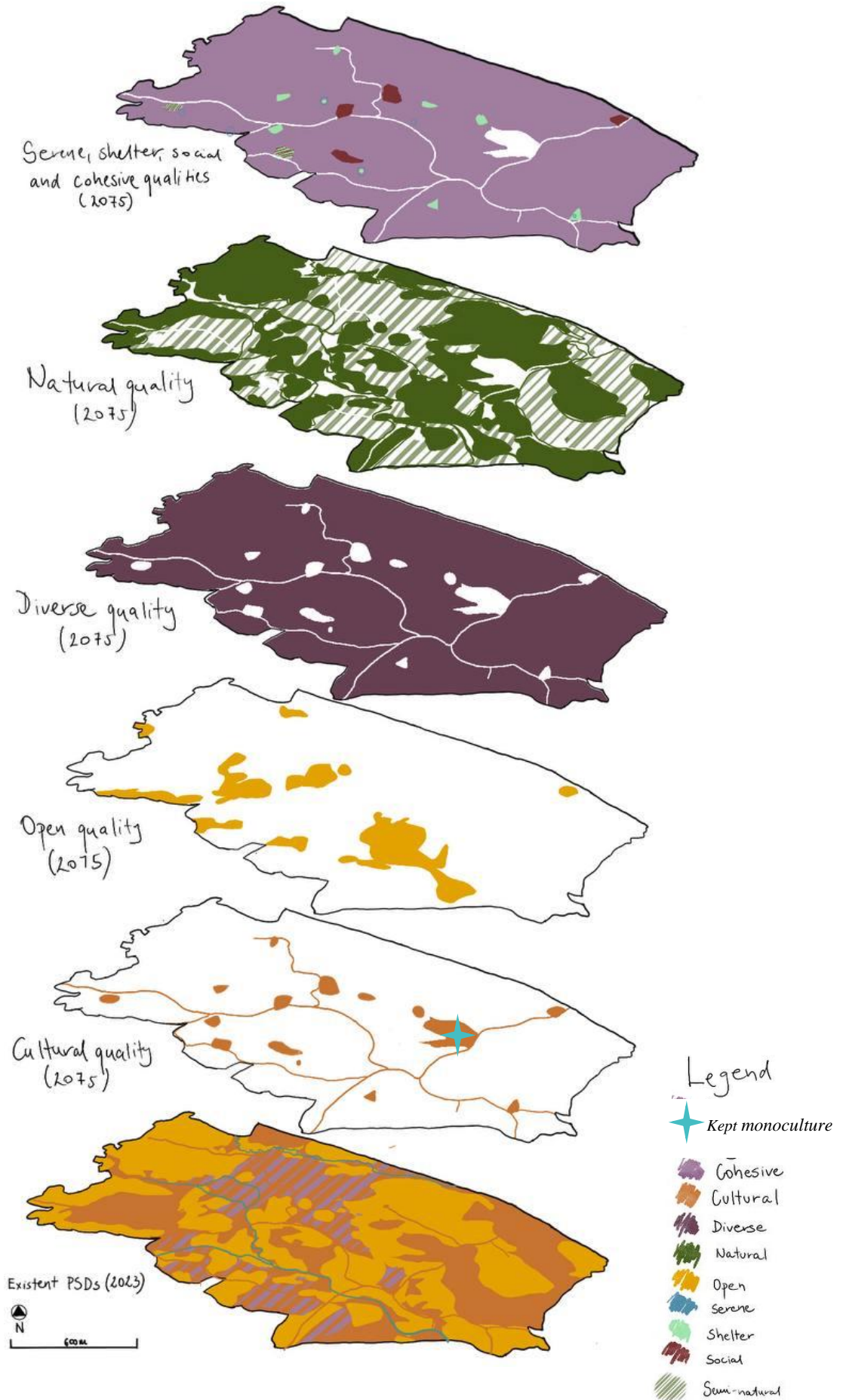


Figure 29: Perceived Sensory Dimensions in Year 50.

Illustration: Tamara Hadházi

Impacts on the landscape

The following graphs show a comparison between the negative impacts of intensive forest management versus the positive impacts of sustainable multifunctional forest management after the implementation of *Silva Renatus* (Figure 30).

The graphs have been separated to three parts: *environmental, small scale and socio-economic impacts*.

On the top, we can see that as long as intensive forestry remains the main management type, the ***environmental impacts*** will add more to global warming with *increasing CO2 emissions* from the number of logged trees, freed carbon sinks and heavy machinery. The reflectivity of the surface of the ground – *albedo* – of the plantations *will remain low* due to the dark and all-year round canopy of coniferous trees, which only absorbs more heat than it reflects back to the atmosphere and space, and *biodiversity loss* will continue to increase locally.

The ***small-scale impacts*** tell us about how an area can react to the intensive management type: *landscape fragmentation* mostly carries an aesthetic quality – the cohesiveness of the area destroyed, patches of plantations are replaced by bare ground. This impact is closely linked with *habitat loss, nutrient deficient soil and erosion*, hence the continuity of the site has been broken up by fragmentation. Furthermore, as monocultural forest stands are not diverse in composition, they are prone to be exposed for *diseases and pests* that attack certain types of flora.

Lastly, the ***socio-economic impacts*** show us how society and stakeholders are affected by this: as big forestry areas *only have one type of land use*, certain ecosystem services are taken away from the land that could be enjoyed by locals nearby. These missing ESS can be climate regulation, disease, pest, and erosion regulating services, pollination, recreation and ecotourism, cultural diversity, aesthetic, and educational values (Wallace, 2007). With the ever-increasing global population, the *need for raw materials is growing*, but it is crucial to not compromise the overall environmental well-being with weak wood supply that comes from over exploitation. *Landowners face financial struggles* due to the cheap purchase price we touched upon before, and there is *no connection to the land* due to the one type of land use that prevents people to use the forest land for recreational purposes.

In comparison, the bottom, green graph demonstrates the positive outcomes of *Silva Renatus*.

Changing to ecosystem-based forestry will result in positive ***environmental impacts***, such as increasing carbon sink, that can tie down atmospheric carbon for longer and lowers the GHG emissions rather than adding to it. The *albedo* will be higher due to the increasing presence of deciduous trees, and therefore can contribute to slightly lower temperatures locally owing to the incorporation of broad-leaved trees and their increased respiratory abilities. The addition of various types of trees and other forest flora will increase biodiversity and gradually will allow different types of habitats to evolve that can accommodate forest fauna.

As we could see from the updated PSD analysis and therefore in the ***small scale impacts***, after a few decades of implementation, the *landscape will be cohesive* and allow us to step into a world of its own. The forest will have a *more resilient and stronger stand structure* which will result in *restored habitats and balanced soil*.

Simultaneously the ***socio-economic impacts*** will be improved as well, due to the possibility to use *the forest for multiple purposes, such as education, recreation, forestry and conservation*. The *quality of the timber products will increase* the stronger stand structure and therefore *the landowners are able to receive various incomes from both tourism and forestry*. Lastly, nature connectedness will also be restored, by *connecting visitors to nature* through experience.

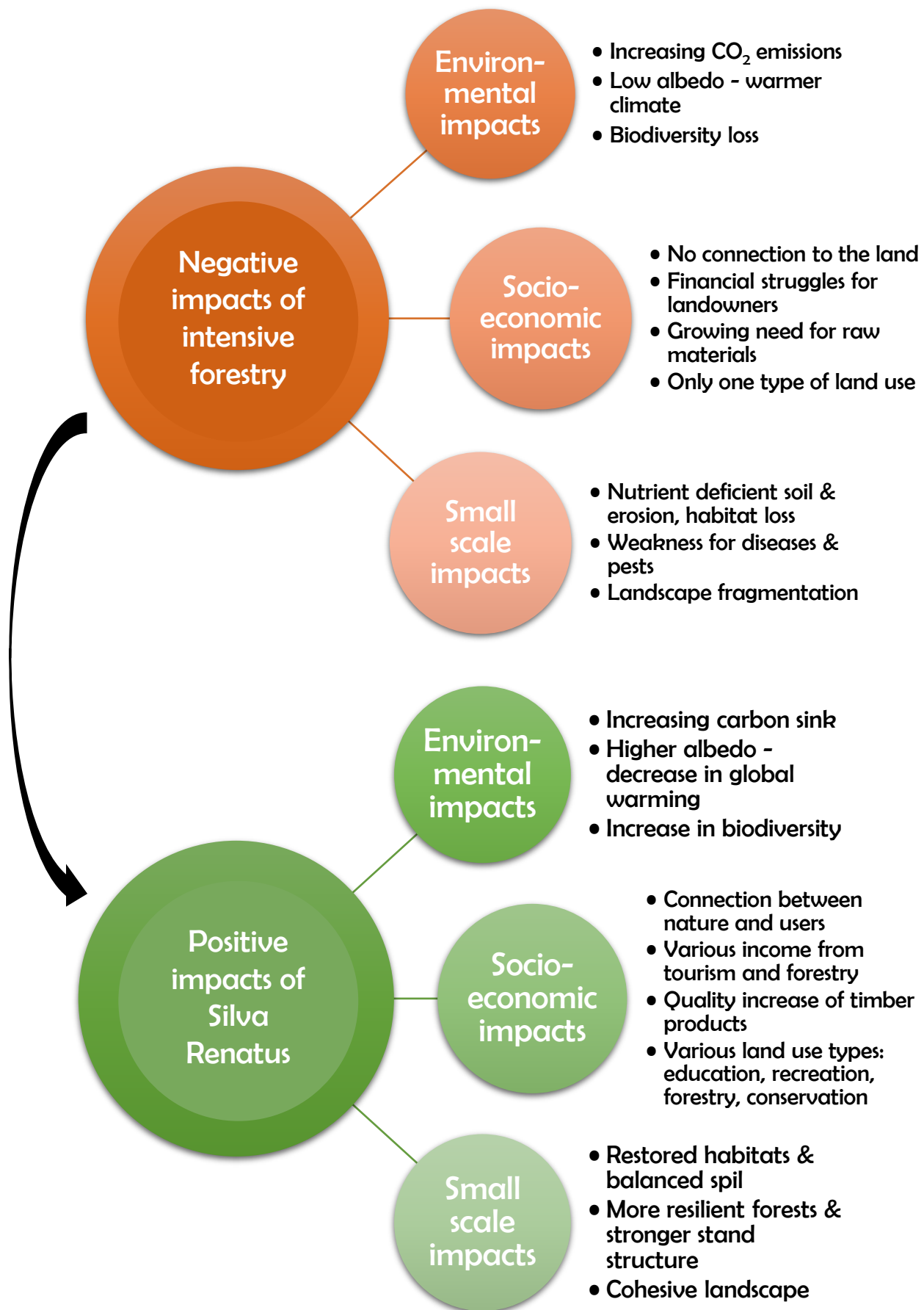


Figure 30: Impacts on the landscape before and after implementation of Silva Renatus.

Overall change in the landscape

- Legend
- Clear/low retention cut
 - Open areas
 - Conifer-dominant plantation
 - Diverse forest land

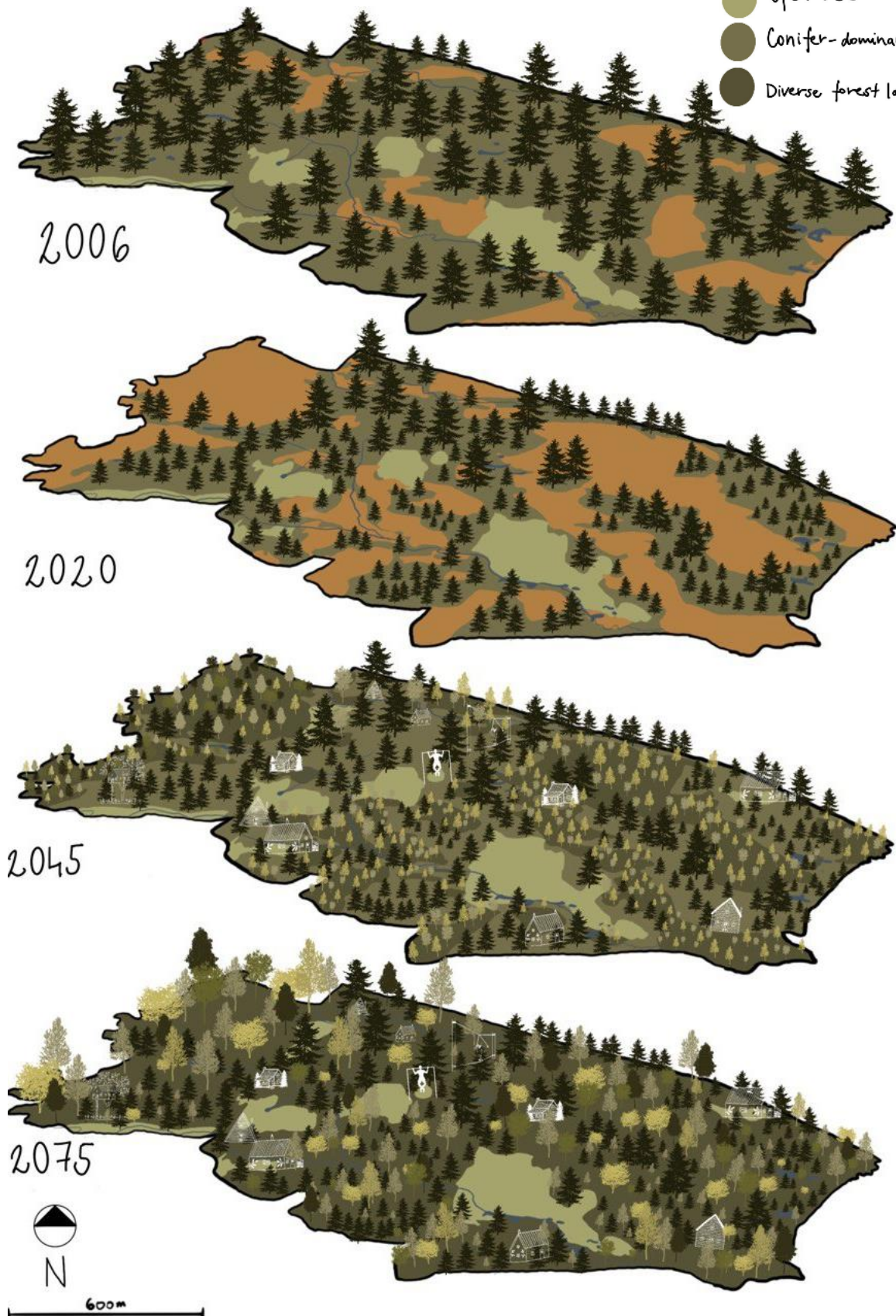


Figure 31: Overall change in the landscape. Illustration by: Tamara Hadházi



Figure 32: Increase in clearcut areas between 2006 (left) and 2020 (right) on the sample site.

Map source: Google Earth

The first two stages on Figure 31 showcased how the landscape have changed in less than 15 years due to clearcutting (marked with yellow). To be able to picture the changes, I used Google Earth and Skogsstyrelsen's felling map in Kalmar county (Skogsstyrelsen, 2023) as the base layers. Since the site is on Sveaskog's land, I had to narrow down Skogsstyrelsen's fellings to my sample area, based on Sveaskog's land ownership map data (Sveaskog, 2022).

According to my calculations in QGIS, the total area of my sample site is 703,34 hectares. The first clear satellite picture I could find of my area in Gullaskruv was taken in 2006 (Figure 32, left), where 11,68 percent (~82 ha) of the forest was clearcut. Arriving on the last satellite picture of 2020 (Figure 32, right), and using the Skogsstyrelsen's GIS data (2023), the total clearcut area has risen to 41,3 percent (~290 ha). A 30 percent change in a relatively small landscape in 14 years is causing a major habitat and ESS loss.

If one would proceed to realise *Silva Renatus*, a visible difference would be seen between old and new forest stands on Figure 31: after approx. twenty years, by 2045, the clearcut areas would be replanted by diverse broadleaved and coniferous forest stands – as it is the priority at this stage – whereas the conifer-dominant monocultures would remain the same.

By the year 2075 though, the conifer-dominant stands would be enriched with broadleaved trees as well by harvesting pines using single-tree selection. Given that the coniferous stands are dense and quite dark, it would probably take more time for the deciduous saplings to grow, that is why the difference is 30 years between the two stages showcased.



Figure 33: Year 2 of *Silva Renatus*, first stages of planting. Illustration by: Tamara Hadházi



Figure 34: Year 30 of *Silva Renatus*. Same pine stands can be seen in the background with a diverse forest in the foreground. Illustration by: Tamara Hadházi

The illustrations above showcase the difference between the first stages of planting, around year 2 (Figure 33), whereas Figure 34 illustrates year 30, where the forest has grown, various canopy and ground layers are expected to be present, and overall it is a lush environment that can be used both for forestry and recreation.

PART V – NARRATIVE

With this next section, I wish to put the project idea into context, by showcasing an adult visitor’s point of view, who visited *Silva Renatus* as a child and returned 25 years later to see his contribution. The storyline contains highlighted parts, which describe the payoffs in the columns on the right for either the landowners, visitors or the environment.

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<p>My mother always wanted to contribute to help the environment in various ways, like reforestation, beach cleaning, collecting garbage from rivers, but she has a weak back due to a car accident she once suffered, and she was always anxious if she would volunteer for a bigger reforestation scheme, she would injure herself further with so much workload.</p> <p>When she saw the opportunity of a short hike paired with low labour tree planting activities and other environmentally conscious projects in <i>Silva Renatus</i>, she booked a long weekend for our family.</p>	<p><i>Getting labour from visitors</i></p>	<p><i>Personal, low effort environmental contribution</i></p>	<p><i>Enhancing biodiversity</i></p>

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<p>It was a special time. I was 8 years old, not so conscious of all the world around me and how our actions influenced it. When we arrived by the electric minibus which picked us up in Nybro, we were greeted by a nice lady in the visitor centre in Gullaskruv, who equipped us with various things, which my mom later told me were a GPS, an information booklet, a map and the keys to the first cabin we stayed at.</p> <p>The visitor centre had a bright, warm feeling to it with wood panels inside, which were decorated with names engraved into the panels.</p>	<p><i>Receive funding for sustainable initiatives</i></p>	<p><i>Not being dependant on private vehicles</i></p> <p><i>Marking the contribution will leave a legacy for guests to visit</i></p>	<p><i>Lower GHG emissions</i></p>
<p>They gave us fika and let us go about the area. The most vivid picture in my head of this vacation was the bare ground with a few trees piercing the blue sky like lonely giants without company.</p> <p>It was a beautiful summer day, yet the sight before me was crying with sadness. I remember asking my mom:</p> <p><i>“Why did we come here? It is so bare...”</i></p> <p>To which she replied:</p> <p><i>“We came here darling, to give back the trees their companions. The squirrels, birds, butterflies, and bees. They are lonely and weak without them.”</i></p>		<p><i>Bigger impact by experiencing vs. looking at pictures/movies</i></p>	

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<p><i>“But how are we going to do that?” I asked in surprise.</i></p> <p><i>“We are going to plant more trees next to the big ones you see. When they grow, the animals will see they can live here again in peace, and they will return.”</i></p> <p>So, we walked to our first cabin, which was standing underneath the dense canopy of pines. The cabin was small and charming, with a small glasshouse attached to one of its sides. The glasshouse was equipped with some furniture to enjoy the view of the trees outside, some planting equipment on the pegboard walls and a raised garden bed in which small tree saplings were planted, some with little tags on them. The tags were showcasing some kind of codes and names.</p>		<p><i>Placing accommodations into attractive environments → memorable experience</i></p>	<p><i>Rewilding = more resilient ecosystem</i></p>
<p><i>“Look!” I called out to my parents “These ones have our names on them!”</i></p>		<p><i>Marking the trees creates a personal connection</i></p>	
<p><i>“Indeed, we are going to plant those then!” Said my mother.</i></p> <p><i>“Are we going to plant like the ones outside?” I pointed at the dark exterior of the dense pine stand just a few meters from the glass walls of the greenhouse.</i></p> <p><i>“No darling, these small trees are different kinds, they are the ones who shed</i></p>			

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<i>their leaves during winter. We will plant various types so the future forest will be mixed.”</i>	<i>More valuable and resilient forest stand</i>	<i>Getting to know various types of trees and their use</i>	<i>Enhancing biodiversity</i>
<p><i>“Why is that good?”</i></p> <p><i>“Because the more types of trees there are, the more types of animals the forest can nourish and give a home to. Also, it will be stronger that way.”</i></p> <p><i>“Stronger? How?”</i></p> <p><i>“It will be more resilient to those insects and diseases which attack certain types of trees.</i></p> <p><i>If there is only one type in a forest and they catch the disease, all the forest may die. We don’t want that do we?”</i></p> <p><i>“No, we don’t.”</i></p>			
<p>We sat down, ate our lunch and then went back to the greenhouse to go out and plant the trees we had for the day. I remember feeling confused because there were only 2 trees which carried each of our names, whereas there were various other ones without any tag on them.</p> <p><i>“Mom... why are there only two trees with my name? Aren’t we planting more?”</i> I asked.</p>			

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<p><i>“We do, but you see the ones in the other compartments are for the animals and for the owners of the place.”</i></p> <p><i>“What do you mean?”</i></p> <p><i>“We are planting two trees each today that will surely be kept in hopes they survive. There are four more: two for the deer and moose to eat, so they don’t eat the ones we want to keep, and two for the owners to harvest once they grow old.”</i></p>	<p><i>The initiative allows owners to harvest (selectively) as well, not only doing it for restorative purposes.</i></p>	<p><i>Planting many “eternal” trees for a higher survival rate.</i></p>	<p><i>“Strategic” planting to serve different user groups (animals, visitors, landowners).</i></p>
<p><i>“But why would they cut them down?” I asked, astonished. “I thought we don’t want that!”</i></p> <p><i>“As long as they only cut down only a few every year and not a whole group, it is not a problem. In fact, if they harvest them that way, there will be more light in the forest to grow new trees by themselves from seed, and the ones they harvest will be of much better quality. Should they cut down the whole stand, it would look the same as the empty plot we saw before, but it is not the case.”</i></p>	<p><i>A continuous harvesting yield</i></p> <p><i>Higher income from lumber</i></p>	<p><i>Continuous benefits from ESS</i></p>	<p><i>Selective cutting vs. clearcutting is more beneficial. Low disturbance, no habitat loss</i></p>
<p><i>“Okay... and what if the ones we keep don’t survive?”</i></p> <p><i>“We will have more to plant tomorrow when we go to the other cabin. By the end</i></p>			

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<p><i>of our vacation, each of us should have six trees to be kept. If all of them survive, we have the choice to give three of them back to the owners, so when they turn older, those can be cut down too. But at least half of what we intend to keep will be kept for at least 150 years.”</i></p>	<p><i>The possibility to have more trees to harvest, but still keep it low disturbance</i></p>		
<p><i>“That long?!”</i> <i>“Yes, if not more. We are planting these in hopes to be kept for centuries, depending on the type of tree of course. And, if many people do the same as we do here, soon it will be a really lush forest, you can visit again.”</i></p>			<p><i>Getting back old growth forests, ESS and CO2 sinks.</i></p>
<p>That being said, we put up our tool vests, in which we could hold our seedlings, gloves, name plates, planting guide, GPS, and took the dibbles in our hands and the tree guards in a sack on our backs. We went back to that same empty plot, where the giants stood to give them company. The dibble was big, and my father had to help with pushing it down, but I remember the feeling of putting the guard around the sapling and applying the name tag, which should mark my contribution to this place.</p>		<p><i>Connection created via experience</i></p>	

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<p>My mom showed me how to write in the codes on the assigned coordinate in the GPS, which she told me should allow us to get updates on the trees later on.</p>		<p><i>Being reminded will make us go back and support the initiative more</i></p>	
<p>Now that I am back, 25 years later, in 2052 to take a look at the trees we planted, all the happy memories are rushing back from that special vacation: the treehouses that surrounded us in the outdoor Woodland cinema setting and watching a movie under the stars.</p>	<p><i>Additional income from returning tourists</i></p>	<p><i>Maintaining the connection creates a moral legacy, that can serve as educational example to our descendants.</i></p>	<p><i>Helping with a new planting cycle in the former monocultures</i></p>
<p>Jumping from tree to tree on the Treeline obstacle course and almost falling down, but I knew the net below me should catch me if it happened.</p> <p>Getting lost on the site because none of us knew how to properly read a map and finding more and more hidden spots which carried possibilities for the future</p>	<p><i>Plants being spread everywhere on site</i></p>	<p><i>Multifunctional spaces create direct attention and excitement</i></p> <p><i>Gaining memories that can only be achieved through personal experience.</i></p>	
<p>Meeting my best friend for the very first time on the Gathering Grounds while sharing stories next to the bonfire.</p> <p>Attending a paper-making workshop made from wood shavings on the first day</p>		<p><i>Participating in educational workshops help to form a child's (or</i></p>	

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
and making a small planner from them the last, when they dried.		<i>adult's) identity and feeling of responsibility towards nature</i>	
The excitement from moving day to day to another cabin on the grounds, so we could plant at every part of the land while enjoying different settings every night. I loved those cabins, they were all different, yet carried an enchanting energy with the surrounding woods compared to the bare grounds we were planting on, and the small glasshouses connected the indoors of the cabin with its surroundings.		<i>Offering unique accommodations make the experience outstanding. Comparing the bare ground with the existent forest makes a deep impact and urges one to contribute to help the environment</i>	
Sure enough my mother was right to bring me here once upon a time. Returning today, the walls of the visitor centre are full of names who contributed to re-establishing biodiversity in the area, and the bare, exposed ground I remember is replaced by a still young, but cohesive and diverse forest that is now home to animals that have been on the red list. I can show my own child what we planted all those years ago and give her a somewhat similar experience.		<i>All small things add up to a bigger good</i> <i>Passing the legacy and knowledge on</i>	<i>The return of ESS benefits its direct environment</i>

Storyline	<i>Pay-off for landowners</i>	<i>Pay-off for visitors</i>	<i>Pay-off for environment</i>
<p>The site now has boards all over the area, showcasing what it looked like completely bare, and why it was terrible for the environment. For we shall not forget the destruction, to keep all the hard work protected.</p>		<p><i>Education, first-hand knowledge</i></p>	

PART VI – DISCUSSION

In this thesis the topic of intensive forest management in Sweden has been introduced through literature reviews and informal interviews, which all shed light on the issues and possibilities of today's forestry practices. This work also focused on detached tourism and how it could be remedied through creating connection between visitors and the destination via place attachment.

The aim of this work was to develop a framework that is applicable for a forest landscape which is not only meant for production, but also to preserve our natural values and nurture connections between our outdoor environment and people.

By choosing and analysing a site in Gullaskruv, Nybro municipality, the background study on hemiboreal forests and their management was put into real-life context and thus through the PSD evaluation, already existent and missing qualities of the landscape were discovered that helped me understand the site-specific needs when developing the framework.

The *Project Silva Renatus* is the key element of this work, hence it suggests the possibility that it is within reach to gain income from forestry whilst protecting our local environment through sustainable approaches and public participation.

To reach this conclusion however, it was vital to set a clear target for this work by posing research questions, which are going to be answered in the following section.

Research questions

How can privately owned forests be managed in a way that preserves endangered ecosystems, creates recreational values, and provides sufficient income from logging at the same time?

Throughout the whole paper, the method of ecosystem-based forestry was introduced, such as The Lübeck-model. This management methodology's goal is to preserve the natural feeling of the forest by following a harvesting regime, that does not destroy habitats – selective logging. By not harvesting contiguous stands after reforestation, the goal of this method is achieved, which is to keep habitats together and preserve the forest's biodiversity. To preserve endangered ecosystems, not only the forest stands should be considered but other land-uses on the site, such as open fields that can be used as diverse grasslands, as well as protecting the streams' water quality for aquatic life. To demonstrate, according to the Global Biodiversity

Information Facility (GBIF, 2023) in my chosen area in Gullaskröv, mosses, like silken homalothecium moss (*Homalothecium sericeum*) and various flowering plants are absent from the site since 2006-2011, like English cinquefoil (*Potentilla anglica*) and Northern eyebright (*Euphrasia micrantha*). Due to the absence of such plants, the order of butterflies (*Lepidoptera*) cannot be found on the site either. Other species of the animal kingdom have also disappeared from the site, like the common otter (*Lutra lutra*) and the European hornet (*Vespa crabro*) since 2006, the latter also being important, as they pollinate. Consequently, ecosystem restoration and conservation are needed and can be achieved through intentional changes.

Furthermore, *Silva Renatus* suggests following the ecosystem-based forestry method in the future, while also continuously regenerating a diverse forest on the clear- and low-retention cut areas by the visiting tourists. By reforesting barren plots with diverse and uneven-aged forest stands, endangered ecosystems might be protected and even strengthened, the site gains recreational value without becoming a nature reserve, therefore it does not exclude logging activities. The visitor participation initiative will also create place attachment to the site, which might be beneficial in spreading the word to others. It provides environmental educational purposes and gives labour and income to the landowner through tourism.

To conclude: a forest can be managed with ecosystem-based forestry and public participation to protect habitats and receive income from various sources. The participatory reforestation initiative of *Silva Renatus* specifically can be applied to sites which have previously been harvested in an intensive way and the landowner wishes to change their methodology and would like to participate in nature conservation and tourism.

What qualities of an intensively working forestry site need to be developed to reach this goal?

Sweden is known for its vast forests and thus tends to be romanticized. Strict coniferous monocultures meant to be cut down in one go however do not contribute to a sustainable industry nor a secure natural environment. As mentioned in the *Today's forestry practices in Sweden* section, clearcutting and retention cutting albeit are efficient, they are posing threats to the environment.

Transition is needed from these harvesting methods to selective cutting.

Strategic tree planting is advised for ungulates to graze on.

Coniferous monocultures are not advised to be replanted, as they may be weak against pests and diseases and are not providing a diverse environment and habitat. Establishing a mixture of deciduous and coniferous forest is advised, which are uneven-aged with various canopy layers.

SWOT

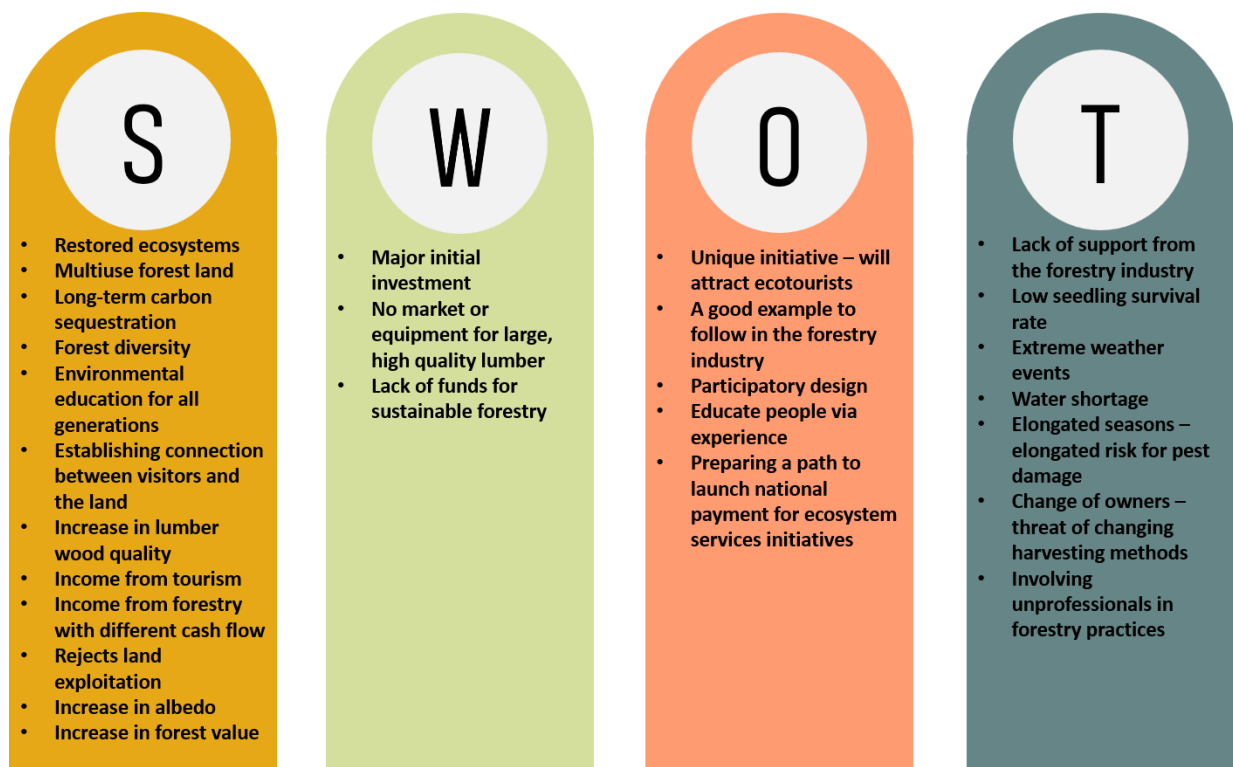


Figure 35: SWOT analysis

A SWOT analysis (Strength-Weakness-Opportunity-Threats) is a practical tool to use before realizing a project, as it points out the positive aspects that are worth doing as well as the negative ones, that might endanger the success of the plan (Figure 35).

The **Strengths** of the project have mostly been presented before in the *Impacts of the landscape* section, and they are quite the same, although a bit more detailed. The strengths overall outweigh the weaknesses and threats, as this project is highly beneficial for the environment by restoring ecosystems and biodiversity, rejecting land exploitation via holistic land management approaches, sequestering carbon for a long period of time and give environmental education for visitors of all age groups, which is incredibly important to teach all generations

outside of educational institutes, thus spreading the knowledge of said holistic approaches. During the participatory phase, visitors establish connection between themselves and the landscape and by doing so, they are also creating a multi-use landscape that is not only used for forestry but also for restorative purposes. Finally, changing to ecosystem-based forestry will allow the landowners to harvest a much better quality of wood due to coherent stand structure and selective logging method.

The major *Weaknesses* of the project are the financial investments, as it is uncertain if there will be any funding in the future for sustainable forestry practices. Furthermore, the market for forest products is also quite enclosed and doesn't allow room for development yet.

The *Opportunities* tab shows us that it is a unique initiative that has its worth in the participatory design which strengthens connectedness to nature and educates people via the experience. The project leads a good example to follow in the forestry industry and paves the path for national sustainable development. Through weaknesses, there are opportunities, in which case, those landowners who would take up the task to strengthen the path towards a more sustainable forestry sector, would be able to show others, that higher quality forest products will find their market if there is a product worth to invest in.

The *Threats* mainly lie in the changing climate and its consequences: although it brings much uncertainty, the threats allow us to prepare for possible pest damage, water shortages and extreme weather events, by choosing the appropriate type of vegetation. Low seedling survival rate is a threat in the starting years of the development, as it is a crucial point of the project that the "eternal trees" survive. Finally, the fear of many landowners is to rely on unprofessional individuals such as tourists, due to their initial lack of knowledge, which is why environmental education in the *Opportunities* tab is so important.

In conclusion, the project has numerous ecological, social and economic advantages that are overshadowed and therefore limited by the conservativeness of the industry and lack of funds.

Tourism

Tourism may always be viewed in some landowners' eyes as the threat to their forests due to the visitors' lack of knowledge. However, this situation is quite similar to having volunteers helping in a reforestation project: through environmental education and preparation beforehand, visitors would receive the foundations and principles of planting trees safely and respecting the landscape while doing so. To reach this goal, there is a need of input from environmental psychologists, ecologists, foresters, conservationists, and horticulturists to prepare such educational material to fit this initiative.

Even though there is no straightforward way of determining the maximum number of visitors a site can have, it is highly important to control the number of tourists to ensure the improvement and persistency of biodiversity.

There must be rules set for tourists to protect the forest from illegal cutting for bonfires, for not disturbing wildlife during nesting period for example. Gender equality between stakeholders has to be prioritized – e.g. not setting norms that women should manage the tourism part while men manage the forest.



Figure 36: *Silva Renatus* logo. Illustration by: Tamara Hadházi

Next steps

Business model

As it was discussed before, making *Silva Renatus* a reality is a costly endeavour. Before implementation, it is highly encouraged to create a site-specific Cost-Benefit Analysis, by following the IUCN framework mentioned in the *Finances* section.

It is also recommended to consider a shared ownership when it comes to such a big investment: neighbouring forest lands might have different landowners, however if one cannot do this initiative by themselves, it would be advantageous to share the goal of ecosystem-based forestry with other landowners nearby.

When it comes to building the business model up, it is crucial to have a clear vision by creating a timeline that is focusing on different stages of the project, that incorporates the following aspects amongst others:

- Identifying potential risks, weaknesses, consequences
- Calculating the benefit to cost ratio
- Having dialogues with communities, stakeholders involved
- Finding subsidies such as tourism-based support or PES schemes
- Apply for building permits, build accommodations
- Setting up the GIS system
- Set up infrastructure on the site, e.g.: solar panels, wind turbines etc.

- Install environmental education equipment: boards, signs, sensory paths etc.
- Acquire tree seedlings
- Gather supplies for the planting initiatives, e.g. dibbles, name tags, GPS, educational pamphlets
- Start marketing (e.g. create a logo (Figure 36), advertise on SM, municipal paper etc.)
- Set up monitoring system for biodiversity growth
- (Hire employees/volunteers who can be involved in the environmental education part)

Public transport

Public transport in the Målerås/Orrefors area is very scarce: on weekdays the bus 139 from Nybro in direction to Målerås goes only 4 times, and on the weekends only once (Kalmar länstrafik, 2022). Given the big time gaps in between departures, it is not easy to plan a journey to Gullaskröv.

The bus is also quite big, and when I visited the site in November, there were only 2 of us on board. It shows how unvisited this area is, but also gives possibilities for improvement. The size of the bus is inappropriate for this number of passengers, which therefore causes unnecessary overload of emissions and usage of resources.

In order to make transport as smooth as possible for visitors to reach Gullaskröv, one suggestion is that the resort should be equipped with an electric minibus, that can pick people up from destinations that are fairly easy to reach with public transport, such as Nybro, Lessebo, or even Växjö.

As the aim of the project is to minimise atmospheric carbon emissions, it will be greatly encouraged to come with public transport and enjoy the free pick-up service of the minibus at a pick-up point. If visitors however wish to use their own cars, parking fees will be applied.

If getting an electric minibus doesn't work out for various reasons, an arrangement could be made with Kalmar and Kronoberg länstrafik to have a smaller on-call bus that takes people from Nybro and Lessebo to Gullaskröv.

Subsidies, PES

Regarding subsidies, grants and income, mentioned in the *Payment for Ecosystem Services (PES)* section, there are limited options in Sweden. Nokås is available, but quite difficult to get according to both Lantto and Öhagen (2022– oral communication), and as presented before, it does not cover much action when it comes to ecosystem conservation. The report from Naturvårdsverket (2022) also mentions, that there is a need to develop new methods for harvesting instead of regeneration felling, but the work on Skogsstyrelsen's part is delayed and are unable to present statistics when it comes to environmental considerations regarding felling methods. **A change is needed on national level** both in the approach of logging methods, the market and the ability to support landowners financially who are willing to do conservation work alongside sustainable logging. Furthermore, it is unclear in the Living Forests initiative, whether it allows landowners to log some percentage of their land or if it only speaks of conservation. There are many uncertainties in the industry, which needs to be solved to allow different approaches to be used.

Conservation

There is a need to identify native species that are on decline in the area with ecologists and conservation specialists. When the thorough identification is done, an inventory and plan have to be created on how all potential land-use areas should look like to support the regression of red-listed species: what are the exact species in the hemi-boreal forest stands from the upper canopy to ground-covering level, and what organisms are vital to be reinstalled to provide habitat for the red-listed species. What species are needed on the grasslands to support all kinds of pollinators: not only to offer food and habitat for them but plants, where for example butterflies can lie their larvae and multiply, as well as plants that support natural enemies against pests as biological control.

Conclusion

There are many tree planting schemes going around on the world, and many of them suggest that it is the ultimate solution to mitigate the effects of climate change.

This work does not suggest that another planting scheme on top of the pile will save the world, nor will it reverse the damage humanity caused to the planet. Nevertheless, this thesis presents

that a change in the Swedish forestry industry is needed, especially amongst private landowners, who have the power of control over their land. Their attitude might define the near future of Swedish forestry, therefore I can only hope that this work might reach them, and I encourage them to think out of the box and take action towards a more sustainable future, because to quote Lantto (2022 – oral communication):

“Forest landowners are environmental heroes.”

– Rickhard Lantto

REFERENCES

LITERATURE

- Alladale Wilderness Reserve (2018): <https://alladale.com/rewilding/the-european-nature-trust/>
- Alladale Wilderness Reserve (2021): <https://alladale.com/rewilding/legacy-alumni-tree-planting-initiative/>
- Aparicio A. (2016), Exploring Recent Long-distance Passenger Travel Trends in Europe, *Transportation Research Procedia*, Volume 14, 2016, <https://www.sciencedirect.com/science/article/pii/S235214651630268X>)
- Arbor Day Foundation (2022): [https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=902#:~:text=This%20tree%20grows%20at%20a,%20to%2024"%20per%20year.](https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=902#:~:text=This%20tree%20grows%20at%20a,%20to%2024)
- ASLA (2018): Landscape Architecture is a STEM Discipline, American Society of Landscape Architects [2022. 12. 02.]
- Atlegrim O., Sjöberg K. (1996): Response of bilberry (*Vaccinium myrtillus*) to clear-cutting and single-tree selection harvests in uneven-aged boreal *Picea abies* forests, *Forest Ecology and Management*, Volume 86, Issues 1–3, 1996, Pages 39-50, ISSN 0378-1127, [https://doi.org/10.1016/S0378-1127\(96\)03794-2](https://doi.org/10.1016/S0378-1127(96)03794-2). (<https://www.sciencedirect.com/science/article/pii/S0378112796037942>)
- Bergenhalm, F., Granlund Ullsten, V., Gustavsson, M., Järbur, E., & Vännström, I. (2020). Skogsbruk idag och i framtiden : Jämförelse av ekonomiska och ekologiska aspekter mellan trakthyggesbruk och kontinuitetsskogsbruk (Dissertation). Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-166832>
- Bergqvist G., Bergström R., Wallgren M. (2014). Recent browsing damage by moose on Scots pine, birch and aspen in young commercial forests – effects of forage availability, moose population density and site productivity. *Silva Fennica* vol. 48 no. 1 article id 1077. <https://doi.org/10.14214/sf.1077>
- Brand C., Boardman B. (2007), Taming of the few: The unequal distribution of greenhouse gas emissions from personal travel in the UK, *Energy Policy*, Volume 36, Issue 1, 2008, Pages 224-238, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2007.08.016>. (<https://www.sciencedirect.com/science/article/pii/S0301421507003527>)
- Cao, J., Zhang, J., Wang, C., Hu, H., & Yu, P. (2020). How Far Is the Ideal Destination? Distance Desire, Ways to Explore the Antinomy of Distance Effects in Tourist Destination Choice. *Journal of Travel Research*, 59(4), 614–630. <https://doi.org/10.1177/0047287519844832>
- Cherubini F., Santaniello F., Hu X., Sonesson J., Hammer Strømman A., Weslien J., Djupström L. B. & Ranius T. (2018) Climate impacts of retention forestry in a Swedish boreal pine forest, *Journal of Land Use Science*, 13:3, 301-318, DOI: 10.1080/1747423X.2018.1529831
- Clayton S., Luebke J., Saunders C., Matiassek J. & Grajal A. (2014) Connecting to nature at the zoo: implications for responding to climate change, *Environmental Education Research*, 20:4, 460-475, DOI: 10.1080/13504622.2013.816267
- Clutton-Brock, T., Coulson, T. & Milner, J. Red deer stocks in the Highlands of Scotland. *Nature* **429**, 261–262 (2004). <https://doi.org/10.1038/429261a>

- IPBES (2019): <https://www.ipbes.net/policy-support/tools-instruments/payment-ecosystem-services>
- Kalmar länstrafik (2022): https://www.kalmarlanstrafik.se/globalassets/tidtabeller/tidtabell-nartrafik/nybro-kommun/maleras_orrefors.pdf
- Kardell, Ö. (2016): Environment and History, Volume 22, Number 4, November 2016, pp. 561-587(27) White Horse Press DOI: <https://doi.org/10.3197/096734016X14727286515817>
- Kyle G., Graefe A., Manning R. & Bacon J. (2003) An Examination of the Relationship between Leisure Activity Involvement and Place Attachment among Hikers Along the Appalachian Trail, Journal of Leisure Research, 35:3, 249-273, DOI: 10.1080/00222216.2003.11949993
- LaMondia, J., Snell, T., & Bhat, C. R. (2010). Traveler Behavior and Values Analysis in the Context of Vacation Destination and Travel Mode Choices: European Union Case Study. Transportation Research Record, 2156(1), 140–149. <https://doi.org/10.3141/2156-16>
- Lõhmus A., Kraut A. (2010): Stand structure of hemiboreal old-growth forests: Characteristic features, variation among site types, and a comparison with FSC-certified mature stands in Estonia, Forest Ecology and Management, Volume 260, Issue 1, 2010, Pages 155-165, ISSN 0378-1127, <https://doi.org/10.1016/j.foreco.2010.04.018>.
- Masonite Beams (2023): <https://www.masonitebeams.se>
- Matadornetwork (2022): <https://matadornetwork.com/read/lake-garda-italy-como-alternative/#:~:text=Lake%20Garda%20Is%20a%20Cheaper%20Alternative%20To%20Lake%20Como%20To%20See%20Italy%27s%20Lakes>
- Mecsekerdő (2019): <https://mecsekerdo.hu/fenntarthato-gazdalkodas/erdogazdalkodasi-terv/>
- Melin Y. (2014): Impacts of stumps and roots on carbon storage and bioenergy use in a climate change context, Doctoral Thesis, Swedish University of Agricultural Sciences, ISSN 1652-6880
- METSO-1 (2022): <https://metsonpolku.fi/korvauslaskelma-pysyvasta-suojelusta>
- METSO-2 (2022): <https://metsonpolku.fi/korvauslaskelma-ymparistotuesta>
- METSO-3 (2022): <https://metsonpolku.fi/maaraaikaisen-suojelun-eri-vaihtoehdot>
- Mikusinski G. & Angelstam P. & Sporrang U. (2004). Distribution of Deciduous Stands in Villages Located in Coniferous Forest Landscapes in Sweden. Ambio. 32. 520-6. 10.1579/0044-7447-32.8.520.
- Mossy Earth (2021): <https://www.mossy.earth/about-us>
- Mossy Earth-1 (2021): <https://mossy.earth/?referral=TAM3QWO87M>
- National Oceanic and Atmospheric Administration (2019): Coral reef ecosystems, U.S. Department of Commerce <https://www.noaa.gov/education/resource-collections/marine-life/coral-reef-ecosystems#:~:text=Coral%20reefs%20protect%20coastlines%20from,of%20food%20and%20new%20medicines.>
- Naturvårdsverket (2006): Naturreservat i Sverige
- Naturvårdsverket (2022): Miljömålen, Årlig uppföljning av Sveriges nationella miljömål 2022 – Med fokus på statliga insatser, Rapport 7033, Mars 2022, p 220-237
- NÉBIH (2014): Magyar Erdők – A Magyar erdőgazdálkodás <https://www.oeo.hu/upload/html/2016-02/Magyar%20erdok%20-%20A%20magyar%20erdogazdalkodas.pdf>
- NÉBIH-1: <https://erdoterkep.nebih.gov.hu>
- Nelson Treehouse (2018): <https://nelsontreehouse.com/blog/theater-in-the-trees/> Nordic Forest Research (2017):

<https://nordicforestresearch.org/klimatnytta/#:~:text=750%20kg%20carbon%20dioxide,carbon%20di%20oxide%20in%20its%20stems.>

Orosz E. T. (2018). Reality and Illusion in Instagram Travel Photos. Pages 3199-3208, ISSN 2352-1465, <https://doi.org/10.1016/j.tpro.2016.05.262>.

Palviainen M., Finér L., Laiho R., Shorohova E., Kapitsa E., Vanha-Majamaa I. (2010): Carbon and nitrogen release from decomposing Scots pine, Norway spruce and silver birch stumps, *Forest Ecology and Management*, Volume 259, Issue 3, 2010, Pages 390-398, ISSN 0378-1127, <https://doi.org/10.1016/j.foreco.2009.10.034>.

Plumptre A. J., Baisero D., Belote R. T., Vázquez-Domínguez E., Faurby S., Jędrzejewski W., Kiara H., Kühl H., Benítez-López A., Luna-Aranguré C., Voigt M., Wich S., Wint W., Gallego-Zamorano J., Boyd C. (2021)

Priya Sharma (2022): This place is better than Santorini: Kea <https://vm.tiktok.com/ZMFmH2Pba/>

Rabbany Md. G., Afrin S., Rahman A., Islam F., Hoque F. (2013): Environmental effects of tourism, *American Journal of Environment, Energy and Power Research* Vol. 1, No. 7, September 2013, PP: 117-130, ISSN: 2329-860X

Regeringskansliet (2018): Strategi för Sveriges nationella skogsprogram, <https://www.regeringen.se/informationsmaterial/2018/05/strategidokument-sveriges-nationella-skogsprogram/>

Richardson, M., Hussain, Z., & Griffiths, M. D. (2018). Problematic smartphone use, nature connectedness, and anxiety, *Journal of Behavioral Addictions*, 7(1), 109-116. doi: <https://doi.org/10.1556/2006.7.2018.10>

Schulze, E.-D., Lloyd, J., Kelliher, F.M., Wirth, C., Reibmann, C., Lühker, B., Mund, M., Knohl, A., Milyukova, I.M., Schulze, W., Ziegler, W., Varlagin, A.β., Sogachev, A.F., Valentini, R., Dore, S., Grigoriev, S., Kolle, O., Panfyorov, M.I., Tchebakova, N. and Vygodskaya, N. (1999), Productivity of forests in the Eurosiberian boreal region and their potential to act as a carbon sink — a synthesis. *Global Change Biology*, 5: 703-722. <https://doi.org/10.1046/j.1365-2486.1999.00266.x>

Siegel, L. A., & Wang, D. (2018). Keeping up with the joneses: emergence of travel as a form of social comparison among millennials. *Journal of Travel and Tourism Marketing*, 36(2), 159–175. <https://doi.org/10.1080/10548408.2018.1499579>

Siegel, L. A., Tussyadiah, I., & Scarles, C. (2019). Does Social Media Help or Hurt Destinations? A Qualitative Case Study. *E-Review of Tourism Research*, 17(4). Retrieved from <https://ertr-ojs-tamu.tdl.org/ertr/article/view/541> [2022. 11. 18.]

Simard D. G. , Fyles J.W., Paré D., and Nguyen T. Impacts of clearcut harvesting and wildfire on soil nutrient status in the Quebec boreal forest. *Canadian Journal of Soil Science*. **81**(2): 229-237. <https://doi.org/10.4141/S00-028>

Skogsinsikt (2023): <https://skogsinsikt.se/en/skogen-i-bild/fore-och-efter-avverkning/>

Skogsstyrelsen (2020): Forest management in Sweden. Current practice and historical background

Skogsstyrelsen (2022): Ansökan om stöd till Nokås eller Ädellövskogsbruk

Skogsstyrelsen (2023): <https://geodpags.skogsstyrelsen.se/geodataport/feeds/AvverkAnm.xml>

Skogsstyrelsen (2023): <https://geodpags.skogsstyrelsen.se/geodataport/feeds/UtfordAvverk.xml>

Skogsstyrelsen, IBFRA (2021): Sustainable boreal forest management – challenges and opportunities for climate change mitigation Report from an Insight Process conducted by a team appointed by the International Boreal Forest Research Association (IBFRA), Report 2021/11

Södra (2018): Skog och vilt

Stoltz J., Grahn P. (2021): Perceived sensory dimensions: An evidence-based approach to greenspace aesthetics, *Urban Forestry & Urban Greening*, Volume 59, 2021, 126989, ISSN 1618-8667, <https://doi.org/10.1016/j.ufug.2021.126989>
(<https://www.sciencedirect.com/science/article/pii/S1618866721000145>)

Sveaskog (2022): <https://www.sveaskog.se/om-sveaskog/karta-over-vart-markinnehav/>

Sveriges Officiella Statistik (2020): Avverkningsanmälningar 2020
<https://www.skogsstyrelsen.se/globalassets/statistik/statistiska-meddelanden/statistiska-meddelanden-avverkningsanmalningar-2020.pdf>

Swedish Environmental Protection Agency (2018): Strategy for Swedish wildlife management

Swedish Forest Industries (2021): <https://www.forestindustries.se/forest-industry/forest-management/qa-about-forestry/the-swedish-forest/>

Swedish Forest Industries (2022): <https://www.forestindustries.se/news/news/2022/09/why-are-there-clearcuts-in-the-swedish-forests/>

The Economist (2022): Climate change: Can money stop deforestation?
<https://www.youtube.com/watch?v=cOfWyCkcSvg&t=634s>

The Royal Society (2021): Why is biodiversity important – with Sir David Attenborough
<https://www.youtube.com/watch?v=GIWNuzrqe7U>

The Woodland Trust (2022): <https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/habitats/caledonian-forest-and-native-conifer-woods/#:~:text=Caledonian%2C%20or%20native%20pinewoods%2C%20are.of%20Scandinavia%20and%20Northern%20Russia.>

The World Bank (2020): <https://data.worldbank.org/indicator/AG.LND.FRST.ZS?locations=SE>

Tribe, J., & Mkono, M. (2017). Not such smart tourism ? The concept of e-lienation. *Annals of Tourism Research*, 66, 105–115. <https://doi.org/10.1016/j.annals.2017.07.001>

U.S. Forest Service (2018): Why is Pollination Important?
<https://www.fs.usda.gov/wildflowers/pollinators/importance.shtml>

United Nations (2015): Sustainable Development Goals, The 2030 Agenda for Sustainable Development, <https://sdgs.un.org/goals>

University of the Aegean, Department of Environmental Studies (2002): Defining, measuring and evaluating carrying capacity in European tourism destinations. B4-3040/2000/294577/MAR/D2
https://ec.europa.eu/environment/iczm/pdf/tcca_material.pdf

van den Brink A. & Bruns D. (2014) Strategies for Enhancing Landscape Architecture Research, *Landscape Research*, 39:1, 7-20, DOI: 10.1080/01426397.2012.711129

Verdone, M. (2015). A Cost-Benefit Framework for Analyzing Forest Landscape Restoration Decisions. Gland, Switzerland: IUCN

VISS (2017): <https://viss.lansstyrelsen.se/Waters.aspx?waterMSCD=WA96822092>

Wallace K. J. (2007): Classification of ecosystem services: Problems and solutions, *Biological Conservation*, Volume 139, Issues 3–4, 2007, Pages 235-246, ISSN 0006-3207, <https://doi.org/10.1016/j.biocon.2007.07.015>.

Wells, N., and K. S. Lekies. 2006. "Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism." *Children, Youth, and Environments* 16:1–24.

Where Might We Find Ecologically Intact Communities?, *Frontiers in Forests and Global Change*, Volume 4, <https://www.frontiersin.org/articles/10.3389/ffgc.2021.626635>, DOI:10.3389/ffgc.2021.626635, ISSN:2624-893X

Wikipedia (2021): <https://sv.wikipedia.org/wiki/Derasj%C3%B6>

Wilcer, S. R., Larson, L. R., Hallo, J. C., & Baldwin, E. (2019). Exploring the diverse motivations of day hikers: Implications for Hike Marketing and Management. *Journal of Park and Recreation Administration*. doi: 10.18666/JPRA2019-9176

Williams, J. (2018). How Instagram is Changing the Way We Travel. Retrieved November 21, 2018, from <https://www.praguepost.com/technology/how-instagram-is-changing-the-way-we-travel>

WWF (2017): <https://www.wwf.se/debattartikel/wwf-vi-har-inte-ett-hallbart-svensk-skogsbruk/>

Zandersen M., Grønvik Bråten K. and Lindhjem H. (2009) : Payment for and Management of Ecosystem Services, Issues and Options in the Nordic Context, *TemaNord* 2009:571

ORAL REFERENCES

Mats Öhagen (2022) – Telephone interview, 2022. October 25., profession: forest landowner

Mikael Karlsson (2022) – Telephone interview, 2022. October 20., profession: Founder of Ecoforestry foundation

Rickhard Lantto (2022) – Telephone interview, 2022. November 22., Profession: forest landowner