

Finland Erasmus+ 2nd May- 9th May 2016



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Introduction

The Erasmus+ structured training course in Finland took place 2nd May to 9th May 2016 consisting of an overview of education, wildlife and habitat conservation, eco-tourism, forestry and wildlife, conservation and access in southern Finland. The objectives of the week set out by the group are shown below and followed through in the report. The report was written as a group and split as follows within the group:

1. Access: Ian McCall and Robin Mitchell
2. Forestry: Radek Zebrowski, Sergey Eldeman and Jean Frame
3. Education and Culture: Beverley Clark and Louise Milne
4. Wildlife and Habitats: Adam Ross

Objectives:

Forestry/ Forest and wildlife research

- The interaction of recreation and forest management. Contradictions between commercial, social and ecological aspects at planning and delivering forest operations. Public access on operational areas and Health & Safety issues.
- Commercial extraction on the ground. Planning: size, shape, conjunction of coupes in terms of machinery access, subsequent restocking and visual impact. Various silviculture approaches (clearfell, thinning, Continuous Cover Forestry). Management of forest operations (harvesting and extraction) with regards to wildlife preservation, ground stability, soil and water protection, pollution control (would be nice to visit an active site). Construction of forest roads and haulage
- Economics of biomass production and impact on silviculture practice
- Natural regeneration and species composition
- Impact of multipurpose forestry on Land Management Plans (long-term felling and restock plan)
- Species selection for planting in terms of commercial outcome, biodiversity and recreation
- Management of herbivores in woodlands (wild and farming)
- Traditional trades in forest and supplementary incomes alternative to timber harvesting.
- Finnish approaches to - forest management for wildlife conservation - forest economies - land ownership - visitor management - education -

wading bird populations - capercaillie habitat - ecology and management of beavers, lynx and wolves

Conservation and Access

- *Allemansrätten*: Our access rights in Scotland are largely modelled on the Scandinavian Everyman's Right and it makes an interesting comparison 11 years on from the implementation of our Land Reform Act.
- Compare rights and responsibilities and social attitudes / relationship to the land / outdoors.
- How aspects of recreation such as camping are managed is particularly interesting. We were interested in approaches for promoting access, recreation, physical activity and enjoyment of the outdoors and wildlife.
- Health and physical activity: our understanding is that there is a strategy for physical activity promoting health and wellbeing.
- There is a potential comparison to be made with Scottish physical activity strategy and walking and cycling strategy.
- What can we learn from how Finland has improved health by promoting physical activity? How much of that is based on outdoor recreation?
- Is workplace physical activity promotion important and how does this work in practice?

Joint Report

The group were made up of 8 people from different organisations across Scotland as shown in the group picture as shown below:



Figure 1: Group picture at Tampere University of Applied Sciences (TAMK)

Backrow: Left to right

Sergey Edelman (Forestry Commission Scotland); Ian McCall (Paths for All); Robbin Mitchell (RSPB); Louise Milne (LLTNP Volunteer Ranger); Adam Ross (RSPB); Radek Zebrowski (Forestry Commission Scotland)

Front row: Left to right

Jean Frame (Woodland Trust Scotland) and Beverley Clarke (Loch Lomond and Trossachs National Park)

Maps

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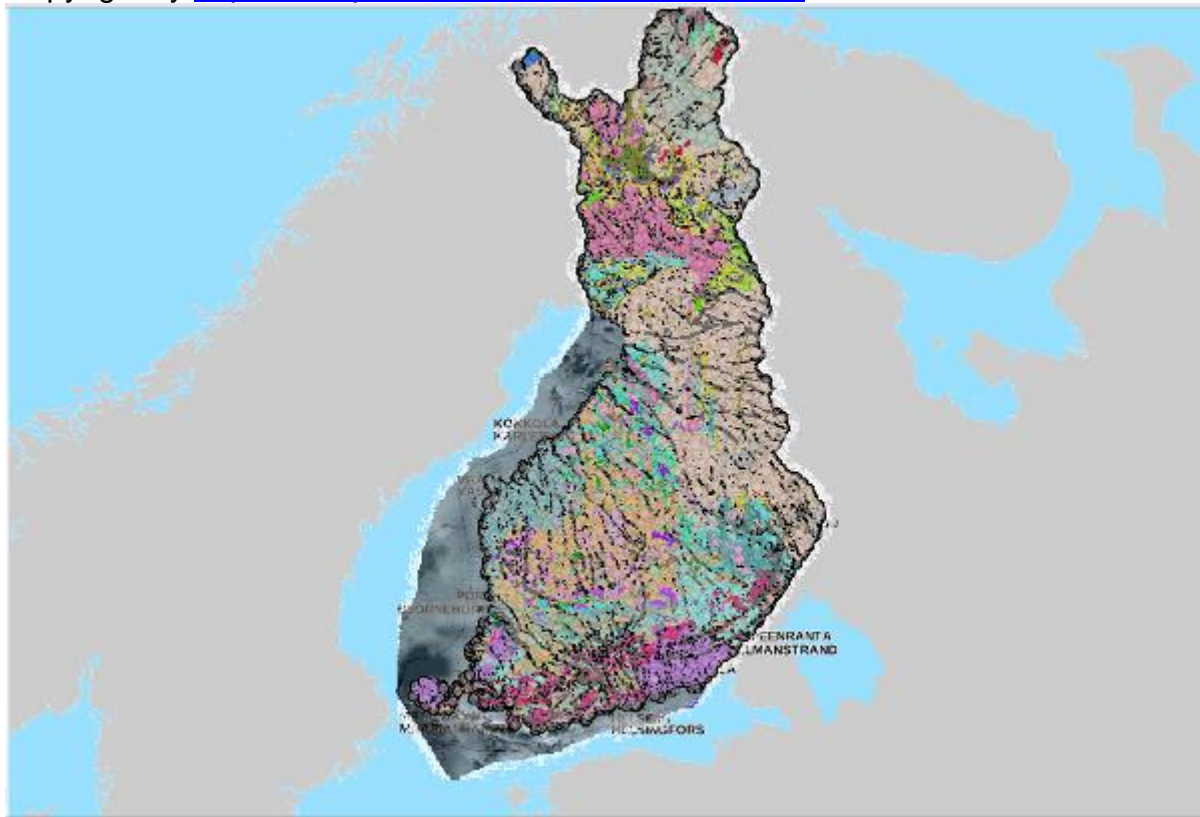


Figure 2: Physical Map of Finland

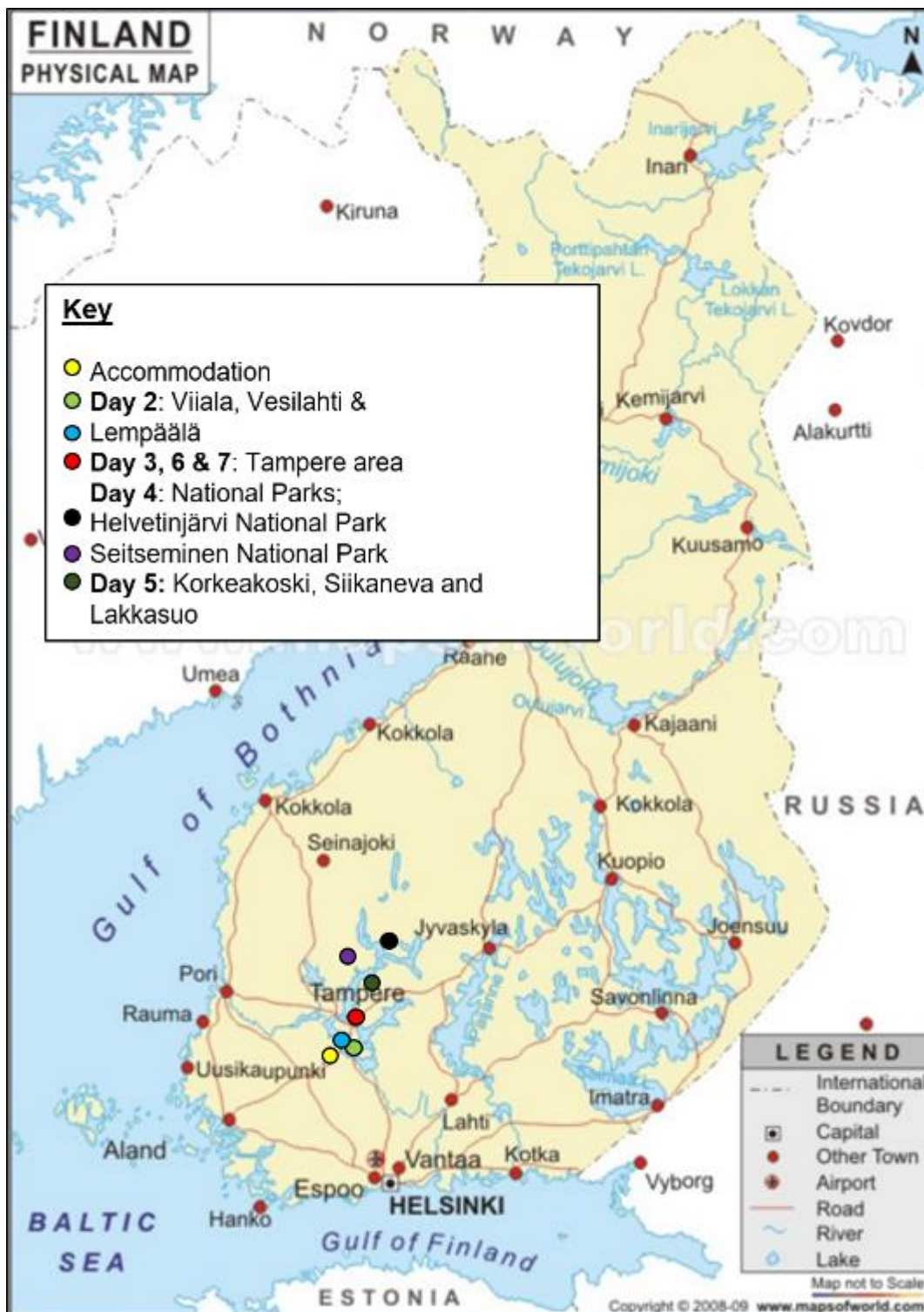


Figure 3: Map of Finland and locations visited

Physical activity and the outdoors in Finland

Ian McCall

Thirty years ago, Finland was one of the world's unhealthiest nations. Diet was poor, people were inactive and heart disease was at record levels. Now it's one of the fittest countries on earth.

In 2012 39% of people in Scotland met the then current recommended physical activity levels. In Finland the equivalent figure was about 50% however there is still recognition that current lifestyles in Finland favour physical inactivity.

Finland has a National Strategy for Physical Activity Promoting Health and Wellbeing 2020 which can be directly compared to our Physical Activity Strategy.



Figure 4: Example signage in Pyynikki

Connection to nature

There seems little doubt that Finns are more connected to nature and the outdoors than Scots – reflecting that Scotland has been more of an urban society for longer. That said, there is a perception that the level of disconnection with nature is also increasing in Finland.

The rights and responsibilities that come with *Allemansrätten* are firmly embedded in the Finnish psyche and reflected in generally very responsible behaviour in the outdoors.

An important factor in the Finns' relationship to the outdoors relates to ownership of land and the owning of rural cottages.

Many private individuals in Finland own forested land. There are around 500,000 forest owners with the average holding being 44ha.

This land ownership pattern stems from the break-up of larger public and private estates in the 1920's - after independence - and after WW2. There are some parallels to be drawn with the ongoing land reform debate in Scotland – our pattern of ownership is somewhat different! This is one factor that has implications for the level of connection to nature in Scotland.

An even larger proportion of the population spend a lot of their free time in forests - 1/7 households own a summer cottage and they are used by extended families.

There are 450,000 such leisure homes in Finland – for a population of just over 5 million. The average cottage is located 200 km from their permanent residence. Of the adult population, 45% have regular access to a summer cottage but 56% spend time at summer cottage annually. They are equally common among rural and urban people.

Outdoor living at a summer cottage is a key part of the Finnish way of life. People are in close contact with nature and take part in many outdoor activities whilst there - boating, fishing, picking berries and mushrooms, cross-country skiing, walking, and collecting firewood in the forest. There is clearly a link here to the promotion of hutting in Scotland through the Thousand Huts campaign and the pilot project in Fife on Forestry Commission land.

An interesting aspect of Finnish life is how popular the collection of berries and mushrooms is – on a totally different scale to in Scotland. 73% of adults report having the skills to pick mushrooms and 38% report doing it annually. Berry picking is the most popular reported forest related activity in the country.



Figure 5: Cowberry bush (*Lingonberry*)

Physical activity

Nearly all Finns take some form of physical exercise. Over 90% of the Finnish population aged over 10 had practised at least one form of physical exercise during the previous four weeks in 2009. Those aged 10 to 14 were most active with 98% of them having taken some form of physical exercise during the previous month.

Finland makes the top-five list of the most physically active European countries. The most popular form of physical exercise is walking, including Nordic walking, practised by three-quarters of people. The next most popular are exercises at home, cycling and swimming – a fairly similar pattern to Scotland.

There has been a shift in emphasis from competitive and elite sports to health-enhancing physical activity for all – similar to what we have been doing in Scotland. Most physical activity used to take place outdoors, but nowadays people also use specifically built facilities - Finland has an estimated 30,000 such sports facilities. The basis of much of the outdoor recreation lies in the rights established by *Allemansrätten* – discussed elsewhere in this report. There is a very close parallel with our access rights and code.

The UKK Institute is a private research organisation that co-operates with the Ministry of Social Affairs and Health as an expert on health and physical activity. The Foundation's Board has representatives from the Ministry of Social Affairs and

Health, the Ministry of Education, the City of Tampere and the University of Tampere.

The main funding is provided by the Ministry of Social Affairs and Health, the Finnish Slot Machine Association (a not for profit monopoly) and public research grants.



Figure 6: People walking in Tampere

Promotion of physical activity

Outdoor activities are recognised as a solution for physical inactivity, sedentary lifestyles and increased obesity rates, as well as the related health risks such as cardiovascular disease, mental health problems and type-two diabetes.

Metsähallitus is a state-owned enterprise that administers more than 12 million ha of state-owned land and water and promotes recreation in national parks and thousands of kilometres of hiking trails.

Parks & Wildlife Finland (former Natural Heritage Services) is a unit of Metsähallitus. Parks & Wildlife Finland is in charge of public administration services which include: nature conservation, facilities and services for outdoor recreation, hunting and fishing services, protected area management planning.

There are 39 national parks managed by Metsähallitus which provides marked trails, campfire areas, wilderness huts and national park visitor centres. There are 72 marked national cycle routes and numerous local path networks.

The Finnish Outdoor Association (Suomen Latu) is a non-profit organisation that has been promoting an active outdoor lifestyle since 1938. Their core activities include hiking, geocaching, skiing, snowshoeing, winter swimming and Nordic Walking. For its trail classification Metsähallitus uses the Finnish recreational trails classification system developed by **Suomen Latu**.

The Finnish approach to getting people more physically active has aimed to sell enjoyable activities to people that happen to require physical activity and ensured exercise was the cheap and easy choice to make. This built on a love of outdoor sports supported by grants for local projects. There are parallels here with the promotion of health walks and other activities in Scotland.



Figure 7: Typical camp fire in the countryside

Active travel

It is clear that a lot of activity (walking, cycling, etc.) is facilitated by good active travel infrastructure in and around communities. But fewer people now walk or cycle to work.

In 2010-2011, Finns made a total of 30 per cent of all their journeys on foot or by bicycle. In Finland 9% of all trips are made by bike - compare to 27% in the Netherlands and 1% in Scotland.

Finnish urban culture is relatively young as the country remained mainly agricultural until the 1940's. Industrialisation and urbanisation was very rapid during the 1960's and 1970's. These decades saw a rapid rise of car-ownership and existing pedestrian spaces are mostly recent, implemented during the last two decades. Transport policy in Finland has tended to favour the car since the 1950s. Many of the issues are very similar to those in Scotland – with the urban traffic system still largely based on the needs of motorised traffic. That said city centres are being reclaimed for people by building new routes for cycling and walking.

The National Action Plan for Walking and Cycling 2020, published in the spring of 2011 by the Ministry of Transport and Communications, is designed to enhance the political status of walking and cycling to the point that they will be recognised by policymakers as equal to other modes of transport. The objective of the associated Action Plan is to encourage and enable people to opt for walking or cycling at least for a portion of their journeys. The aim is to increase the share of trips made by walking and cycling by 20%. These can be compared to our Cycling Action Plan for Scotland and the National Walking Strategy.



Figure 8: People cycling in Tampere

Workplace

Workplace physical activity promotion seems well established in Finland. Companies receive tax incentives to encourage staff to be more active and some offer financial inducements to staff to walk and cycle. There has been a trend for employers to have outdoor, active away days.

90% of employers support their employees' physical activity in some way. Each year employers spend an average of about 200 euros per employee for physical activity. The money goes to anything from gym vouchers to providing workout facilities and saunas.



Figure 9: View of Tampere from tower and boardwalk in peatland

Summary

- Finland has a good track record on outdoor access and recreation and in increasing physical activity.

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- There are comparisons to be made between their physical activity strategy and walking and cycling strategy and our approach.
- Land tenure and summer cottages have an influence on people's connectedness with nature.
- How they manage aspects of recreation is particularly interesting.
- The interaction of recreation and forest management is very relevant – e.g. promoting physical activity on the forest estate and development of hutting.
- As in Scotland active travel is a key area to be addressed.

Everyman Rights and SOAC

Robbin Mitchell

Background

Finland has a long tradition of access to its countryside, both formally and informally. Until very recently, there has been a history of a significant proportion of the population living in the countryside which has meant there has been a healthy respect for the rural environment.

Context

Finland's countryside is mostly made up of forests, wetlands, and lakes and rivers. With a population of 5.4 million, Finland's population is similar to that of Scotland, 5.2mill. However, in terms of land mass, Finland has three times (338,000km²) the area than Scotland (80,000km²) over which their people can roam. Consequently, Finland is a sparsely populated country, where roaming is made easy by an extensive road network and the concept of Everyman's Right. The difference in land mass leads to significant differences in intensity of management of the whole of Finland compared to Scotland, in terms of forestry, conservation management and people management.

Legal framework

Finland's Everyman's Rights (the Right) were legally established in 1917 following Finland's independence from the Russian Republic. However, they existed in a largely unwritten code of practice for centuries prior to this. In Scotland, the most comparable rights are enshrined in the Land Reform (Scotland) Act 2003, implemented in 2005. The Scottish Outdoor Access Code (SOAC) gives guidance on rights and responsibilities under the Act. With its historical "Right to Roam", Scotland has felt that it is at the forefront of access legislation in the UK, particularly in comparison to England's CROW Act. However, compared to Finland's c100yrs of experience of the Right, Scotland is a mere beginner with only 11 years' experience with a codified right! As such, there is a lot to learn from Finland's experience and knowledge of public access management in the rural environment.

Extent of Rights

The Right applies for free to anyone living/staying in Finland, without the need to apply for prior permission. They extend to most Finnish land (with some practical exceptions such as private houses and gardens, farm yards, cultivated fields etc.) and allow walking, camping, picking fruits and berries, swimming, boating, fishing and some motorised access e.g. snowmobiles. Special regulations in national parks and many nature reserves additionally limit activities during the bird breeding and nesting season.

The basic premise of the Right is that both the landowners and the people exercising the Right, have rights and responsibilities to respect nature, people and property.

Experience of Finland and the Right

From discussion with the Finnish hosts, in general and on the whole, the Right is adopted and implemented fairly across the country, although there are areas of concern leading to misunderstandings. These have been brought about due to 1) a significant change in the places where the population live, 2) a consequent different understanding and use of the Right and 3) a commercialisation of the use of the Right.

The right does seem to be very much an established part of peoples' lives and is included in the school curriculum.

As per other industrial countries, the Finnish population has moved from the countryside to the towns/cities over the past centuries. This has been noticeable over the past 100 years and consequently the population has increasingly become more urban and disconnected from nature. At the Nature School we visited, we learnt that the grandparents (65 yrs+) of the primary children, knew the plant/animal/tree names of the countryside as they had been brought up in that environment. However, the parents (c 30yrs) of the primary children did not know the same information, as they had been brought up in the towns and cities. This lack of knowledge by parents of young children has led to a decrease in the number of people visiting the countryside, and an increasing lack of appropriate knowledge from those that do. This creates some unintentional issues in managing the rural environment relating to inappropriate camping and fires, and littering. The Nature School is seeking to address these issues by teaching the primary school children the names of the plants/animals/trees of the forest, and by taking them into the forest to teach them basic skills such as making a fire/cooking sausages on sticks etc. Hopefully by the time these children become parents themselves, enough children will have experienced the Forest Schools across Finland to address the current lack of understanding of the environment.

An additional aspect that demonstrates the changing Finnish population relates to 'predator species' in Finland such as wolves and bears. A lack of personal experience, and an urban media, has fed the fears of the predominantly urban population regarding the perceived dangers of wolves and bears. There are thought to be only c 200 wolves and a couple of thousand bears in Finland, and although it is known that wolves kill domestic and farm animals, the older generations of Finnish country populations accepted these losses as part of farming/the countryside. Current media coverage of these losses, and the fear of bears, has generated a discussion about managing wolf and bear numbers within Finland. Similar concerns exist in Scotland following the reintroduction of the white tailed eagle, and the possible reintroduction of lynx and ultimately wolves.

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An interesting, and presumably unintended consequence of land taxation in Finland is potentially going to affect the Right. Landowners in Finland are about to be/have been taxed on the extent and value of the land they own. These lands are subject to the Right, and third parties can receive free benefits from the Right such as camping, fishing, picking berries etc. Finnish landowners are beginning to question why they cannot charge for these rights to generate income to meet some of their tax bills. A specific example of this relates to the right to pick berries and fruit which is not restricted to personal use via the Right. Consequently, there are business people paying non-Finnish workers (predominantly from Thailand) to pick fruits and berries, and using the proceeds for commercial production. Such activities and taxation, could lead to a review of the Right to prevent commercial exploitation of the personal benefits.

That said, the Finnish concerns are minor to those in Scotland where a majority of the population lives in an urban environment, and is very disconnected from nature by virtue of their home location and the modern world. It is comforting to know however, that one of the greenest, healthiest countries in the world, has similar issues to Scotland albeit not on the same scale.

Figure 10: Public campfire lodge in Seitsemien National Park



Forestry: an overview

Radek Zebrowski

Sergy Eldeman

Jean Frame

History and Key facts

Three fourths of the land area of Finland, 22.8 million ha, is covered by forests (forest land and low productive forest). In addition, there are 3.2 million ha of open ground or sparsely tree stocked other land areas (open mires, rocky grounds, etc.) as well as 0.2 million ha of other forestry land (forest roads, storage sites, etc.) and 12% water.



Figure 11: Example of typical birch stand and clear fell area

In Finland, there are about 17.9 million ha of predominantly coniferous forest land (89%) and 1.9 million ha of predominantly broadleaved forest land (10%). The remaining 1% consists of

temporarily open areas in between regeneration fellings and subsequent reforestation.

As a result of a preference for pine in forest regeneration and drainage of pine dominated peatlands, the percentage of forests dominated by pine has increased. Correspondingly, the area of predominantly broadleaved forests has decreased. However, the total volume of broadleaved stock in Finnish forests has increased at the same time, as mixed stands have become more common.

After the Second World War, Finland ceded about 12% of its land area to the Soviet Union. Since then, there have been slight changes in forest area due to afforestation and clearing of agricultural land, drainage works, the construction of communities,

and other land use measures. Some of the increase in forest area after the 1950s is due to changes in the classification of forest land. There are three main laws in relation to forestry which are:

- Finnish Forest Act
- Act on the Financing of Sustainable Forests
- Act of Forest Protection from Insect and Fungal Damage.

Ownership Structure

As in other countries in Western Europe, forests in Finland are mainly owned by private people and families. In the principal growth area, southern and central Finland, about 3/4 of all forests is in private ownership, and in some areas in southern Finland the percentage can exceed 90%. State forests are for the most part situated in northern and eastern Finland. Private forestry is in fact the linchpin of the Finnish forest economy, as the growing stock volume, annual increment and fellings in private forests each account for between 64% and 83% of the total. Private forests produce over 80% of the roundwood purchased annually by the forest industry in Finland. Some 74% of private forests are family-owned. The average size of holdings is 30 ha. There are 375,000 forest property entities of over two ha. There are more forest owners than there are holdings, because spouses often have joint ownership of a holding. As estates and pools have an average of four partners, the number of people owning at least two ha of forest is estimated to be about 737,000. In other words, one out of every eight Finns is a forest owner. Today, the largest single socio-economic group among private forest owners (about 45%) are pensioners.

The state owns 26 % of the Finnish forests that are mainly situated in the north of Finland, and 45 % of them are under strict protection. State lands are managed by Metsähallitus, the analog of Forest Enterprise Scotland.

Metsähallitus works on the principle of co-operation, openness and interaction with all parties interested in the use of state-owned land. Among other, Metsähallitus is responsible for harvesting and selling timber, as well as maintaining state-owned forests in accordance with the principles of multiple uses.

As Finnish legislation places an obligation to protect biodiversity, environment management secures ecological values besides commercial wood supply. Also, there is special emphasis on recreation and cultural heritage on the public ground. The state agency is widely practicing the Continue Cover Forestry regimes on areas with biodiversity, recreational or landscape values. Such regimes include mature thinning, retention felling, uneven-aged methods and gap felling. Mature thinning defines as a shelter-wood system.



Figure 12: Metsaan.fi guidance

In retention felling, more trees than usual are left to maintain landscape or increase the volume of deadwood. In uneven-aged felling, the forest is managed by treating groups of trees, while selective felling is mainly the removal of single trees.

In both methods, trees are removed on a small scale and the forest is both regenerated and grown simultaneously. In other words, there are trees of many ages and sizes growing continuously on the site. In gap felling, the site is regenerated in stages and preserving the landscape character, making small gaps that vary in size and shape.

Generally, gap felling is applied to 20–25% of the total area of the site. In southern Finland the gaps are up to 0.5 ha in size, while further north the maximum size of a gap is one hectare. Similar techniques have been observed also in privately owned forest holdings. Firstly, many owners appreciate this approach and voluntarily contribute to wildlife conservation, and secondly, relatively small holdings allow avoiding concentrated clear-fells and keeping small-scale size of coupes.



Figure 13: Ownership map example

Forest Certification

Forest certification is a voluntary instrument for market forces. It serves as an adjunct to the implementation of sustainable forest management, ensuring the commitment by the owners to silvicultural instructions and standards.

In forest certification, an independent third party grants a certificate (sustainable forestry certificate) vouching for the sustainable management and use of the forest holding in accordance with an agreed standard. The major international certification systems are the PEFC (Programme for the Endorsement of Forest Certification Schemes) and the FSC (Forest Stewardship Council).

Finland has its own national certification system, the FFCS (Finnish Forest Certification System), designed in the 1990s for family forestry. The system was accepted as part of the PEFC in 2000. Finland's PEFC forest certification standards have been updated twice since acceptance in 2000. Today, 95% (22 million ha) of Finland's forests are certified under the PEFC system.

Finland's FSC certification standards were completed and approved by the international FSC in 2010. The number of forest holdings certified under the FSC system is expected to increase in Finland in the near future.

In the UK context, auditable certification standards were developed in response to concerns about the environmental and social impacts of forest management, especially in primary forests.

The Forest Stewardship Council (FSC); an international nongovernmental organisation, developed an independent system for the certification of timber and timber products from both tropical and temperate forests, providing a market mechanism to reward responsible forest management.

In 1998, the UK was among the first to have a national forestry standard endorsed by the FSC. This was developed further and became the UK Woodland Assurance Standard. Although a voluntary standard, UKWAS is widely adopted in the forest industry, and forms the basis for certification through both the FSC and the Programme for the Endorsement of Forest Certification Programmes (PEFC). The Woodland Trust was a founding member of UKWAS and continues to be an active representative of the environmental sector.

Forestry Commission woods, as well as those of other major landowners such as the National Trust and the RSPB are now certified under UKWAS. There are other forest certification systems available internationally but the Woodland Trust considers the FSC to be the only one that truly balances the economic, environmental and social aspects of woods and forests internationally.

In relation to the UK, FSC UK has been running for 21 years (1994-2015) and currently has over 2800 Chain of Custody certificates (CoC) and 1587,999ha of forest certified through the FSC (UK, 2016). Interesting, compared to Finland only 5% of Scotland's forests are FSC certified. Of which there is a UK strategic plan which sets out the objectives of what is expected of its certified bodies. There are several guidance standards available in the UK but the most used is the UK Woodland Assurance Standard version 3.1 which sets out guidance on methods of managing woods/forests in a 'sustainable' manner.



Figure 14: FSC branding UK



UKWAS

The Introduction section of the UK Woodland Assurance Standard explains the background to the development of the certification standard.

This diagram illustrates how the UK Woodland Assurance Standard draws from both governmental requirements and those of the two leading global forest certification schemes to produce a certification standard that conforms to UK regulatory requirements and provides the tool necessary for woodlands to be independently verified as meeting the requirements of both these certification schemes. The responsibility for different aspects is also indicated.

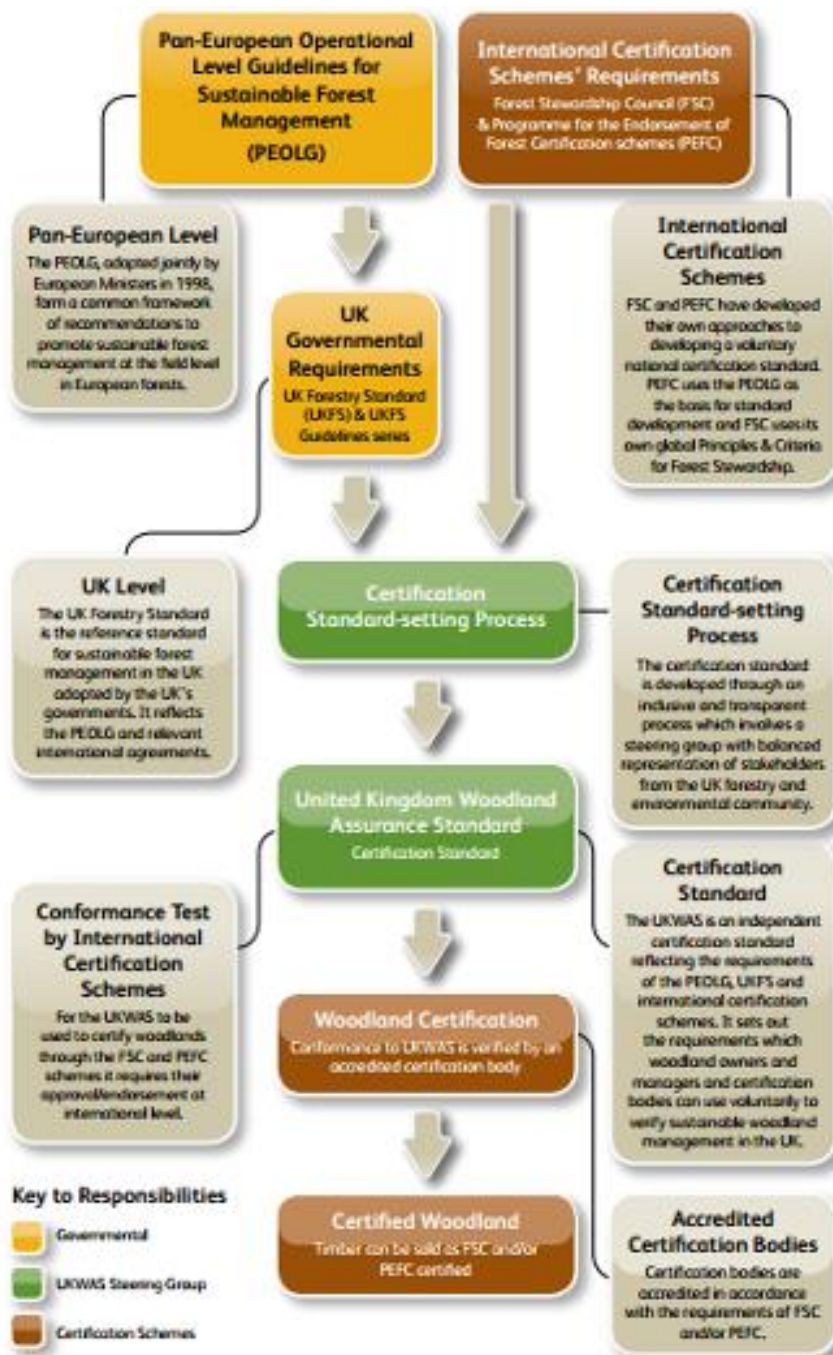


Figure 15: UKWAS decision chart

Forest Management

Forest Management Associations and the *Finnish Forestry Centre* provide advisory services for forest owners. Advisory services may take the form of personal or group consultation, or consultation provided in conjunction with exhibitions, competitions or field trips. Group consultation services are also provided by institutes of forestry.

Forest industry companies organise excursions and meetings for their forest owner customers. Forest management plans for individual holdings are an important instrument for systematic long-term forest management. A forest management plan is a report, based on on-site visits, on the forest resources of an individual holding and includes calculations for harvesting options and notes on forest management measures needed. Management plans for individual forest holdings are mostly prepared by the Finnish Forestry Centre and the Forest Management Associations.

Metsähallitus, forest industry companies and other bodies that own large tracts of forest have drawn up corresponding plans for the forests administered or owned by them, plans that reflect their own needs.

Land in Finland is classified according to its use.

86 % of land area is forestry land. Forestry land is further divided into different types according to the productivity of the land: productive forest land, where the annual wood growth is over one cubic meter per hectare, poorly productive forest land, where growth is between 0.1 and 1 m³, and unproductive forest land, where the annual growth is below 0.1 m³.

Forests (the area of forest land and poorly productive forest land) cover 75 of Finland's land area.

Presumably, 66% is the only productive forest land, which covers an area of 20.3 million ha.

As it is highlighted already, Finnish forestry can be defined as a management of native tree species with respect to their natural growth and reflects the natural cycles in the boreal biome. The main management objective is to secure the high-quality timber production considering preconditions for the multiple uses of forest resources along with biodiversity conservation. This approach is based on distinctive natural and cultural heritage where the majority of Finns have historically inhabited and mastered forest ecosystems.

It also appears in the modern forest management system; which combines the state's strategic planning, technological implementations, involvement of society in the decision making process at national and local levels, responsibility of forest owners and the industry operators. Despite the substantial economic importance of timber production, many Finns do not consider even commercial forests only as a crop.

This is probably the core dissimilarity regarding forestry in Scottish society, where many people are not familiar with the forest environment and cannot appreciate extensive woodlands.

Obviously, this difference in mentality originates in the long history of deforestation in Scotland when many generations have been accustomed to open spaces. Despite afforested areas in Scotland being about 18 % of land; it is considered that only 1% of territorial surface (about 180 square km) can be defined as covered by native woodland. Most of Scottish forests have been created as commercial plantations and could be argued as not being attractive for human beings as a natural habitat.



Figure 16 : Large birch retained for timber value in a Norway spruce stand

For comparison, almost all Finnish forests are described as the semi-native. This is the consequence of traditional multiple uses and a rational approach to forest regeneration. About 120,000 ha of forest land are planted or seeded annually favouring almost exclusively native tree species. Seed-tree or shelter wood felling aimed for natural regeneration account for 30,000 – 40, 000 ha annually.

In contrast, in Scotland, the opportunity for shelter wood and selective felling are drastically limited due such abiotic factors as the climate and soil conditions. Prevalent shallow soils on the exposed hilly relief in combination with gusty winds from Atlantic do not contribute any intermediate interventions. Clear-fell and planting is the main silvicultural method. On the other hand, warm winters and plentiful precipitation create conditions for exceptionally fast growth of trees and short rotations. However, harvesting in Scottish forests is based on the same principle to that in Finland, which is called the Nordic cut-to-length system (CTL): the logs are de-branched and cut to appropriate lengths according to their use on the site. Branches and crowns are normally left in the forest, but may, in some areas, also be used as fuel.

Another silviculture method that is widely applicable in Finland is thinning. Thinning constitutes an integral part of the management of commercial forests. They are carried out 2 to 3 times during the rotation period of stands. The economic outcome can be increased by up to 50% by tending. Without thinning mature trees would remain too thin and hardly valuable as saw log.

Evidence of thinning is widely presented in the forest landscape. Many sites along the group's itinerary took us through productive forests that had been thinned. It is routine practice in Finland and it seems that most of forest owners perceive the labour-intensive, time-consuming and unprofitable first thinning as an absolutely necessary step to achieve greater outcome in the future.



Figure 17: Typical birch stand with Norway spruce understorey

Age of stands for the first pre-commercial thinning varies depending upon forest type; for instance, mixed spruce-birch on drained peatland is carried out before 15 years and average tree height is about 3m, which is much advanced compare to the current practice in Scotland. As the pre-commercial thinning is the owners' initiative, it reflects their understanding of silviculture, which is a remarkable illustration of people's involvement in forest management.

Private individuals and families own around 60 % of forests in Finland. There are some 632,000 individual family forest owners in Finland, if all those who own forest holdings jointly and forest holdings larger than two ha are included. This means that nearly 14 % of Finns are forest owners.

The forests owned by families and individuals pass from one generation to the next through inheritance; this is why Finns generally use the term 'family forestry'.

Private owners have the legal right to leave their holdings unmanaged (that would be irresponsible for productive forests in Scotland). If forest owners officially commence to manage their holding, the management plan has to be approved by **Finnish Forest Centre - Suomen metsäkeskus**. The Finnish Forest Centre is a state-funded organisation covering the whole country and promoting forestry and related livelihoods, advising landowners on how to care for and benefit from their forests and the ecosystems therein, collecting and sharing data related to Finland's forests and enforcing forestry legislation. The Forest Centre in Finland is made up of 5 service areas, the largest being the Northern service. There are approximately 530 employees of the Forest centre which takes the form of two areas of delivery: business and forestry service. Interestingly, the mission statement for the Forest centre is '*growth to the field of forestry*' which takes the form of more detailed data capturing of the forests, either through laser scanning/field surveying and through the 'metsaan.fi' data base for all forest owners and forest professionals.

Finnish Forest Centre operates under the guidance of Ministry of Agriculture and Forestry.

The Forest Centre creates a design plan where management coupes are allocated by location, shape and harvesting years. Owners have the right and responsibility to implement the plan in different ways, by themselves, co-operatively, hiring contractors or trust holdings to Finnish Forest Association or the Central Union of Agricultural Producers and Forest Owners (MTK).

The Forest Centre carries out the random control of operations. The reputation of stakeholders is the important factor for the contractual relationship and that contributes to the moral in Finnish forest industry.

Forest Planning

In Finland the first individual forest management planning efforts were already done at the end of last century. Since the beginning of this century regular forest inventories, timber assessments and stand measurements have been conducted.

The importance put on forest planning is understood as the Finns have made their living from the forests and their products throughout the history. Forestry plans on various levels are important tools in the production of timber and non –timber

produce and for the utilisation of these. In addition to the National Forest Inventory (NFI) plans, forest management planning is carried out nationally, regionally and for individual forest holdings. The regional Forestry Centres are responsible for the implementation of the regional forest management planning concept. The results of these are mainly a forest inventory and map database including stand-by-stand proposals to cuttings, silviculture and other forest activities.

These plans are delivered at a reasonable price to the local Forest Owners' Association to support their extension services and operational annual planning. Within the context of regional forest inventories, each forest owner is offered a more detailed individual management plan for his / her forest holding. On an average, about 60% of the owners use this opportunity to receive a plan at a price of about half of the actual total planning costs. Forest management plans for individual forest holdings are 11 made for a period of 10 years (20 years in northern Finland). The contents of an individual plan are confidential and accessible only to the landowner and the responsible professional forester.



Figure 18: Map of forest owner boundaries

Forest Research: Hyytiälä Forestry Field Station of Helsinki University

The emphasis and resource input to forest research is remarkable in the sense that it is engrained into the forest policy and that the longevity of forest research is an extremely important mechanism in Finland, and to the future of Finland's forests.

Hyytiälä Forestry Field Station of Helsinki University near Korkeakoski. Antti Uotila, provided the group with much insight to the high level of research being carried out in Finland, somewhat ahead of Scotland and the

UK as whole. The research centre provides accommodation for at least 150 students during the summer months to carry out research and a tradition for the students is to write their names on the wall as show in **Figure 18**.



Figure 19: Names written on the wall in the accommodation at the research centre

The size of the research centre covered approximately 40 ha of forest with the aim to gain more forest from the adjacent state-owned forests in the near future. An impressive 30- 50 publications every year are scientifically published predominantly in international journals. The SMEAR II (Station for measuring Ecosystem-Atmospheric Relations) site was opened in 1995 in a (now) 55-year-old Scots pine forest. The Forest Station is an active field centre for research into the interactions between forests, peatlands and the atmosphere. **Figure 19** illustrates the scale of a plot and **Figure 17** is an example of plot on map location.

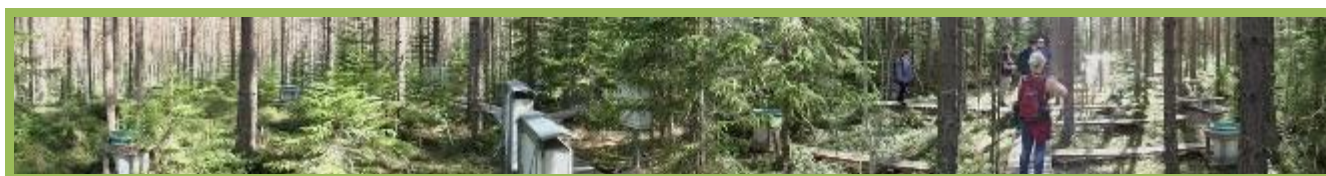


Figure 20: Overview of a plot

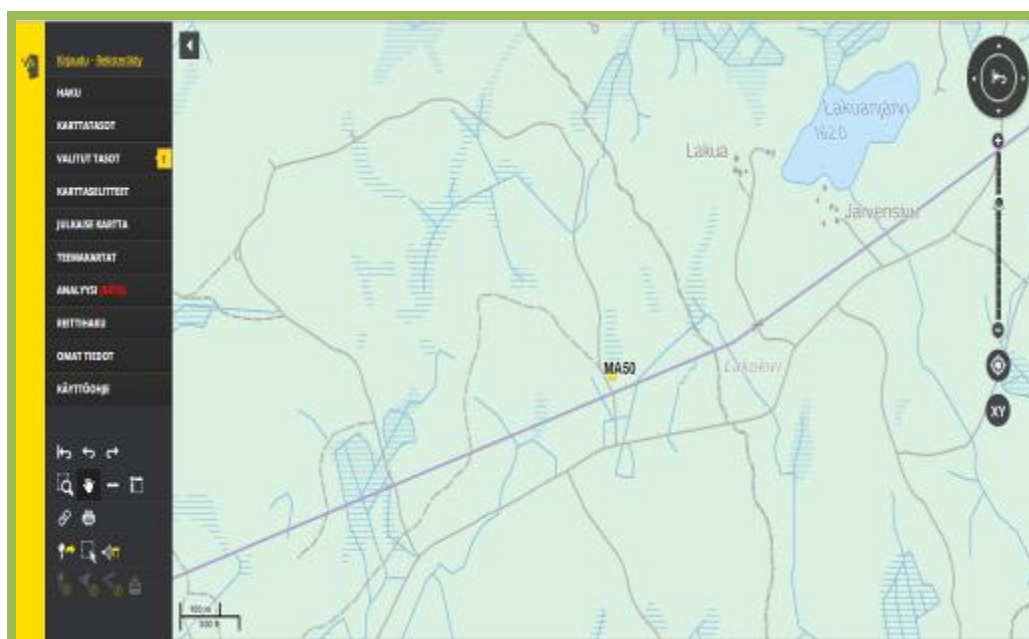


Figure 21: Map of plot

The station has three towers which are used to measure flux measurements, tree physiology (respiration) and aerosol movements. The visited allowed the group to see the complexity of the whole set-up and the evolution of it for over 30 years now. These Finnish research stations form part of a wider European network of research stations; the European Long-Term Ecosystem Research Network and now is hosting scientists from around the world who are developing their own similar network of forest and climate change research stations: using technology developed here.



Figure 22: Tower and group been shown a research plot

Urban Forestry

Pyynikinharju, Pyynikki Esker

The site visit to Pyynikki Esker was a great insight to forest management in an urban environment. The forest itself is located to the west of the city centre of Tampere. It is known as the world's highest gravel ridge Pyynikinharju and is of geological importance in Finland. The map below shows the outline of the esker and the observation tower the group visited.

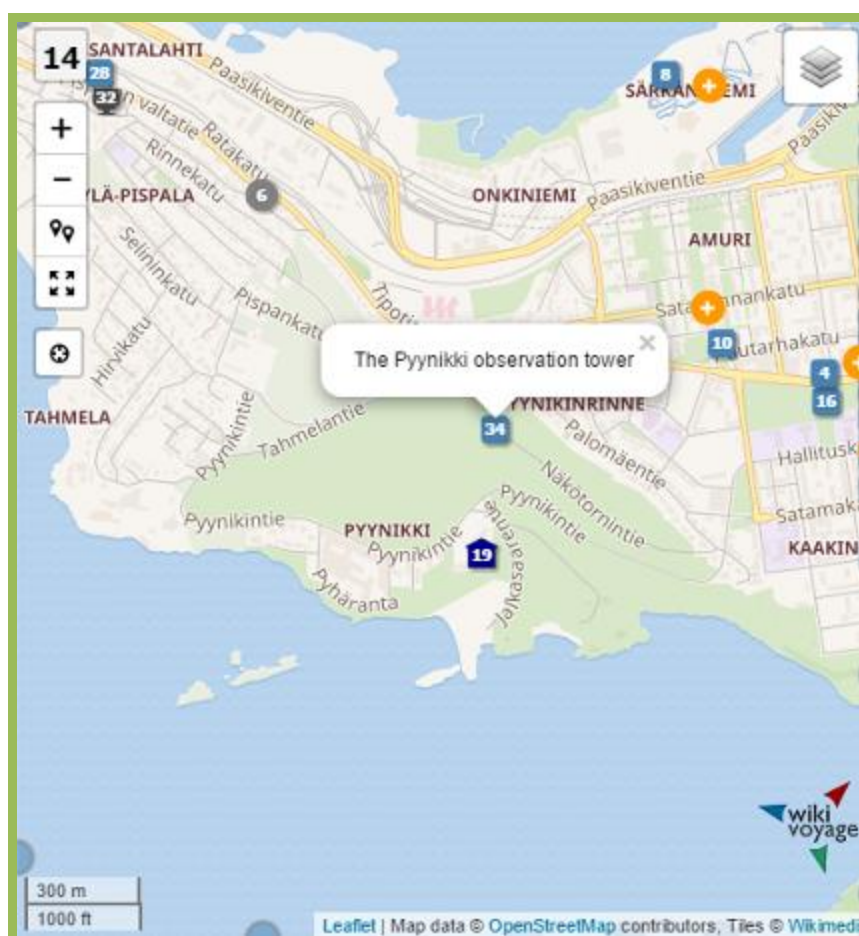


Figure 23: The Pyynikki Esker: Map showing observation tower

The size of the forest was approximately 35ha and comprised of predominantly a conifer canopy (Scots Pine/Norway Spruce), with less than 10% broadleaved species (rowan, elder, birch) and felt that it was a forest expected to see in Scotland.

Contrary to Scotland, the forest management objectives in an urban setting were different in relation to the age structure and species compositions in the understorey. The management of the forest saw rowan as a pest whereby such regeneration is removed. Whereas in Scotland, the main objectives on the whole in an urban environment is the tree safety aspect/people engagement and generally about creating a resilient forest with different age structures and species compositions.

Forest biodiversity

The most astonishing display of deadwood/fungi/mosses and lichens were in abundance throughout all the forests that were visited in Finland throughout the week as shown in the photos below.

Figure 24: Moss/Fungi/Flora in the Forests



Finland Visit: forestry aspect

Our first day saw us travel 50km south of Tampere to Viiala and Vesilahti areas near Lempäälä. Our guide for the day was Manne Viljamaa responsible for wildlife conservation in the area also a forest owner. Manne explained us the impact of forestry operations on wildlife like Capercaillie and protected by law flying squirrel. Manne during the day described the how the forest protection in Finland works.

Manne explained that the state of mires is poor particularly in Southern Finland. Most of peatlands were drained and planted up with conifer crop. Recently Finnish Forestry has been trying to restore these areas. The aim of the supplementation programme for mire conservation is to improve the state of mires and their protection. The programme supplements the basic programme for mire conservation from 1979 and 1981.

During the visit to the old growth forest, our guide Manne explained the recent efforts to protect small areas of herb-rich habitats. He showed us the area with old aspen and small-leaf lime. The Herb-Rich Forest Conservation Programme protects these forest areas in various zones of largely deciduous vegetation and secures the subsistence of their flora and fauna. The programme includes 436 areas, covering a total of approximately 5300 ha. Herb-rich forests are also protected through the METSO programme. Verdant patches of herb-rich forests are part of the especially important habitats protected by the Forest Act. However, woods rich in broad-leafed deciduous species as well as hazel woods are specified as habitats protected under the Nature Conservation Act. During the discussion it transpired that in some cases those areas are not identified and mapped before operations by forest management companies. There seem to be a lot of trust in forestry machine operator's abilities to recognise those herb rich forest areas and exclude those areas from harvesting. Manne explained that forest operators course takes 3 years and it covers all aspects of forestry. As a result of aggressive forestry especially after the WWII, old forests are rare. However, they are extremely important for natural diversity. The Programme for the Protection of Old-Growth Forests encompasses a total of 320,000 ha.

After a refreshing lunch, Manne showed us the forest owned by him and his family, where good timber production and conservation go hand in hand. He also explained the multifunctional aim of forest management in Finland based on practice in his forest. The main aim of multifunctional forest management is to safeguard the production of high-quality roundwood, the biological diversity of forests and the potential for the multiple functions and services derived from forests. The basic unit for forest management in Finland is the stand. Forest stands are classified according to their naturally occurring plant communities, based on a forest site type classification developed by botanist A.K. Cajander. The surface vegetation at each individual site indicates the properties of the site and also the growth potential of trees. There are six main site types in southern Finland, and management and harvesting are directed according to their properties. The average size of managed stands in

southern Finland is about 1.2 ha. Manne showed us stands examples of stands management varied in the growth phase. Seedling stands are managed by cleaning and thinning. Young and advanced thinning stands are managed by intermediate fellings, which are carried out 2-4 times during the growth cycle of the stand. Each time, 25% to 30% of the then current growing stock in the stand is removed. The purpose of intermediate fellings is to direct the growth of the stand in favour of the best trees, to encourage their growth and thereby to produce harvesting income already prior to regeneration felling. We learned very interesting facts about economics of forest operations. It transpires that apart from the pre-commercial thinnings where main objective is silviculture, all felling interventions are profitable. The average annual yield per thinning/felling area is 400 m³ and covers several ha. Site boundaries or trees to thin are not usually marked out, only boundaries of different ownership are, as the machine driver is appropriately trained to carry out thinning on his own responsibility.

In the regeneration phase involving natural regeneration, seed or shelter wood trees are left standing to seed the site. Sometimes natural seeding may take place by trees on the forest edge surrounding the regeneration area, or several small regeneration clearings may be opened up by local felling in the stand. Artificial regeneration by seeding or planting is preceded by final felling that completely removes the growing stock. The success of regeneration is ensured by clearing the site and exposing mineral soil with mechanical soil preparation prior to regeneration, and ensuring that grasses will not endanger the early development of seedlings. From discussion with Manne it transpired that main goal is to create a fully productive stand with a suitable species composition in a reasonable period of time (with short or with no fallow period). We had seen restock site where majority of Norway spruce (*Picea abies*) was of natural origin and those planted came already treated with Pine weevil repellent applied to the plant stem. Manne said that no pesticide is used during the establishment phase. The majority of Finland's current forests have regenerated naturally; about 35% are planted or artificially seeded. However, even artificially regenerated stands have great numbers of naturally regenerated trees as well.

On Thursday we arrived at the University of Tampere, we had several lectures where we were given a summary of the structure of the university. Weather was warm and sunny and allowed us to explore the forest park in university's hinterland where we learned more about Finish forestry organisation and management. Prof Ari Vanamo Head of Faculty of Forestry explained the ownership, management, species and timber processing industry structure in Finland. We have learned that the most important tree species are Scots pine (*Pinus sylvestris*) (47% of standing volume), Norway spruce (*Picea abies*) (34%) and birch (*Betula pendula & pubescens*) (15%). In the past few years Finland used nearly 60 million. m³ per annum of the timber increment, that is to say, 74%. The Finnish forest is at present in a regeneration period following a period of production orientated forestry which practiced clear cutting up until the beginning of the 90's.

Prof Vanamo explained that the new Forestry laws are based on the principles of forest sustainability according to Rio offer a favourable framework for an efficient use of timber, whilst at the same time protecting nature and encouraging biodiversity. Basically only as much wood can be felled as will re-grow. After the final cutting the owner is compelled to regenerate, if he does not do so the reforestation will take place at his cost. 95% of Finnish forests are certified according to the national FFCS-system (recognised by the PEFC and FSC). Finland is considered a forerunner in the area of forest certification.

Prof Ari explained to us the history of ownership. On average the 440,000 forest owners each own 24 ha of forest. Forest owner associations play a very important role in forest profitability. It is their job to advise and further educate forest owners, to promote forest profitability, to organise joint sales or to act as intermediaries for large timber buyers. Nearly all forest owners who own more than 30 ha of forest have a management plan, which is usually updated annually. They are supported by internet based programmes in which they can simulate various alternative forms of management and their outcome. Finnish forestry can rely on a successful timber industry, which processes raw wood into high quality products (paper, cellulose, furniture and houses) and also on international trade. There are hundreds of small and medium sized businesses and most importantly three large international companies Metsa, StoraEnso and UPM.

On the fifth day we spend a day at Hyytiälä Forestry Field Station of Helsinki University near Korkeakoski. Antti Uotila, Head of the Station showed us in the morning the SMEAR II (Station for measuring Ecosystem- Atmospheric Relations) site was opened in 1995 in a (now) 55 year old Scots pine forest. The Forest Station is an active field centre for research into the interactions between forests, peatlands and the atmosphere. The station has three towers which are used to measure flux measurements, tree physiology (respiration) and aerosol movements. We were able to see how complex the whole set-up has become as it has been evolving for over 30 years now. These Finnish research stations form part of a wider European network of research stations; the European Long-Term Ecosystem Research Network and now is hosting scientists from around the world who are developing their own similar network of forest and climate change research stations: using technology developed here.

Alongside the climatic research the research station has almost 250 long-term experimental sites which represent different tree species compositions, developmental classes, site conditions and management histories, together with long term weather measurements. This was both very interesting and also very exciting. It was interesting to hear about the measurements and to see the pods used on living trees to measure photosynthesis and respiration. In the afternoon we had seen one of the biggest peatlands Siikaneva and Lakkasuo and outcomes of CCF practice in Finland. On Saturday we were taken to an urban forest in the Pyyrikki suburb of Tampere by Evaluina Asikainen. The forest is growing on an esker which runs

for several kilometres through the city and is surrounded by it. Forest management is carried out by the municipality. As expected in this type of forest is kept to minimum and it's rather focused on removal of dangerous trees and stimulating natural character of this forest. The forests have got a very natural feel to them in contrast to many urban woods and parks in the UK where management consists of tidying up all deadwood and mowing, spraying or strimming the undergrowth. The urban forest has been used by the Forestry department of the University as a teaching resource. Eevaliina told us that she took the students out to teach them basic ecology and species identification skills, both areas had a pine, spruce and birch canopy with the typical field and ground layers you would expect in the boreal forest zone. Eevaliina said that the neighbouring communities at Pyynikki have requested the removal of the regenerating understory of birch and rowan in some areas to give a more open feel and to improve sight lines.

Summary

- There are several applications of learning from the structured course that will be applied to all the groups' job roles:
- Multipurpose forestry – forestry is integrated with eco-tourism, recreation, farming and conservation. The owners have a strong incentive to nurture their property with care, and to employ silvicultural systems that have minimal adverse effect on the landscape.
- Forest planning – insight to integrated resource management, promoting natural regeneration in establishing next generation, habitat management for protected species in productive woodlands.
- Silviculture – The trip enabled and enhanced the knowledge of stand dynamics in north temperate and boreal forest types, and was especially instructive in presenting a range of alternative silvicultural systems to clear-felling implemented in. Many of these could be applied to enhance the sustainable management of native woodlands in Scotland.
- There is some limitation to interpolate the long-term experience of forestry in Finland to Scottish ground due to notable natural differences. However, programmes of silviculture alternative to clear-felling are taking place across all forest districts in Scotland to enhance resilience, biodiversity and recreational attributes of forests.
- The essential role of the Forestry Commission of Scotland, Woodland Trust, RSPB, Loch Lomond and The Trossachs National Park, Paths For All, other government agencies and NGO to introduce the principals of multiple uses of forests along with education and engagement of Scottish people to be more familiar with forest ecosystems. The attitude of people to forests in Finland is impressive.

example for Scottish society, especially, considering the recognised importance of trees in climate change mitigation and hence the intention to create more woodland in Scotland.



Figure 25: Prof Vanamo from TAMK doing an outdoor lecture for the group.

Wildlife & Conservation

Adam Ross

The flight from Edinburgh to Tampere provided an early opportunity to put the two countries' forestry statistics into context. The sheer scale of blanket forestry in Finland made for a striking comparison with the compartmentalised farm plots and heather moorlands of Scotland. Finland's landmass is 4 times bigger than Scotland's, yet the populations are roughly the same size. The pressure of human interests on the landscape is therefore far less intense in Finland - a fact which cropped up repeatedly and went some way to explaining what felt like a slightly less hands-on approach to conservation and habitat management.

Despite climatic differences, the Boreal forests of Finland share many similarities with the native Caledonian Forest which once covered most of Scotland and is now mainly restricted to small isolated pockets in the Highlands. Finland's forests are overwhelmingly dominated by Scots pine, Norway spruce and silver birch and interspersed with the likes of aspen, alder and goat willow. The forests are carpeted with mosses and berry-rich heath shrubs and lichens have colonised rapidly over the last 20 years in response to improvements in air quality. Forestry is integral to the Finnish economy and way of life so the majority of woodland is subject to rotational felling and replanting with few forests exceeding 200 years in age. A crucial fact to bear in mind when considering commercial versus ecological imperatives in forest management is that, in Finland, the native tree species are also regarded to provide the most economically viable timber. The decision to retain native habitats is therefore as much a financial one as an environmental one. This contrasts sharply with Scotland which has sacrificed some biodiversity through the widespread favouring of non-native Sitka Spruce for commercial forestry due to its fast growth rate, straight timber and market price. In addition to these vast forests, 10% of Finland is covered by lakes and waterways and there are 9 million ha of peatland with 4 million ha retained in their natural condition. The landscape therefore comprises a very significant amount of bog, mire, wetland and freshwater habitat.

Attitudes to wildlife and conservation

1 in 5 families own forest in Finland and 22% of all forests are owned and protected by the state. Private forest owners are encouraged to manage their land with biodiversity in mind on a voluntary basis and this approach is met with varying degrees of cooperation. The owners who do manage their land in an ecologically sympathetic manner were said to do so out of personal responsibility and a long-term vision where, rather than felling for immediate profit, they can hand down intact woodland to their children and give them the option of how to manage it. The majority of conservation work is undertaken by government organisations. National parks and protected areas were described as being relatively under-staffed with a lot of the practical work and

maintenance in being done by volunteers and sometimes prisoners and offenders. Volunteering is very popular and often over-subscribed with a lot of people paying for the opportunity.

Although birdwatching as a hobby is becoming more popular, it is not as established as in Britain. This could be connected to the fact that most conservation work in Finland is taxpayer funded. In Britain, conservation charities invest a huge amount of resources in enthusing, inspiring and informing the public about nature in order to recruit members and raise funds.

In Finland there is less of a requirement for this type of public engagement since the government takes care of things. In Tampere the group did encounter a marquee where the public were being encouraged to build bird boxes. The marquee looked like a typical RSPB or Woodland Trust recruitment stall but was in fact organised by the Green Party of Finland. They are the third largest political party in the Tampere region and are working on a project to place a million bird boxes around the country.



Figure 26: Green Party Marquee

Engagement with the outdoors and a connection with nature has traditionally been a strong part of Finnish culture due to the popularity of foraging, hunting, foresting and outdoor recreation. Generational declines have been observed but the forest schools programme aims to nurture environmentally literate children. At the Tampere Forest School the group witnessed a pre-school class being quizzed on bird identification and their skills appeared to be much higher than those of children in Scotland.

Birds

Finland's national bird is the Whooper Swan which was nearly hunted to extinction by the 1950s but benefited from a public campaign to protect and celebrate the species which now thrives throughout the country. During the week-long trip, common crane lived up to its name while common buzzard did not (none were observed throughout the entire week and population numbers are far lower than in Scotland). The sound of chaffinches was ubiquitous

along with other common birds such as blue tit, great tit, house sparrow and warblers. Blackbird was scarce but the thrush family was otherwise well represented by song thrush and mistle thrush as well as large numbers of resident fieldfare and redwing which are only experienced as winter visitors in Scotland. Marsh harriers exploit the



Figure 27: Pygmy owl

abundance of wetlands and number between 700 and 1000 breeding pairs, compared with the UK's 320-380 breeding pairs which favour the east and south-east of England with only a very small number breeding in Scotland. A hunting osprey was a regular visitor to Hiivalahti Lake where the group were staying.

Some of the biggest contrasts in bird life exist in the variety of woodpeckers and owls. Finland is home to 8 woodpecker species and 10 owl species in comparison with Scotland's 2 woodpecker species and 4 common owls (5 if you include the very scarce little owl). The group were fortunate to observe a pair of Ural owls and a female Pygmy owl during their trip thanks to the guidance of university lecturer and conservationist Manne Viljamaa who has been monitoring nest boxes for a number of years. Woodpeckers were harder to spot but the group observed many bore holes and heard the sounds of wryneck, great spotted woodpecker and the comparatively huge black woodpecker.

The day with Manne began with an early-morning visit to a capercaillie lek site. Manne informed the group that capercaillie typically begin displaying before sunrise and then take a break for roughly the first hour of daylight while the sun is low, before resuming lekking activity for around two hours. Peak lekking season had finished and there was a constant breeze which Manne said might put the birds off since it makes it harder to listen for predators. As a result, no lekking was observed but a couple of members of the group witnessed a female flying across a woodland clearing and the amount of capercaillie droppings indicated that this was a very active site.

Unlike in Scotland, capercaillie are not considered a conservation priority. Finland hosts a population of approximately 300 000 compared with an estimated 1000 birds in Scotland. Black grouse numbers (another of Scotland's priority species) are also over 100 times higher in Finland and the populations are so healthy that both black grouse and capercaillie can be legally hunted. 6% of the Finnish population participate in regulated, permitted hunting of a variety of birds and mammals including deer, hares, elk, beaver, fox, pine marten and bears. Attitudes toward controlled hunting in Finland are

generally positive since it is a traditional past-time, resulting in sustainable food production and an engagement with the outdoors. It is also considered to play a useful societal role in controlling species such as the non-native white-tailed deer which graze heavily and elk which cause a number of fatal traffic collisions every year. Although capercaillie are not protected, they are given a level of prominence and significance since the Finns realise that there is tourism potential and global interest in the species due to its comparative scarcity and unique characteristics.

Although capercaillie numbers in Finland remain strong, the species has seen a fairly sharp decline over the last 50 or 60 years. The numbers are thought to be stabilising again but Manne attributed the decline to modern forestry practices, particularly the clear-cutting of forestry which leads to a loss of cover as well as vital food sources such as bilberry. He also mentioned a tendency for forest owners to replant pinewoods with spruce which can be a problem since capercaillie will eat pine needles but not spruce. Interestingly, the lek site that Manne monitors had recently experienced clear-cutting but the disturbance did not seem to have deterred the birds. Radio-tagging in Scotland showed that deer fence collisions accounted for 24% of first year bird's mortality and 8% of adults annually. During the Finland trip, the group did not encounter any deer fencing in the forest since it is considered too expensive and not wholly necessary since browsing pressure by deer is lower due to natural predation as well as hunting. Predation of capercaillie and other ground nesting birds is not regarded as a significant problem although fox, pine marten, goshawk and corvids will occasionally take eggs and young birds as part of their natural diet. Mammals such as fox, pine marten and badger which assume the role of apex predators in Scotland are subject to predation themselves from larger mammals in Finland so populations are perhaps better regulated and therefore pose less of a threat to ground nesting birds. Non-native species such as raccoon dog and American mink are believed to be a bigger concern. Although Finland has experienced climate change, particularly in regards to warmer winters, they do not appear to have suffered the same wet summer conditions that have caused problems for capercaillie and black grouse in Scotland.

The sheer scale of viable habitat is a key component of capercaillie and black grouse success in Finland. Given capercaillie's reliance on pine needles, bilberries and insects, it is particularly well-suited to Scotland's native Caledonian forests. However, these forests have been reduced and fragmented to such a degree that the low number of birds in Scotland is perhaps unsurprising. Finland's expansive mosaics of dense and open native forest, peat bogs and mires provide the necessary refuge for both capercaillie and black grouse to better withstand the variety of additional pressures they face.

Peatlands

Finland's expansive areas of peat bogs and fens support a high level of biodiversity and sequester large amounts of carbon. Sphagnum mosses dominate along with cottongrass, sedges, bilberry, cranberry, lingonberry and carnivorous plants such as sundew. Heather grows naturally but is noticeably less widespread than in Scotland where its growth is encouraged via rotational burning for the benefit of red grouse estates. This is becoming an increasingly controversial practice so it was interesting to visit peatlands where no burning takes place. Breeding bird populations on peat bogs are high among waders such as curlew, golden plover and greenshank as well as raptors such as merlin, hen harrier and short-eared owl. Finnish peatlands are also home to around 30 species of butterfly as well as a variety of beetles, spiders, dragonflies, damselflies, reptiles and amphibians. The group visited two sites in Siikaneva and Lakkasuo where large areas of bog are surrounded by forest. Although the majority of the bogs are too wet for trees to grow, there were areas where the ground became drier and pine trees were growing sparsely. It was noted that this would not be seen as favourable in Scotland and common practice would be to remove these trees in order to prevent them from drying out the bog. However, Antii Uotila from Helsinki University's forestry field station deemed this a natural part of peatland habitat which was important for certain plant species and did not pose a risk to the overall integrity of the bog. It certainly felt like a less managed approach, closer to the idea of 'rewilding' where nature is allowed to "do its own thing".



Figure 28: On boardwalk at Peatland

Mammals

At a time when Scotland is awaiting the government's decision on beaver reintroduction, it was useful to talk to people who live and work in an area where beavers are reasonably common. Eva Mäntyvaara, a biology teacher at Tampere Forest School described beavers as “essential” and others confirmed the ecological importance of this keystone species in terms of their ability to create habitat and enhance biodiversity. Beavers do create some problems for farmers and foresters, but landowners have a number of options available to them including deterrence and licensed culling. Government compensation is not generally issued for damage caused by beavers. The native Eurasian beaver (*Castor fiber*) became extinct in Finland in the 1800s and was reintroduced in the 1930s. However, both Eurasian and Canadian beavers (*Castor Canadensis*) were released because at that time they were not recognised as distinct species. Both species have had a positive impact on Finnish ecosystems but the non-native beavers outnumber the native population by a ratio of around 5:1. The two species occupy the same ecological niche but are not believed to be genetically compatible. They currently exist in distinct populations but are moving closer together and conservationists worry that displacement and eventual extinction of the native Eurasian beaver in Finland could be a potential scenario. Conservation laws and guidelines advocate conserving native species and limiting the spread of aliens so Finnish authorities are currently exploring how best to respond to the spread of Canadian beavers.

Figure 29: Flying Squirrel' rice'



Red Squirrels benefit from vast conifer woodland cover and do not face competition from invasive grey squirrels as they do in Scotland so are fairly widespread and not a conservation priority. The Flying Squirrel (*Pteromys volans*), on the other hand, is granted strict legal protection. This species only occurs in three EU countries (Finland, Estonia and Latvia) and is protected under both EU and Finnish legislation. The national guidelines put in place to safeguard Flying Squirrels against disturbance can sometimes result in permission being denied for forestry and development. This has led to frustration and disagreement with some claiming that protection should be relaxed while others believe the buffer zones around dreys should be even wider. Flying squirrel droppings were observed during the trip and look like yellow grains of rice. Environmental activists have been known to paint real grains of rice and place them at the base of trees in order to try and prevent new developments!

An obvious difference between Finland and Scotland is the existence of large predators. Finland is home to brown bear, grey wolf, Eurasian lynx and wolverine. The group observed wolf scat in Viiala near Tampere and lynx were said to be present in most of the forests and national parks that were visited. Bear and wolverine are more likely to be found further north and along the eastern border with Russia. Wolves and lynx are very seldom seen by

humans but have a significant effect on their ecosystems which is evinced by the lack of deer fencing. Regulation of deer numbers is aided by direct predation as well as predator/prey relationships where deer are deterred from grazing in one area for too long thus allowing some tree regeneration to occur without the need for fencing. Lynx and wolves can pose problems for livestock farming, reindeer husbandry and fur farming however some government compensation is available to those who are affected adversely.

Miia from TAMK informed the group that the grey wolf currently faces negative perceptions from Finnish society. It is said that children are spending less time outdoors because parents worry about wolf attacks and many call for culls. There have been no recorded incidents of wolves attacking humans in Finland since the 1800s yet 75 wolves were controversially culled last year in Finland leaving a population around 200. Illegal poaching of wolves also occurs. Brown bears, which are arguably more dangerous than wolves, number much higher at around 1500 but are less controversial. Urban encroachment is less of a risk with bears but they also benefit from being Finland's national animal and are therefore a source of pride and respect. Markus, the guide at Tampere Natural History Museum spoke about the folklore and legend associated with the bear. It was once considered superstitious to say the word "bear" out loud so there are nearly a hundred different Finnish terms to describe them. Conversely, wolves have been perceived as villainous and unpopular in Finnish folklore and the Finnish word for wolf (*susi*) translates as "useless thing". Societal attitudes towards large predators are therefore deep-rooted.

Summary

- Human pressure on the land is less intensive than in Scotland
- Native woodlands are retained for economic reasons as well as environmental
- The majority of conservation work is undertaken by the government
- Engagement with nature is traditionally high but has seen generational declines
- Forest schools teach wildlife identification skills from an early age
- Capercaillie and black grouse numbers are far higher in Finland than in Scotland
- 4 million ha of peatland supports wildlife and stores carbon
- Public attitudes toward beavers generally positive but questions exist regarding invasive Canadian species
- Large predators perform an important ecological function but social attitudes are problematic
- Controversial culling of wolves has taken place



Figure 30: Signs of capercaillie, and wolf

200 Steps to 'Hell' and Back

National Parks in Finland

Louise Milne

It's not every day you go to hell with a witch! Day five of our Erasmus+ ArchNET Finland trip saw us do exactly that. The witch in question was Liisa, who describes herself as a 'good spirit nature witch' and the destination was Helvetinjärvi (Hell's Lake) National Park.

Situated 50kms north of Tampere city, Helvetinjärvi National Park is a wilderness of grandness. Wild forests loom tall over steep sided gorges with dramatic drops to deep, dark lakes. It is an ancient landscape, formed 150-200 million years ago and further crafted by ice during the last ice age. It is as rugged as it is beautiful; dramatic as it is peaceful.



Figure 31: Tall trees and tall tales with Liisa (foreground)

With over 40kms of marked trails within the National Park, Liisa led us on the Helvetistä Itään Nature Trail, a 4km circular trail from Kankimäki to Helvetinkolu gorge (Hell's Hole). As we walked through sun dappled spruce and pine forests on narrow, well-worn trails I was in sensory heaven, not hell.



Figure 32: Images from Hell's Lake



My eyes were filled with a forest carpet of lush green moss dotted with red Lingonberries, which tasted sharp and refreshing. Our footsteps were accompanied to the rapid beat of a woodpecker's drumming, possibly one of the three toed variety. The smoke of a distant campfire wafted up my nose and touched a memory of camping in Scotland as a kid. Step by step we wandered the trail, stopping occasionally to read the information boards. Some annotated the

natural heritage of the area; others were more fantastical and told tales of goblin gold. It may have been the fact that our guide was a witch, but the overwhelming sense I felt on the trails was one of ancient tradition and forest folklore.

As we emerged from the forest we were suddenly struck by the sight of a vast gorge. We had arrived at Helvetinkolu or Hell's Hole above Lake Iso Helvetinjärvi. Stopping a while atop the steep sided cliff edges of the gorge we stood rapt as Liisa continued the folklore with the tale of how the National Park got its name- an old warlock, incensed that pike had been stolen from the lake, fought with the thief, after which he cursed the lake

stating that- *"There is not going to be any pike in this hell's lake as long as my nails are still soft."*

Tall tales and stunning views of the gorge have been attracting people to the area since the 1800's. Although the National Park was designated in 1982- several popular sites, including Helvetinkolu, were protected as landscape areas in the 1950's. Commercial logging used to be carried out in the 19th century, with the trails being primarily created by the loggers who required access to the lake sides from where the logs would be floated downstream to be processed. In fact, the lake side forests are some of the oldest in the National Park. Their trunks are decorated with Lungwort lichen, a sign that the trees are in good health and the air is clear. During our visit to the Forest School the day before we had learned that lichen was uncommon 20-30 years ago in many areas of Finland. This was in part due to acid rain. The fact that lichen is now more widespread in Finnish forests is a sign of the natural balance returning.



Figure 33: Signing out of Hell

But now was not the time to haver as time, or should that be hell, waits for no man. So we left the gorge side and aptly descended 200 steps towards the lake side. As we climbed down I had a feeling of trepidation, not that we were descending into hell, more the fact that we had to ascend the 200 steps to get back out again! Liisa had

assured us that if we signed the visitor's book

in the day hut by the lakeside, our sins would be pardoned and we could leave hell feeling unburdened. So while Liisa busied herself round the fire pit making coffee, we all traipsed into the hut and signed away our sins. The hut is described as a day hut and welcomes visitors to rest awhile by the fireside. It was built in the 1920's by the Youth Association of Finland, presumably on a volunteer basis. Being a National Park volunteer myself I was interested in the role volunteers play in Finnish National Parks. As it turns out, not that big a role at all. Occasionally, the National Park will utilise volunteers to do practical maintenance work such as removing fallen trees. Otherwise a small workforce of National Park employees gets the job done as and when. Metsähallitus Natural Heritage Services, who manage Finnish National Parks, do have a volunteering programme, but it is aimed more at international volunteers than locals. Liisa explained that conservation volunteering is a new thing, a fashion of sorts, due to the fact that lots of celebrities in Finland are currently promoting conservation volunteering. This

notion struck me as strange as I'd expected Finnish people to be self



Figure 34: Public campfire facilities at Hell's Lake

motivated towards conserving the beauty of their surroundings rather than by some celebs latest act of kindness. But on reflection, the fact that many Finnish have nature on their doorsteps, and that 10% (500,000) of the population owns an average forest holding of 44 ha, conserving the forests is not a pastime but a way of life, albeit a commercial one. Sustaining their income means that they naturally sustain the forest. Volunteering is for the city dwellers and there is a current drive back towards greening their fingers. So if they need to be spurred on by a celeb then so be it. Again, on reflection, this is nothing new really as conservation organisations the world over have been utilising big names to promote their work.

Upon entering Helvetinjärvi National Park, plus the other 38 National Parks in Finland- city dwellers, locals and tourists alike are well catered for- trails are clearly signposted, information posts are educational and the views spectacular. There are 6 designated campsites within the National Park each with a cooking shelter, campfire sites, firewood shelter, axe and a dry toilet. Helvetinkolu lake side not only has the day hut with an indoor fire but also a large outdoor fire pit complete with permanent pot stand and nearby woodshed. The woodshed was very well stocked with the axe proudly wedged in a chopping log outside. I noted with interest there was no chain attached to the axe to stop it wandering off. Furthermore there were no litter bins, or litter for that matter. Signage was fun and encouraged visitors to 'pack it in, pack it out'.

It would appear that lots of people were attracted to hell because, as we sipped our coffee by the lake, more and more people arrived. The fire pit soon became crowded as did the lake side. But there was no jostling for a good spot or loud territorial music playing. I did however note the ground was heavily eroded, with exposed tree roots being utilised as seats or lean-to's. We were an eclectic mix by the lake. The fire pit was encircled by generations from one family; the boat launch had a mother and kids dangling off it; a group of Scouts lounged around their backpacks and a very relaxed group of hikers went for a skinny dip! This was duly noted by our group in a sign language of raised eyebrows and furtive sideways looks. We commented that they were expressing their Everyman's Right in the extreme! In a bid to distract us we commented on Liisa's beautiful wooden cup from which she was drinking her coffee. She explained it was a Kuksa, a traditional cup made from birch wood and her most treasured and lifelong possession. By tradition you must either make your own or receive it as a gift. Its origins lie with the Sami people of Lapland and it symbolises the unity between people and the wilderness. In Liisa's hands it looked like it had been carved especially to fit the curve of her grasp. Either that or her good spirit had magically moulded itself around the hard wood.



Figure 35: Traditional mug

As we ascended the 200 steps out of Hell's Hole I felt a new sense of vigour. Was it the wonderful weather, the congenial company of the group or the secret ingredient Liisa said she'd added to the coffee which made the ascent much easier than anticipated? Who knows but at least I can say I made it to hell and back unscathed.

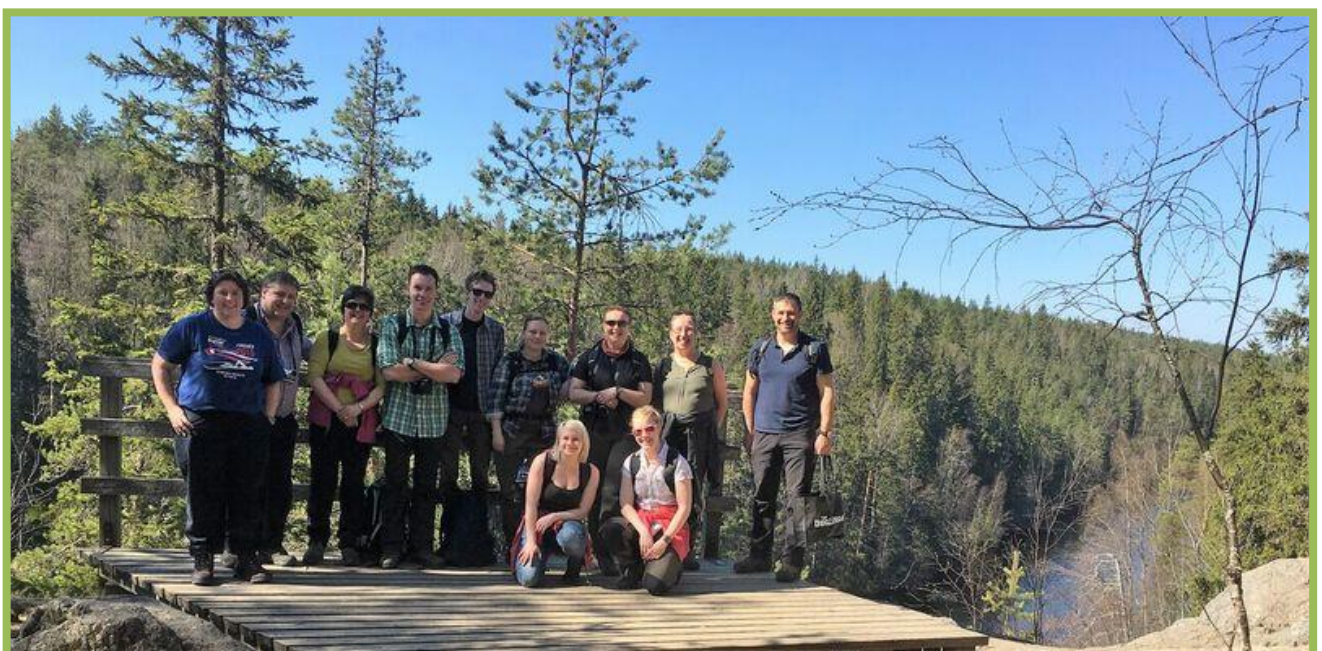


Figure 36: Group picture at the lake

Key facts about Helvetinjärvi National Park:

- Founded 1982
- 50kms north of Tampere
- 49.8km²/19.2m²
- Mixed habitats- old backwoods, forest ponds, lakes, boggy mires and rocky gorges
- 40kms of marked trails
- Voted into Top 10 European National Parks- Guardian readers 2015



Figure 37: Logo of Helvetinjärvi National Park

Education and Culture

Beverley Clarke

Background to Finnish Education

“The main objective of Finnish education policy is to offer all citizens equal opportunities to receive education. The system is highly permeable, that is, there are no dead-ends preventing progression to higher levels of education. An average of 91% of 16/17 years olds (end of compulsory education) carry onto to vocational or higher levels of education.

The focus in education is on learning rather than testing. There are no national tests for pupils in basic education in Finland. Instead, teachers are responsible for assessment in their respective subjects on the basis of the objectives included in the curriculum.

Most education and training is publically funded. There are no tuition fees at any level of education.

In Finland school inspections were abolished in the early 1990s. The ideology is to steer through information, support and funding”

The Finnish National Board of Education – Finnish Education in a Nutshell, 2012

Based on the above, it is often quoted that Finland has one of the best performing education systems in Europe, if not the world. Finland is estimated to invest around 6 to 7% of its GDP in education, maintaining that level even with a 5 % drop in GDP from 2008- 2013.

Tampere Nature School – Korento (Dragonfly School)

There is no doubt that the Finns are very proud of their education system and in particular their network of 20 Nature Schools all over the country, with a morning visit being part of the week’s study programme.

The Nature School is member of LYKE - The Finnish Association of Nature and Environment Schools, whose funding comes from the Ministry of Education and Culture.

Funds for the operation of the various education centres come from Municipalities, Funds for Youth Centres (The Ministry of Education and Culture), Metsähallitus (Nature Centres), NGOs and private enterprises Tampere Nature School (Tampereen luontokoulu) is located about a 30 minutes’ drive north of Tampere. In summer 2000, the Nature School took over part of Teisko secondary school, as Teisko junior school was moving to a neighbouring village. Tampere Nature School was open in September 2002.

The Nature School's popularity exceeded all expectations immediately; they do not have the staff or resources to accommodate all those schools that wish

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to attend. Hence the surprising statistic provided by Eva; one of the Nature School teachers, that basically every child in Tampere can only get one day a year at the Nature School.

In addition to the one day that every class can attend, the school also provides two weeks of summer school in June, for any child who wishes to sign up, as well as teachers' personal development and training, open days for parents and interested parties and supporting the school curriculum and the Green Flag Eco Schools programme. Teachers at the nature school, therefore work longer than their colleagues in other schools, who usually finish for summer at the end of May.

The school also provides a transition programme for 7th grade children (12/13 years) in the autumn to help them make connections and friends in their new school. It also helps teachers to see the how the dynamics of the class is going to work. Something similar happens in schools in Scotland, who are now using environmental schemes such as the John Muir Award and outdoor education centres to help children work with each other before attending Secondary School.



Figure 38: Forest School Classroom

It was stated by Eva that a number of 25-30 year old teachers are not trained or as engaged with the environment as they once were and hence their students are not experiencing as much outdoor or nature learning. Again this is being emulated in Scotland with the now compulsory CLPL for Primary teachers as part of their GTC registration. The Teaching in Nature (TiN) programme has been developed to help address this.

In Finland, it is now compulsory for all school children to create a file of plant ID as part of the curriculum, so teachers have to learn them too. She also mentioned that she believes Finnish children; particularly those from larger

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settlements, are becoming overly protected by their parents and as such becoming detached from nature, as it is seen and dangerous or 'messy'.

The main aim of the Nature School Centres is to help kindergartens and schools in Finland to get professional help with their nature and environmental education and address these issues.

The average day at Korento will see a class of around 15- 20 pupils (age dependant) attend the school for about 4- 5 hours. The main focus for the nature school are Grades 1 – 7 (7 years to 14 years), but they will also work with and support Pre-school (6 years) and Kindergarten. The class teacher was astonished to hear that formal education in Scotland starts at the age of 4 ½ or 5. She stated that children that age should be 'playing'!



Figure 40: Children learning to use maps



Figure 39: Photosynthesis game

They can cover all aspects of nature education, but nearly every group Eva teaches, play a game about photosynthesis to help them understand properly that the process is not just about the production of oxygen by trees and plants but about energy exchange and the production of glucose for a plant or tree. This reinforces the importance of the role trees and plants in nature and they are not just there to 'make oxygen for humans!', which is what basically is taught at their own schools.

The study group were able to watch a group of 15 pre-school children (6 years old) for part of their day. They were brought in by their parents and were met by the younger years' teacher, Anna. They learnt about the birds, butterflies and plants that they were likely to see in spring and sang a song and played a game to help them remember. They were then given a short map reading and orientation lesson using a hand drawn map of the outdoor area; learning how to orientate the map and identify the key features.

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(Map reading and orientation is a key skill for the Finnish. Orienteering as a sport is very popular and they attend many competitions in Finland and abroad.)

The group were then taken on a tour of the rest of the school followed by a walk round the nature school grounds in the wake of the pre-schoolers, watching what they were learning, experiencing and exploring.

Anna used stories, foraging and listening skills to help the children explore the woodland area, followed by the mandatory campfire and sausage cooking.

It was noted that the school does not provide every visiting class teacher with a risk assessment before the children visit, although they do have an accident and emergency plan. The whole outdoor learning experience is a far more relaxed affair.



Figure 42 : Forest School yurt



Figure 41: Camp fire with school children

Further Education

In the afternoon of the study group's day, we were taken to TAMK to meet the Ari Vaneo, the Head of the Forestry Degree course.

“Finland has 14 Universities and 24 Polytechnics. Higher education is offered by universities and polytechnics. Universities emphasise scientific research and instruction. Polytechnics, also known as universities of applied sciences, adopt a more practical approach. There is restricted entry to all fields of study and applicant volumes outweigh the number of places available, so they use different kinds of student selection criteria. Most commonly these include success in matriculation examination and entrance tests.”

The Finnish National Board of Education – Finnish Education in a Nutshell, 2012

The Forestry Degree Course has been running at TAMK for 20 years, with the curriculum changing significantly with demand within the industry and the introduction of The Forest Laws in 1996 over that time. The course is 4 years, with a 5 month internship between 2nd and 3rd years and a final thesis being produced in the 4th year. Students can elect for different course options beyond the core subjects such as harvesting and conservation, to achieve the 240 credits required for the degree.

To be able to compete in the job market in Finland, a large number of students will aim to also achieve a Master's Degree which can take an additional two years. To shorten graduation times and increase completion of studies, further education policy makers have introduced personal study plans and financial incentives.

Acknowledgements

Arch Network

Erasmus+

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Hosts - Maria Järvinen and Vera Kuivasto, Forestry students at TAMK

Manne Viljamaa

Eva Mäntyvaara and Anne Viitalaakso

Ari Vanamo

Liisa Tyllilä

Antti Uotila

Eveliina Asikainen

Appendix 1: Flora and Fauna

Table 1: Flora and Fauna (1)

<u>Birds</u>		<u>Mammals</u>		<u>Amphibians & Reptiles</u>	
Osprey	<i>Pandion haliaetus</i>	Roe deer	<i>Capreolus capreolus</i>	Common Toad	<i>Bufo bufo</i>
Eurasian pygmy owl	<i>Glaucidium passerinum</i>	White tailed deer	<i>Odocoileus virginianus</i>	Common Lizard	<i>Zootoca vivipara</i>
Ural owl	<i>Strix uralensis</i>	Red squirrel	<i>Sciurus vulgaris</i>		
Marsh harrier	<i>Circus aeruginosus</i>	Hedgehog	<i>Erinaceus europaeus</i>		
Goshawk	<i>Accipiter gentilis</i>	Brown hare	<i>Lepus europaeus</i>		
Kestrel	<i>Falco tinnunculus</i>				
Common Crane	<i>Grus grus</i>				
Hooded crow	<i>Corvus cornix</i>				
Tree pipit	<i>Anthus trivialis</i>				
Jay	<i>Garrulus glandarius</i>				
Chiffchaff	<i>Phylloscopus collybita</i>				
Snipe	<i>Gallinago gallinago</i>				
Chaffinch	<i>Fringilla coelebs</i>				
Great tit	<i>Parus major</i>				
Jackdaw	<i>Corvus monedula</i>				
Fieldfare	<i>Turdus pilaris</i>				
<u>Birds cont.</u>			<u>Birds cont.</u>		
Redwing	<i>Turdus iliacus</i>		Grey heron	<i>Ardea cinerea</i>	

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Song thrush	<i>Turdus philomelos</i>)		Magpie	<i>Pica pica</i>	
Blackbird	<i>Turdus merula</i>		White Wagtail	<i>Motacilla alba</i>	
Whooper swan	<i>Cygnus cygnus</i>		Siskin	<i>Spinus spinus</i>	
Blue tit	<i>Cyanistes caeruleus</i>		Wood warbler	<i>Phylloscopus sibilatrix</i>	
Lapwing	<i>Vanellus vanellus</i>		Ruff	<i>Philomachus pugnax</i>	
Curlew	<i>Numenius arquata</i>		Common gull	<i>Larus canus</i>	
Black headed gulls	<i>Chroicocephalus ridibundus</i>		Pochard	<i>Aythya ferina</i>	
Capercaillie	<i>Tetrao urogallus</i>		Goldeneye	<i>Bucephala clangula</i>	
Teal	<i>Anas crecca</i>		Cuckoo (heard)	<i>Cuculus canorus</i>	
Mallard	<i>Anas platyrhynchos</i>		Great spotted woodpecker (heard)	<i>Dendrocopos major</i>	
Great crested grebe	<i>Podiceps cristatus</i>		Black woodpecker (heard)	<i>Dryocopus martius</i>	
Little gull	<i>Hydrocoloeus minutus</i>		Black grouse (heard)	<i>Tetrao tetrix</i>	
Canada goose	<i>Branta canadensis</i>		Wryneck (heard)	<i>Jynx torquilla</i>	
Baranle goose	<i>Branta leucopsis</i>		Raven (heard)	<i>Corvus corax</i>	
House sparrow	<i>Passer domesticus</i>		Goldfinch(heard)	<i>Carduelis carduelis</i>	
Coot	<i>Fulica atra</i>		Goldcrest(heard)	<i>Regulus regulus</i>	
Tufted duck	<i>Aythya fuligula</i>		Yellowhammer (heard)	<i>Emberiza citrinella</i>	
Pheasant	<i>Phasianus colchicus</i>		Willow warbler (heard)	<i>Phylloscopus trochilus</i>	

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Table 2: Flora and Fauna (2)

<u>Butterflies</u>		<u>Plants</u>		<u>Mosses & Lichens</u>		<u>Fungi</u>		<u>Tracks and signs</u>
Brimstone	<i>Gonepteryx rhamni</i>	Broad buckler fern	<i>Dryopteris dilatata</i>	Stiff clubmoss	<i>Lycopodium annotinum</i>	Chaga	<i>Inonotus obliquus</i>	Beaver (felling activity)
Peacock	<i>Aglais io</i>	Hard / Deer fern	<i>Blechnum spicant</i>	Sphagnum moss (sp.)	<i>Sphagnum sp.</i>	Red ring rot / white speck	<i>Phellinus pini</i>	Flying squirrel (scat)
Green hairstreak	<i>Callophrys rubi</i>	Common polypody	<i>Polypodium vulgare</i>	Common haircap moss	<i>Polytrichum commune</i>		<i>Inonotus leporinus</i>	Wolf (scat)
		Labrador tea	<i>Ledum palustre</i>	Red-stemmed feathermoss	<i>Pleurozium schreberi</i>	Willow brackets	<i>Phellinus igniarius</i> group	Elk (scat)
		Common cottongrass	<i>Eriophorum angustifolium</i>	Glittering wood-moss	<i>Hylocomium splendens</i>	Velvet-top fungus	<i>Phaeolus schweinitzii</i>	Pine Martin (scat)
		Hare's-tail cottongrass	<i>Eriophorum vaginatum</i>	Reindeer lichen	<i>Cladonia rangiferina</i>	Root rot	<i>Heterobasidion annosum</i>	Goshawk (nest + feeding signs)
		Common sedge	<i>Carex fusca</i>		<i>Cladonia arbuscula</i>	Lacquered bracket	<i>Ganoderma resinaceum</i>	Mountain hare (scat)
		Hairy woodrush	<i>Luzula pilosa</i>	Fork-moss	<i>Dicranum sp.</i>	Beeswax bracket	<i>Ganoderma pfeifferi</i>	Capercaillie (male and female scat)

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<u>Butterflies</u> <u>cont.</u>	<u>Plants</u>		<u>Mosses &</u> <u>Lichens</u>		<u>Fungi</u>		<u>Tracks and signs</u>
	Liverleaf hepatica	<i>Hepatica nobilis</i>	Green dog lichen	<i>Peltigera aphthosa</i>	Artist's fungus	<i>Ganoderma applanatum</i>	Hazel grouse (skeleton)
	Wood anemone	<i>Anemone nemorosa</i>	Dog lichen	<i>Peltigera canina</i>	Hoof / tinder fungus	<i>Fomes fomentarius</i>	Three-toed woodpecker (feeding signs)
	Purple moorgrass	<i>Molinia caerulea</i>	Big shaggy moss	<i>Rhytidiadelphus triquetrus</i>	Birch polypore	<i>Piptoporus betulinus</i>	
	Cranberry	<i>Oxycoccus palustris</i>	Textured lungwort	<i>Lobaria scrobiculata</i>	Cushion bracket	<i>Phellinus pomaceus</i>	
	Herb paris	<i>Paris quadrifolia</i>					
	Yellow bird's-nest	<i>Monotropa hypopitys</i>					
	Eared willow	<i>Salix aurita</i>					
	Goat willow	<i>Salix caprea</i>					
	Common cow-wheat	<i>Melampyrum pratense</i>					
	Alder buckthorn	<i>Frangula alnus</i>					
	Bearberry	<i>Arctostaphylos uva ursi</i>					
	Rubus (unknown)	<i>Rubus sp</i>					
	Horsetail	<i>Equisetum sp</i>					
	Bog bilberry	<i>Vaccinium uliginosum</i>					

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	Lingonberry	<i>Vaccinium vitis-idaea</i>					
	Crowberry	<i>Empetrum nigrum</i>					
	Deergrass	<i>Trichophorum cespitosum</i>					
	Starflower	<i>Trientalis europea</i>					
	Tormentil	<i>Potentilla tormentilla</i>					
	False lily of the valley	<i>Maianthemum bifolium</i>					
	Bracken	<i>Pteridium aquilinum</i>					
	Wood sorrel	<i>Oxalis acetosella</i>					
	Reed grass	<i>Calamagrostis sp.</i>					
	Marsh violet	<i>Viola palustris</i>					
	Germander speedwell	<i>Veronica chamaedrys</i>					

Appendix 2: Contacts (Scotland)

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Appendix 3: Itinerary

NET Finland 2016 May 2-9 - Maria Järvinen and Vera Kuivasto, Forestry students at TAMK

Monday May 2 Arrival

Tuesday May 3 Wildlife **Manne Viljamaa**

AM Viiala and Vesilahti areas

Capercaillie mating area at Karstunjärvi (lake Karstu)
Walk in primeval forest
Ural owl's nest

PM Lempäälä

Pygmy owl, Lastunen (**Manne's forest**)
Birdlake Ahtialanjärvi (lake Ahtiala)

manne.viljamaa@tamk.fi

Wednesday May 4 Education

AM Tampere

Tampere Forest School Korento, Terälahti
Eva Mäntyvaara and Anne Viitalaakso
luontokoulu@tampere.fi

PM Tampere

Ari Vanamo – Head of Forestry Course
Tampere University of Applied Sciences
Eva Mäntyvaara and Anne Viitalaakso
ari.vanamo@tamki.fi

Thursday May 5 National parks **Liisa Tyllilä**

AM

Helvetinjärven kansallispuisto (**National park Helvetinjärvi**), Ruovesi

PM

Seitsemisen kansallispuisto (**National park Seitsemisen**), Ylöjärvi

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Multiharju
Primeval forest

hikingtravel@hikingtravelhit.fi

Friday May 6 Peatlands

Antti Uotila, Head of Station

Hyytiälä Forestry Field Station, **Korkeakoski**

AM

Walking tour nearby Hyytiälä

(Memorial birch stand, prescribed burned area, water quality after maintaining drainage of peatland, spruce planting and mycorrhiza, SMEAR station, relationships between forest and atmosphere)

PM

Walks in Siikaneva and Lakkasuo

antti.uotila@helsinki.fi

Barbeque at Rustholli with Study Group and Miia, Maria and Vera

Saturday May 7

Tampere day

AM

Pyynikinharju, Pyynikki Esker in Tampere

Eveliina Asikainen

eveliina.asikainen@tamk.fi

PM

Tampere Museum of Natural History and The Giants of the Ice Age exhibition, guided by Markus

Free time

Dinner at *Grill it* restaurant, Tower Hotel Tampere

Sunday May 8 Lake Näsijärvi

Monday May 9

Back to Scotland