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Facts and Figures of the Barents Forest Sector

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Abstract
Aim of this paper is to present the key facts and figures of the forest sector of the northernmost parts of Norway, Sweden, Finland and Russia i.e. so called Barents Region. The paper provides an overview on the forestry and forest industry of the regions and discusses the future development of the forest sector in the Barents Region.

Forest area of the Barents region is about 87 million hectares, growing stock approximately 8 billion m^3, and annual fellings nearly 48 million m^3. About 80% of the forest area and growing stock volume are in the Russian part of the Region. Intensity of forest utilisation is much lower in Russian and Norwegian parts of the Region than in Finland and Sweden.

Medium-sized and large-scale companies dominate the forest industry of the Barents Region. Some of the largest pulp and paper producers in Europe are located in the northernmost counties of Finland and Sweden. In general, these countries answer for over 60% of the European Union pulp production, one quarter of paper and cardboard production and over 30% of the production of sawn goods. Also Russian part of the Barents Region is a significant producer of forest industry products: the region produces almost half of the produced pulp in Russia, 45% of paper, over one third of all produced cardboard and 17% of sawn timber.

As a renewable resource, forests provide a lot of opportunities for the Northern Europe. However, it requires planning, product development and cooperation between the forest sector actors and other stakeholders to utilise forests to their full potential. In addition to high-grade wood-based products, bioenergy is a future possibility of the Northern Europe. Also non-wood uses of forests can be a significant provider of income in the northern areas.

Keywords
Barents region, Norwegian forestry, Swedish forestry, Finnish forestry, Russian forestry

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Other information

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Foreword

Information about forests and forest industry on national level is quite easily available, but it is much more difficult to find information for a certain region, like the Barents Region. This report has been prepared to fill this gap under the auspices of the Barents Forest Sector Task Force.

In the Barents cooperation the role of the forest sector was first recognised in 1999 when an initiative was set out to improve rural development in the boreal forest region covering the forested areas of Norway, Sweden, Finland and Northwest Russia. In March 2000, the Barents Euro-Arctic Council recognised the significant role that forest management and forest industry could play in promoting sustainable development and well-being in the Euro-Arctic region and called for intensified efforts to further cooperation and development activities. The Council made a decision to create a Barents Forest Sector Task Force under the auspices of the Working Group on Economic Cooperation. One of its major goals was to prepare a Northern Dimension Forest Sector Programme, forming a mission for continued collaboration on forests under the framework of the Barents Euro-Arctic Council and the 'Northern Dimension' of the European Union policy.

Barents Forest Sector Task Force has been contributing to the overall development of the forest sector in the region. It has been supporting the creation of necessary conditions for development in forestry, environmental care and wood based industries through co-operation, mutual concrete actions, projects and programs in the forest sector. Task Force has organised meetings and seminars, and has acted as a platform for communication between stakeholders.

Ministry for Foreign Affairs of Finland and the Finnish Ministry of Agriculture and Forestry have supported the preparation of this report. Authors of the report would like to thank Bernt-Håvard Øyen, Clas Fries, Erik Sollen and Eugene Lopatin for their comments and help.

In Joensuu, 8th April 2008

Timo Karjalainen
Chairman of the Barents Forest Sector Task Force 2006-2007

1 Introduction

Forest sector has traditionally been one of the mainstays of the economy in many regions of the Northern Europe. Boreal coniferous forests dominate the northern landscape and cover a large part of the region. Northern forests supply raw material for the forest industry, but also provide outstanding opportunities for outdoor recreation and multiple use of forests as well as support nature based means of livelihood from reindeer herding to nature tourism. Climatic conditions in many parts of the regions are harsh, which has moulded the landscapes and created unique ecosystems, which contain some of the most vulnerable biodiversity resources.

Due to the barren grounds and harsh conditions, agriculture has never flourished in the northern regions, and people have had to find other sources of livelihood. Northern nature provides an ample of natural resources from minerals, oil and gas to forest, fish and biotopes. One of the earliest resources to be utilised by man has been forest. Over the years northern regions have developed an extensive network of forest industry production plants, and even though forestry has declined in relative importance in the regions' economy since the end of the II World War, sector is still considered a cornerstone on local level as well as in the national economies of the northern regions. Many major cities and numerous local communities are still highly dependent on the success of their forest industries.

Closeness to the main markets has never been the advantage of the forest industry in Northern Europe. Nevertheless, an ample and good quality of raw material, reasonable prices for wood and energy, availability of workforce and good level of technological development, at least in Finland and Sweden, have made it possible for the forest industry to cope in the global competition. However, at the moment forest industry in the northernmost Europe is facing big challenges related to the profitability of production. Growing markets in the East are attracting more and more investors whereas the production plants in Northern Europe are struggling with increasing production costs, oversupply of certain products as well as with problems related to wood procurement. In the Nordic countries with high labour costs it has been evident for a number of years already that the regions cannot compete in bulk production, but need to concentrate on products requiring high level of knowledge and innovations.

As a renewable resource, forests provide a lot of opportunities for the Northern Europe. However, it requires planning, product development and cooperation between the forest sector actors to utilise forests to their full potential. In addition to high-grade wood-based products, bioenergy is a future possibility of the Northern Europe. Also non-wood uses of forests are a significant provider of income in the northern areas. In Finnish Lapland, for example, tourism brings an income of 500 million euros a year and has already become a significant provider of livelihood in addition to forestry.

Aim of this report is to present the key facts and figures of the forest sector of the northernmost parts of Norway, Sweden, Finland and Russia i.e. so called Barents Region. The report provides an overview on the forestry and forest industry of the regions and discusses the future development of the forest sector in the Barents Region.

2 Barents Region

2.1 Area

The Barents Region is a name given to the land along the coast of the Barents Sea, with an aim to establish extended international cooperation after the fall of the Soviet Union. Formally the Barents cooperation was started in 1993 by signing the Kirkenes declaration, in which the signatory countries agreed to establish a council of the Barents Euro-Arctic Region to provide impetus to existing cooperation and consider new initiatives.

Geographically, the Barents Region includes the northernmost parts of Norway, Sweden, Finland and Northwest Russia (Figure 1). Administratively the Region is divided into 13 counties (Table 1). The surface area of the Barents Region is approximately 1,76 million km². It equals the combined area of France, Portugal, Spain and Germany. About 75% of the territory is in Russia. Average population density is only 3.4 inhabitants per km², varying from 0.2 inhabitants in the Nenets Autonomous Area (Russia) to 8 inhabitants in the region of Oulu (Finland). The Barents Region may be regarded as very sparsely populated: for comparison the population density of the whole Finland is 17 inhabitants per km² and that of France, for example, 112 inhabitants per km^2.

Figure 1. The Barents Region (Source: http://www.beac.st/)

Sparse population is one of the characteristic features of the Barents Region. Along with vast territories it makes the distances long, creating challenging conditions for developing the infrastructure in the region. In Nordic countries, both road and railway systems are well developed, whereas in the Northwest Russia road network is less developed and thus travelling and long distance transportation are mainly done on rails. In general in the Barents Region, there is a lack of east-west connections, as most of the connections are going from north to south.

Table 1. The Barents Region is divided into 13 counties.

County	County centre
Norway:	
County of Nordland	Bodø
County of Troms	Tromsø
County of Finnmark	Vadsø
Sweden:	
County of Västerbotten	Umeå
County of Norrbotten	Luleå
Finland:	
Province of Lapland	Rovaniemi
Province of Oulu	Oulu
Province of Kainuu	Kajaani
Russia:	
Arkhangelsk Region	Arkhangelsk
Republic of Komi	Syktyvkar
Murmansk Region	Murmansk
Republic of Karelia	Petrozavodsk
Nenets Autonomous Area	Naryan-Mar

2.2 Characteristics

In terms of climatic and geographical conditions the Barents Region is rather challenging. A considerable part of the Region lies above the Arctic Circle. The majority of the Region belongs to the temperate coniferous forest zone whereas the Scandinavian mountain chain, the northern parts of the Kola Peninsula, the Nenets Area and Novaja Zemlja are part of the Arctic tundra. The climate in the northernmost areas of the Barents Region is characterised by long, cold winters with plentiful snowfall, and short, light summers. Thus, ecosystems in the Region are fragile to environmental changes, such as climate change.

As a whole, the Barents Region has rather similar climatic conditions and industry specialisations. Therefore in general the different counties of the Region have fairly similar bases for their economies. Nevertheless, economic development of different counties differs quite sharply due to historical reasons related to differences in economic and political systems. However, wood as a raw material and forest industry production have been earlier and are even today of primary importance for most of the regions.

The Barents Region is very rich in natural resources such as forests, minerals, fish, gas and oil. Typically, further processing of raw materials and consumption of products based on local raw materials has been taking place further south. Medium-sized and large-scale industries within steel, forest, paper, ore and mineral branches and within fishing, gas and oil branches dominate in the industry structure. Tourism is also a very important sector of the economy. Even though major investments are underway in new oil and gas fields in the Barents Sea, also other industrial clusters are developing (Figure 2). Besides the natural resources, the Barents Region has also skilled labour

force and the region constitutes a meeting point between the European Union, the Russian Federation and Norway. Standard of living in the Barents regions is typically lower than in the southern parts of the Barents countries. A great difference in the standard of living is encountered also between Northwest Russia and the Nordic countries. Currently economy is, however, developing faster in Russia than in the Nordic countries.

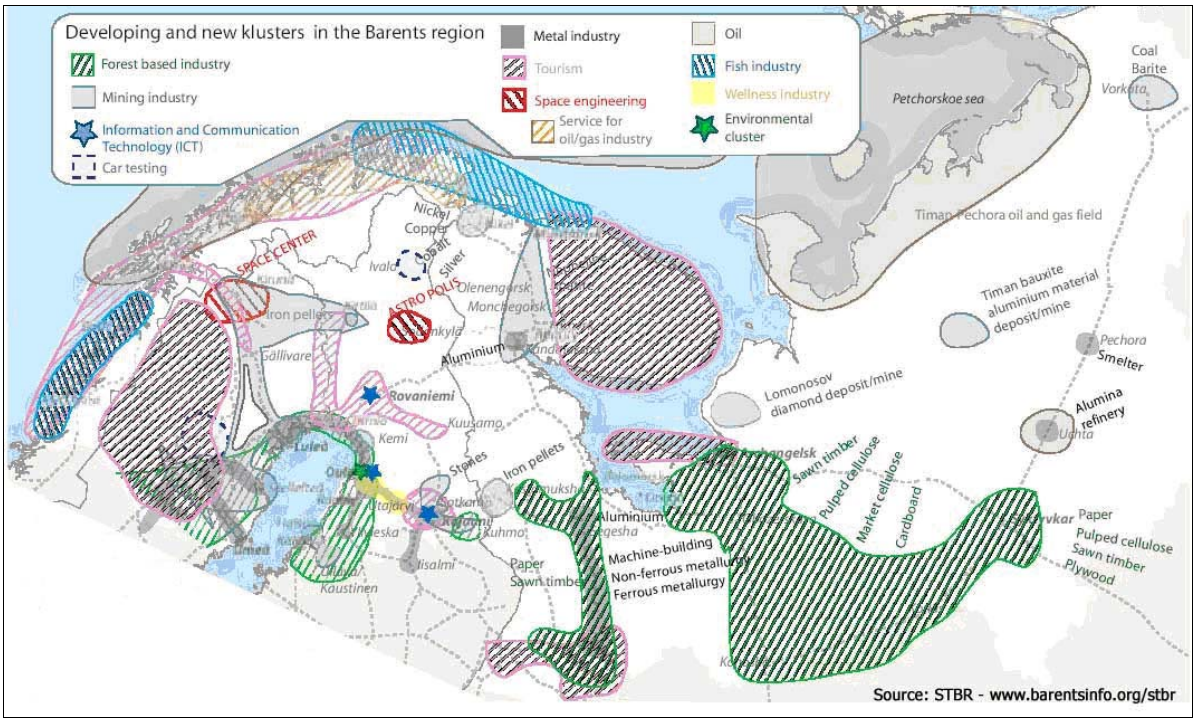

Figure 2. Current and developing clusters are mainly related to the important raw materials of the region *(Source: Sustainable Transport in the Barents Region, http://www.barentsinfo.fi/stbr/).*

2.3 Population and Cities

The Barents Region consists of thirteen regions and many different ethnic groups in four countries. At least 15 different languages are spoken in the Region. Approximately 5.5 million people live in the region, of which 1.6 million live in the Nordic countries and 3.9 million in Northwest Russia. In 2005, the largest city in the region was Murmansk with a population of 380 000 followed by Arkhangelsk with 356 000 inhabitants (Figure 3). The largest Nordic city is Oulu (Finland) with approximately 129 000 inhabitants, followed by Umeå (Sweden) with a population of 106 000.

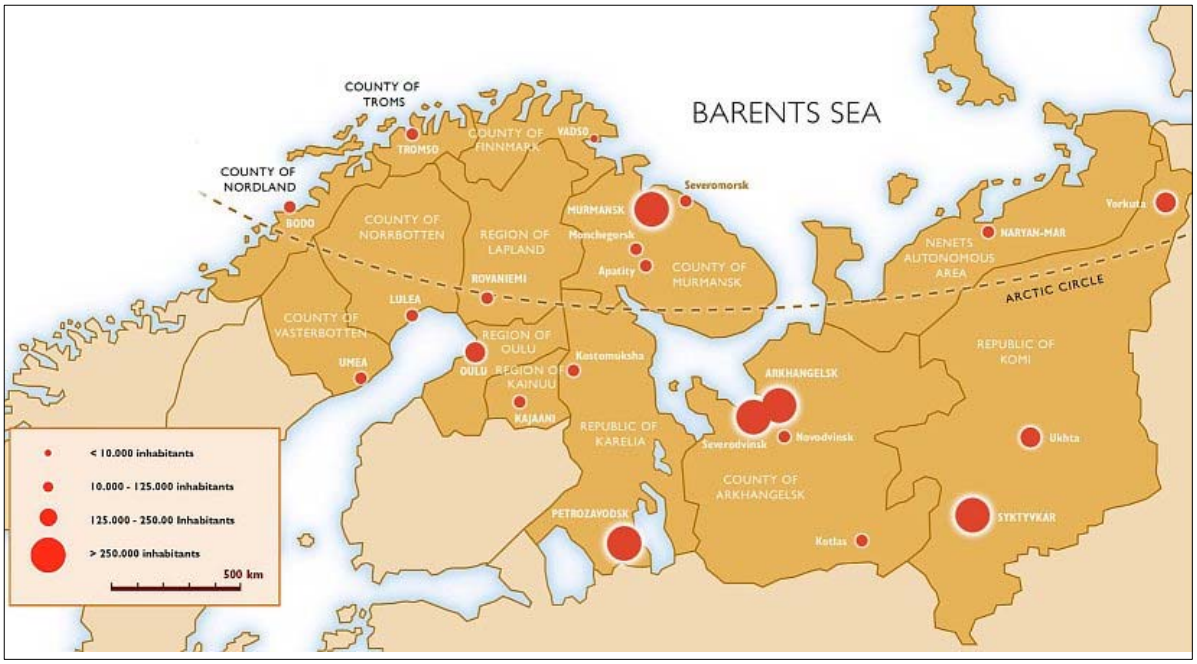

Figure 3. Largest cities in the Barents Region. (Source: http://www.barentsinfo.org/)

Indigenous peoples give the culture of the Barents Region its own flavour. There are over 75 000 Sami inhabitants in *Sápmi*, the traditional area of the Sami people. More than 40 000 of them are living in Norway, 15 000-25 000 in Sweden, 6 500 in Finland and 2 000 in the Murmansk region in Russia. Nenets are the most numerous indigenous people in Russia. In the Nenets Autonomous Area they form a minority of 7 000 people. Komi, Karelian and Veps do not have the status of indigenous people at the federal level, but do have it on the regional level. Approximately 70 000 Karelians and 6 000 Veps people are living in the Republic of Karelia. In the Republic of Komi lives over 249 000 Komi people.

2.4 Cooperation in the Barents Region

The Barents cooperation was formally started in 1993 by signing the Kirkenes declaration. Cooperation is organized on two levels; the Barents Euro-Arctic Council (BEAC) operates at government level and the Regional Council at regional level.

The purpose of the Barents cooperation is to strengthen east-west infrastructure, establish people-to-people contacts and thereby contribute to the economic, cultural and social development of the Barents Region. The cooperation creates good conditions for interregional exchange in many different fields; e.g., culture, indigenous peoples, youth, education, IT, trade, environment, transportation and health. Chairmanship of the Barents Euro-Arctic Council is rotating every second year. Finland took over the chair of the Council from Norway in November 2005, followed by Russia in November 2007 and Sweden in November 2009.

In the Barents cooperation the role of the forest sector was first recognised in 1999 when an initiative was set out to improve rural development in the boreal forest region covering the forested areas of Norway, Sweden, Finland and Northwest Russia. In March 2000 the BEAC recognised the

significant role that forest management and forest industry could play in promoting sustainable development and well-being in the Euro-Arctic region and called for intensified efforts to further cooperation and development activities. The Council made the decision to create a Barents Forest Sector Task Force (BFSTF) under the auspices of the Working Group on Economic Cooperation. One of its major goals was to prepare a Northern Dimension Forest Sector Programme (NDFSP), forming the mission for continued collaboration on forests under the framework of the Barents Euro-Arctic Council and the 'Northern Dimension' of the European Union policy.

Barents Forest Sector Task Force has contributed to the overall development of the forest sector in the region by supporting the creation of necessary conditions for the development of forestry, environmental care and wood based industries through co-operation, mutual actions, projects and programs in the forest sector. Task Force has organised meetings and seminars and has acted as a platform for communication between stakeholders. Also the BFSTF chairmanship has rotated, and Finland acted as a chair for the years 2006-2007, after the Norwegian chairmanship.

3 Forest Sector of Northern Norway

3.1 Overview of Northern Norway

The three northernmost counties of Norway, Finnmark, Troms and Nordland, form the westernmost part of the Barents Region. These three counties have a total land area of 112 000 km² and a total population of approximately 465 000 people.

The county of Finnmark is the largest county in Norway occupying 49 000 km^2, but it is also the least populated county with only 73 000 inhabitants. Most of the population lives in urban settlements along the coast. However, the indigenous people – Sami constitute about one quarter of the population – live mainly in the inland. About 5% of the population in Finnmark is of foreign origin, mainly from Russia and Finland. Alta is the largest municipality with about 17 000 inhabitants. Kirkenes is a border town and an important centre in cooperation between Norway and Russia. In Finnmark trade and services form the largest employment sector. Industry is the second important employer. The county has for a long time had the highest unemployment rate in Norway. Finnmark has played an important role in international politics, especially related to the Northern Dimension, North Calotte Cooperation, the Barents Region and bilateral work with Northwest Russia. County's greatest development potential lies within tourism, fishery and sea farming. In the future the development of oil and gas industry is expected to generate increased economic activity.

The county of Troms has 152 000 inhabitants and its land area is approximately 26 000 km^2. The county has 25 municipalities with a population ranging from 550 to 60 000 inhabitants. Approximately 10% of the population is of Sami heredity. More than half of Troms´ inhabitants live on islands. Four of Norway's largest islands are situated in this county, the largest – Hinnøya – being divided between Troms and Nordland. In Troms county the public, social and private services form the largest employment sector. Industry takes the second place, followed by transport, construction and primary services. The administration centre of the county – Tromsø – has been the location for the arctic university since the 1970's.

The county of Nordland has approximately 240 000 inhabitants and has the longest coastline of Norway's counties. The total area is approximately 38 000 km^2. The county consists of 45 municipalities. The smallest is Træna, with 438 inhabitants, while Bodø is the largest with a population of 40 736. The city of Bodø is the administrative center of Nordland. Nordlands landscapes make tourism a major industry for the county. Each year some 170 000-200 000 tourists visit the Lofoten Islands alone. In Nordland, the basic means of livelihood are fishing, agriculture, industry, trade, commerce and public services. The largest employer is the service sector. The primary industry employs about 10% of the work force, mostly in fishing, farming, forestry and reindeer farming. The share of secondary industries, i.e mining, power production, building and construction, is 20%. Nordland has about 3 000 Sami people.

3.2 Forest Resources

3.2.1 Forest Area and Volume of the Growing Stock

In Northern Norway, forest land covers an area of about 2.7 million ha (Table 2), which is approximately 19% of the country's forest land area. The figure excludes the county of Finnmark,

which has not been included in the National Forest Inventory (NAF) before the 9th NFA, which started only in spring 2005. A considerable part of the forest land area in Northern Norway is unproductive due to high altitudes and barren ground. Approximately 1.1 million ha of the forest land area is productive land, which is less than half of the total forest land area. In Norway, productive forest land is defined, similarly to other Nordic countries, as forest with an annual yield capacity of at least 1 m^3/ha under favourable stands conditions. Productive forest land belonging to nature protection areas is not included in the category. About half of the productive forests in Northern Norway have been estimated to be economically non-operational due to difficult terrain and long transport distance.

Table 2. Forest resources of Northern Norway.

Region	Total land area, 1 000 ha	Forest land area, 1 000 ha	Productive forestland, 1 000 ha	Volume, million m^3	Annual increment, million m^3
Norway	30 428	14 835	7 535	647	22
Barents Region	10 672	2 761	1 091	45	1.4
Nordland	3 607	1 712	592	27	0.9
Troms	2 488	1 050	416	17	0.6
Finnmark *	4 576	n/a	83	n/a	n/a

* Finnmark has not been included in the 8th National Forest Inventory and therefore the figures for Finnmark are from the Norwegian Mapping Authority and Census of Agriculture and Forestry in 1989

Source: Statistical Yearbook of Norway 2006, The Norwegian Forest and Landscape Institute

Increment in the forests of Northern Norway is relatively low - 1.4 million m^3 annually. The total volume of growing stock is 45 million m^3 excluding the county of Finnmark. The figures for growing stock volume and annual increment relate to the total wooded area.

3.2.2 Structure of the Growing Stock

Deciduous tree species dominate in Northern Norway - in the county of Troms they form 88% of the total growing stock volume, whereas in the country on average deciduous species form one fifth of the total volume (Table 3). The most important and dominant tree species is downy birch. Sub-Atlantic birch forests spread from outer islands and coast to the high mountains. Forest line is about 600 meters above the sea level in the inland districts of Troms and Nordland, but decreases to the sea level nearby the coast. Birch occupies about two thirds of the productive forest land area of Northern Norway. Silver birch is relatively rare, although it grows in the municipalities of Pasvik, Tysfjord, Sørfold, Saltdal and Beiarn. Norway spruce, occupying approximately 0.2 million hectares, is widely growing in Helgeland district and north of the Arctic Circle. In the eastern part of Finnmark Siberian spruce (*Picea abies ssp. obovata*) can be encountered. Scots pine is dispersed up to latitude 70º22' and it covers a total area of about 80,000 hectares. In the birch forest one may also find aspen, goat-willow, rowan and other boreal tree and shrub species. Nordland and Troms counties have also significant plantations of Norway spruce - altogether 120,000 hectares - as well as some plantations of Sitka spruce (*Picea sitchensis*) and Lutz spruce (*Picea x lutzii*) near the coast, 10 000 hectares in total. Also some minor plantings of Siberian larch, Mountain pine, Lodgepole pine, Siberian pine, Siberian fir, Subalpine fir and other conifers can be found. Forest area has increased by 10-15% since the 1950's, mainly at the cost of grassland and fields.

Table 3. Growing stock volumes by tree species in Northern Norway.

Region	Volume of growing stock	Dominant tree species		
		Pine *(Pinus spp.)*	Spruce *(Abies spp.)*	Deciduous
	million m³			
Norway	762	250	341	171
Barents Region	54	6	12	37
Nordland	33	4	12	18
Troms	21	2	0.3	18
Finnmark	n/a	n/a	n/a	n/a

Source: The Norwegian Forest and Landscape Institute

Norwegian forests are divided into five development classes (Table 4). Class I forests are open areas under regeneration, class II regenerated areas and young forests, class III young thinning stands, class IV advanced thinning stands and class V mature forests ready for cutting. Over one third of Norwegian forests - both in the northern parts of the country as well as in the country on average - belong to the class of mature forests. The most common age class in Nordland is 71-80-year-old stands (14%) and in Troms 51-60-year-old stands (16%). From the forests of Nordland 2.5% are more than 140 years old and in Troms 0.2%.

Table 4. Productive forest area by development class in Northern Norway.

Region	Class I	Class II	Class III	Class IV	Class V	Total
	1,000 ha					
Norway	350	1 649	1 335	1 634	2 437	7 405
Barents Region	51	167	150	276	339	982
Nordland	28	112	91	156	195	583
Troms	23	55	58	119	144	399
Finnmark	n/a	n/a	n/a	n/a	n/a	n/a

Source: The Norwegian Forest and Landscape Institute

3.3 Forest Ownership and Administration

The productive forest land area in Northern Norway is divided into more than 18 000 forest holdings with at least 2.5 hectares of productive forest. Over 17 000 of these holdings are smaller than 100 hectares. In Norway as a whole, the predominant group of forest owners are the non-industrial private forest owners, family forestry being typically combined with farming. Generally, private forest owners own 97% of the forest holdings in Norway, but in Northern Norway the structure of forest ownership differs greatly from the country average: in the counties of Nordland and Troms 82-83% of the forest land is state owned, and in the county of Finnmark the figure used to be nearly 100%.

What comes to Norway's northernmost country Finnmark, the land ownership structure changed drastically in summer 2006, when the Parliament of Norway adopted so called Finnmark Act (*Finnmarksloven*), on the basis of which the state owned land of Finnmark was transferred to the people of Finnmark, who will own the land jointly through the so called 'Finnmark Estate' (*Finnmarkseiendommen*). The Estate became the largest private land owner in Norway. The objective of the Finnmark Act is to ensure that those who live in Finnmark have a bigger say in how land in Finnmark is utilised, and especially to ensure the Sami interests to be assessed in decision making. The Act will not, however, affect the rights of public access or exempt the county from other regulative legislation. The Finnmark Estate is governed by a six member board appointed by the Sami Parliament and Finnmark County Council.

State forests and mountain areas in Norway are managed by a state owned company Statskog, which administrates approximately 20% of the area of Norway. Only about 5% of Statskog's land is productive land, on which commercial forestry operations are conducted. Most of the remaining land is mountain and wilderness area, primarily in Nordland and Troms counties. Most of the Statskog's land is above the tree line. Statskog facilitates outdoor activities and recreational use of state owned land by providing huts and cottages all over the country. In addition to its commercial operations, Statskog carries out a number of administrative tasks at the request of the Ministry of Agriculture and Food and Ministry of Environment. The administrative tasks include among other things management of hunting and fishing on state land.

Nature protection areas of Norway are managed by the Directorate of Nature Management, which operates under the Ministry of Environment.

3.4 Nature Conservation and Multiple Use of Forests

The most important nature conservation area types in Norway are national parks, landscape preservation areas and nature reserves. In all, more than 4 million hectares in Norway are protected by the nature conservation act. This is approximately 13% of the total land area of the country. In addition, there are areas protected by other laws. If compared to many other northern countries, due to Norway's topography with a high mountain range stretching across the country from south to north, conservation areas are more evenly distributed in different parts of the country without any obvious accretion towards the north. However, what is common to regions with a high share of protected area is that they have a large amount of mountainous areas, glaciers and low-productive land. In Northern Norway the total area protected by the nature conservation act is over 1.1 million hectares, which is 28% of all protected area of the country (Table 5).

Table 5. Protected area by the nature conservation act in Norway in 2005.

Region	National parks	Landscape preservation areas	Nature reserves	Other	TOTAL
	1,000 ha				
Norway	2 219	1 416	381	13	4 029
Barents Region	789	250	106	0.7	1 145
Finnmark	228	38	36	0.04	302
Troms	167	128	15	0.2	310
Nordland	394	84	55	0.5	532

Source: Forestry statistics, Statistics Norway 2005

National parks are the most common form of protection in Norway. In the end of 2006 Norway had a total of 29 national parks on the mainland. Twelve of these parks are located completely in the three northernmost counties of Norway (Table 6) whereas Børgefjell National Park is located on the border of Nordland and Nord-Trøndelag counties. National parks are large, relatively undisturbed natural areas usually established on state owned land with a purpose of preserving these areas for future generations. Another important objective is to offer people a possibility for traditional open-air recreation.

Table 6. National parks of Northern Norway in 2006.

NATIONAL PARK	Year of founding	Area, 1,000 ha
Finnmark		
Øvre Anarjóhka	1976	139
Øvre Pasvik	1970	12
Varangerhalvøya	2006	180
Stabbursdalen	1970	75
Seiland	2006	32
Troms		
Reisa	1986	80
Øvre Dividal	1971	77
Ånderdalen	1970	13
Nordland		
Børgefjell *	1963	145
Junkerdal	2004	68
Møysalen	2003	5
Rago	1971	17
Saltfjellet-Svartisen	1989	210

* Børgefjell national park is located on the border of Nordland and Nord-Trøndelag counties. The area in the table refers to the total area of the national park.

Source: Directorate of Nature Management

Landscape preservation areas are designed to preserve the character of any special natural or cultural landscape. Traditional land use and agriculture are allowed, but any activity that would essentially change the character of the landscape is prohibited.

Nature reserves are the strictest form of protection in Norway. Nature reserves are usually small, almost undisturbed areas where the aim is to protect special habitats or animal communities. The areas are often of high scientific value.

Forests have, to a greater extent, developed towards a place for recreation and leisure experiences (i.e. picking berries and mushrooms, sports, hiking etc.). In Northern Norway reindeer herding is still an important activity, especially for the Sami population. Contrary to, for example, Finland, all reindeer herders in Norway are Sami people.

3.5 Utilisation of Forest Resources

Compared to other countries of the Barents Region, forestry and forest industry are much less important sources of livelihood in Northern Norway. Forest sector provides work for about 700 people, of which about 150 work in forest industry. In Northern Norway there are currently one medium sized sawmill, one fibre board plant and about 500 small farm sawmills. The farm sawmills mainly serve the needs of the farms for wooden materials, and provide in addition some extra income in local sales. Several industries in Northern Norway utilize and process wood as a part of their production (fishfarm industries, door and window manufacture etc.).

In Norway, the commercial roundwood removals have for many years been less than the allowable cut. According to the Statistics Norway, a total of 0.18 million m^3 of roundwood was harvested in Northern Norway in 2003 (Table 7). Most of the wood came from final fellings.

Table 7. Roundwood removals[1] for sale by type and method of felling in Northern Norway in 2003.

Region	Removals for sale, 1,000 m^3	Type of felling		
		Final fellings	Thinnings	Other
		%		
Norway	7 173	88	8	3
Barents Region	180			
Nordland	131	91	3	5
Troms/ Finnmark	49	81	14	5

[1] Including properties with at least 2.5 hectares productive forest area.

Source: Forestry statistics, Statistics Norway 2005

4 Forest Sector of Northern Sweden

4.1 Overview of Northern Sweden

The counties of Norrbotten and Västerbotten form the Swedish part of the Barents Region, covering approximately 165 000 km² from which land area is over 153 000 km². These two counties have a total population of approximately 510 000 people.

The land area of Västerbotten is about 55 000 km^2. The county is sparsely populated, more than half of its area being covered by forests. Along the coast of the Gulf of Bothnia lie the bigger cities of Umeå and Skellefteå. The county has a population of 258 000, of which 80% live along the coast. The average age in the county is relatively high and over the past years population development has been negative due to low birth rate and migration. In sharp contrast, Umeå has been one of the most dynamic cities in Sweden with a population growing during the period 1980-1997 by 27%.

Västerbotten's largest employer is public sector. Although private services sector has grown fastest over the past few years, the strongest sectors in the economy of the county are still forestry and mining, which form with agriculture the backbone of Västerbotten's economic structure and development. One of Europe's best-know ore fields - the Skellefteå ore field - is located in Västerbotten and the county also has other world class ore deposits waiting to be utilized. High transportation costs and disadvantages of county's peripheral location result in a low value of refinement of raw materials, even though there is a good potential to develop wood processing and mining industries. The county is strongly dependent on export. About 6 000 people are employed in forestry, wood processing and pulp and paper industries. In the future, it is expected that tourism will become even greater source of income and employment for the county. Europe's largest nature reserve, Vindelfjällen is located in the northwestern part of Västerbotten.

Norrbotten is Sweden’s northernmost county and at the same time the largest in area. County’s land area is about 98 000 km^2 and population approximately 253 000 inhabitants. The county is divided into 14 municipalities and the biggest town and regional centre is Luleå. Other towns are Boden, Piteå and Haparanda. Most of the population is concentrated on the coastal regions.

Norrbotten is the raw material centre of Sweden and primary, resource-based industries form still the backbone of the county's economy. Natural resources in the form of timber and ore provide raw material for processing industries that utilises local hydropower. Mines and forests of Norrbotten account for a significant share of Sweden's export incomes. The forest industry is concentrated around Piteå and Kalix, where Billerud, Kappa and SCA produce paper and packaging products. The sector includes also ten larger sawmills.

Even though primary industries are still important, small and medium-sized companies continue to grow, thanks to success on markets outside Norrbotten. One of these success stories is company Älvsbyhus, which started as a local sawmill and is now the largest Nordic manufacturer of prefabricated homes. An important factor in transforming the economy from a resource-based to one that is knowledge-based has been the Luleå University of Technology, which provides higher education to 11 000 students annually. The variety of nature and Nordic culture in Norrbotten carry major development potential also for a growing tourism industry.

4.2 Forest Resources

4.2.1 Forest Area and Volume of the Growing Stock

The forest land area of Northern Sweden is 6.8 million hectares (Table 8), which is about 30% of Sweden's total forest land area. In Sweden, the definition of forest land is the same as in other Nordic countries i.e. land with the annual volume increment of more than 1 m^3/ha is considered as forest land. In the county of Norrbotten, forest land covers an area of 3.6 million hectares and in Västerbotten about 3.2 million hectares. The total volume of growing stock in Northern Sweden is 628 million m^3, which is one fifth of the growing stock volume of the whole country. Mean annual increment is 2.8 m^3/ha.

Table 8. Forest resources in Northern Sweden according to the Swedish National Forest Inventory 2001-2005.

Region	Total land area, 1,000 ha	Forestland, 1,000 ha	Volume *, million m^3	Annual increment, million m^3
Sweden	41 305	23 037	3 107	108.4
Barents Region	15 400	6 797	628	18.8
Norrbotten	9 914	3 617	310	9.2
Västerbotten	5 486	3 180	317	9.7

* Volumes exclude dead trees and windfalls (88.1 million m^3 for Sweden, 10.3 for Norrbotten and 9.1 for Västerbotten)

Source: National Forest Inventory 2001-2005, Official Statistics of Sweden

The Swedish land-use class system divides land into ten different classes: forest land, pasture, arable land, swamp, rock surface, subalpine woodland, mountains, other land, nature reserves and urban land. The prevailing land-use class in Northern Sweden is forest land, 58% of the total land area in Västerbotten and 36% in Norrbotten. The other most common land-use classes are nature reserves (2.4 million ha) and mountain areas (2.1 million ha) in Norrbotten, swamps (0.9 million ha) and nature reserves (0.6 million ha) in Västerbotten. In recent years, forest land area has decreased slightly due to the establishment of new nature reserves.

4.2.2 Structure of the Growing Stock

Coniferous tree species form over 80% of the total volume of growing stock in Northern Sweden (Table 9). The most common coniferous tree species are pine and spruce, the prevailing deciduous species being birch.

Table 9. Growing stock volumes by tree species according to the Swedish National Forest Inventory 2001-2005.

Region	Total volume of growing stock	Dominant tree species			
		Pine *(Pinus spp.)*	Spruce *(Abies spp.)*	Birch *(Betula spp.)*	Others
	million m³				
Sweden	3 107	1 230	1 296	372	209
Barents Region	628	322	189	102	14
Norrbotten	310	179	74	51	7
Västerbotten	317	144	116	51	7

Source: National Forest Inventory 2001-2005, Official Statistics of Sweden

Swedish forests are divided into four development classes (*huggningsklass*): open regeneration sites (class A), seedling and young stands (class B), thinning stands (class C) and mature stands ready for final felling (class D). In Northern Sweden the development class structure of forests is rather even between young stands, thinning stands and mature stands (Table 10). The most common age class both in Norrbotten (18%) and Västerbotten (15%) is the age class between 41 and 60 years. A quarter of all forests both in Norrbotten and Västerbotten belong to the age classes of more than 100 years although the proportion of forests older than 160 years has decreased during past years. Normal rotation period in Northern Sweden is 130 years.

Table 10. Forest land by stand development class according to the National Forest Inventory 2001-2005.

Region	Forest land total, 1,000 ha	Class A	Classes B1+B2+B3	Class C	Classes D1+D2
		Open regeneration site	Young stand	Thinning stand	Stand mature for final felling
		% from forest land			
Sweden	23 037	4.6	25.2	37.2	33.1
Barents Region	6 796	4.1	28.2	37.5	30.3
Norrbotten	3 617	4.0	28.2	38.7	29.1
Västerbotten	3 179	4.2	28.1	36.2	31.5

Source: National Forest Inventory 2001-2005, Official Statistics of Sweden

4.3 Forest Ownership and Administration

Slightly over half of all Swedish forests are privately owned. However, in Northern Sweden state and other public organisations are the largest owners of forest land - 45% of forest land area is owned by public bodies (Table 11). Despite the seemingly large share of state forests, large part of publicly owned forests is, in fact, owned by companies, as Sweden changed in 2004 the compilation system of forest owner statistics to meet international standards. In this reconstruction of statistics, forests of a state-owned forest company Sveaskog were transferred from the owner category 'Company' to 'Public bodies'. In Northern Sweden this meant that in Norrbotten roughly 1.8 million hectares of forests owned by state-owned companies were transferred to publicly owned forests, in Västerbotten 0.8 million hectares. Thus, the share of company-owned forests is currently merely 16% of the total forest land area in Northern Sweden, when it used to be almost 50% before 2004. Private individuals own 39% of forest land.

Table 11. Ownership of forest land according to the Swedish National Forest Inventory 2001-2005.

Region	Private	Companies	Public bodies
	Ownership of forest land, %		
Sweden	51	25	24
Barents Region	39	16	45
Norrbotten	35	11	54
Västerbotten	43	22	35

Source: National Forest Inventory 2001-2005, Official Statistics of Sweden

The Swedish Forest Agency - Skogsstyrelsen - is the Government's expert authority on forests and forest policy. The Agency is, among other things, responsible for providing advice in forest-related matters to forest owners, supervising compliance with the Forest Act, providing services to the forest industry and supporting nature conservation efforts. The operative work is done with the help of offices throughout the country. The Agency does not, however, manage state forests. Excluding national parks, state forests are managed by a commercial state-owned forest company named Sveaskog. Sveaskog is Sweden's largest forest owner with 3.4 million hectares of productive forest land i.e. 15% of all forest land in Sweden. Nature conservation areas, on the other hand, are under the administration of the Environmental Protection Agency.

4.4 Nature Conservation and Multiple Use of Forests

Approximately 11% of Sweden’s land area is protected by some kind of nature conservation legislation. The backbone of nature conservation in Sweden is the network of nature reserves, which cover a total area of 4.1 million hectares and account for over 80% of all the protected area of the country (Table 12). Nature reserves can be owned both by state or private persons and they vary in size from a few hectares to thousands of hectares. National parks are the second important conservation area type. They are always state-owned, large protection areas with a typical landscape to their location. National parks cover a total area of almost 700 000 hectares, which is 14% of the total protected area of the country.

A large share of the protected land area in Sweden is located in the Northern part of the country. In the end of 2005, there were 338 nature reserves and nine national parks in the two northernmost counties of Sweden (Table 13). The total area of nature reserves and national parks in Northern Sweden was approximately 3.3 million hectares, which is 64% of the total protected area of Sweden. Most of the protected areas are located in the mountain areas of Northern Norrbotten.

Table 12. Nature reserves of Northern Sweden in 2005.

Location	Number	Total area, ha	Land area, ha
Sweden	2 712	4 103 085	3 463 008
Northern Sweden	338	2 648 945	2 449 767
Norrbotten	180	1 845 233	1 714 246
Västerbotten	158	803 712	735 521

Source: Swedish Environmental Protection Agency

Table 13. National parks of Northern Sweden in 2005.

NATIONAL PARK	Location	Year of founding	Area, ha
Vadvetjåkka	Norrbotten	1920	2 630
Abisko	Norrbotten	1909	7 700
Stora Sjöfallet	Norrbotten	1909	127 800
Padjelanta	Norrbotten	1962	198 400
Sarek	Norrbotten	1909	197 000
Muddus	Norrbotten	1942	49 340
Pieljekaise	Norrbotten	1909	15 340
Haparanda Skärgård	Norrbotten	1995	6 000
Björnlandet	Västerbotten	1991	1 100

Source: Swedish Environmental Protection Agency

According to the Swedish legislation, 'the right of public access' gives everyone the free right to be out in the forest - both visitors from abroad as well as Swedish citizens. The free access gives a good basis for the multiple use of Swedish forests. Utilisation of forests for other purposes than timber procurement has also been taken into consideration in the forest legislation: according to the Forestry Act, all forest land should be managed with environmental consideration. It is estimated that about 8 100 tons of berries are picked annually for sale in the Northern Sweden. In addition, approximately 2 000 tons of berries are picked for household use.

4.5 Wood Harvesting

In Northern Sweden the annual gross fellings totalled approximately 12.5 million m^3 during period 2003-2005 (Table 14), which was about 13% of all the fellings of the country. Area of final fellings was 52 000 hectares, which was approximately 26% of the total area of final fellings in Sweden. In addition to final fellings, 57 000 hectares of forest were thinned and 55 000 hectares of young stands cleaned annually in Northern Sweden during 2003-2005.

Table 14. Annual gross fellings and types of fellings by region in 2003-2005.

Region	Annual gross fellings, 1,000 m^3	Forest land area subject to		
		Final fellings	Thinnings	Cleanings
		1,000 ha		
Sweden	97 500	204	347	220
Barents Region	12 526	52	57	55
Norrbotten	5 048	n/a	n/a	n/a
Västerbotten	7 478	n/a	n/a	n/a

Source: Swedish Statistical Yearbook of Forestry 2007

About 40% of all felled roundwood in Northern Sweden comes from forests owned by private individuals, 33% from state and other public forests and 27% from forests owned by private companies and other private owners. The share of wood coming from state and public forests is significantly higher in Northern Sweden that in the country on average (12% in the whole country), whereas the share of wood harvested in private forests is somewhat lower (63% in Sweden on average).

4.6 Forest Industry

Forest industry plays an important role in Northern Sweden. Forest sector in Västerbotten employs about 6 000 people within forestry, wood products and pulp and paper industries. The county promotes itself as a world-leader in the forest technology industry. Komatsu Forest, Rottne and Vimek, for example, manufacture complete machines in Västerbotten, while Cranab, Indexator and Olofsfors, among others, focus on specific machine parts. In Västerbotten 18 of the county's 100 largest companies are in the forest and wood sector. Together these companies have a turnover of over SEK 5 billion.

Forest industry plays an important role in the economy of Norrbotten and the sector employs more that 4 000 people. The county has a number of large scale production plants, among others, Europe's largest kraftliner producer and one of Europe's leading suppliers of white sack paper are located in Norrbotten.

4.6.1 Sawmill Industry

In 2000, the total production of sawn timber in Northern Sweden was 2.75 million m^3 (Table 15). This is 17% of the total sawn timber production of the country. In the same year the total number of sawmills in the region was 42, from which 19 fell in the category of 25 000 - 100 000 m^3 of sawn timber per year and 9 sawmills produced annually more than 100 000 m^3. The production is almost completely softwood i.e. pine and spruce.

Table 15. Production of sawmill industry in 2000.

Region	Sawn timber 1,000 m³
Sweden	16 054
Barents Region	2 754
Norrbotten	1 207
Västerbotten	1 547

Source: Swedish Statistical Yearbook of Forestry 2006

Some of the largest producers of sawn timber in Northern Sweden are SCA Timber's Munksund, Rundvik and Vilhelmina sawmills, Setra Group sawmills in Rolfs, Lövholmen and Malö as well as Martinsons Group sawmill in Västerbotten.

Loosely related to sawmilling industry, Norrbotten's county has also successful wood construction industry. Älvsbyhus AB is a flourishing wooden house construction company, which concentrates on manufacturing prefabricated houses. Company is the larges manufacture of prefabricated homes in Scandinavia.

4.6.2 Chemical Forest Industry

Northern Sweden produced 0.17 million tons of market pulp in 2004. In the same year the production of kraftliner was 1.46 million tons and kraftpaper 0.13 million tons. In comparison, the total production of wood pulp in Sweden was 12.1 million tons in 2004.

There are four pulp- and paper mills in Northern: Sweden SCA Packaging Obbola AB in Västerbotten and others in the Norrbotten county (Table 16). Only Billerud Karlsborg mill produces market pulp, others produce pulp only for their own production. Northern Sweden is specialised in the production of kraftliner as that is the main product for most mills. Many of the factories of Northern Sweden are significant also in the European scale. Smurfit Kappa Kraftliner Piteå is Europe's biggest kraftliner producer and Billerud Karlsborg factory is one of Europe's leading suppliers of white sack paper.

Table 16. Production of chemical forest industry in Northern Sweden.

Region	Products	Production capacity, tons
Norrbotten		
Billerud Karlsborg AB	Sack and kraft paper Market pulp	130 000 170 000
Smurfit Kappa Kraftliner Piteå AB	Kraftliner	700 000 *
SCA Packaging Munksund AB	Kraftliner	340 000 *
Västerbotten		
SCA Packaging Obbola AB	Kraftliner	420 000
Masonite AB	Fibreboard	25 000 *

* annual production

Source: Company web-pages

In addition to pulp and paper manufacture, there is one fibreboard mill located in the region. Masonite AB in Rundvik, Västerbotten, produces high quality boards for construction as well as basic material for laminated flooring, packaging and sandwich elements.

5 Forest Sector of Northern Finland

5.1 Overview of Northern Finland

The regions of Lapland, Oulu, and Kainuu form the Finnish part of the Barents Region covering an area of 160 500 km². The total population of the regions is 645 000 inhabitants.

Oulu region stretches from the coast of the Gulf of Bothnia to the Russian border, and is roughly equal in size to the whole of Netherlands. The total land area of the Oulu region is 35 000 km^2. Currently the total population is 380 000 people, of which about 50% live in the regional capital Oulu. Population of the region is growing and the region has a favourable population structure: people are well-educated and the age structure is the youngest in the whole of Finland. During the past years Oulu region has profiled itself as a recognised centre of technology in Finland and the share of primary production has declined sharply. Wood processing and paper industry, as well as metal industry together with electronics and high technology are the largest private employers in the Oulu region. At present there are about 17 000 jobs in hi-tech industries.

Kainuu region is located 500 km north from Helsinki having a common border with Russia. The total surface area of Kainuu is approximately 24 500 km^2, of which 12% is covered by water. The total population of the region is about 85 000, of which almost one half lives in the regional capital Kajaani. Kainuu is known for its hilly landscapes and large uninhabited wilderness, but economically the sparsely populated region has been suffering lately from poor development. The largest employment sector in the Kainuu region is public services. Compared to other regions of Finland, Kainuu has the lowest number of private companies. During the past years Kainuu has been suffering from unemployment, and currently the region has the highest unemployment rate in Finland. A future challenge of the region is to fight the out-migration to other regions, which deteriorates the population structure. Forestry has traditionally been an important sector of industry in Kainuu, and also currently it is one of the most important employers of the region.

Lapland is the northernmost province of Finland with close to 185 000 inhabitants. About 4 000 of them are indigenous population - Sami people. The total area of the region is 99 000 km^2, which equals 30% of the whole of Finland. Lapland shares a common border with Sweden, Norway as well as with Russia - altogether 1 642 km. Regional capital is Rovaniemi with 58 000 inhabitants. Primary production and public sector are significant employers. Especially in the northernmost part of Lapland reindeer herding is an important provider of livelihood along with forestry. Private services and industry are employing less people than in the country on average, but nevertheless significance of the metal and forest industry in Kemi-Tornio region with all its multiplicative effects is great for the whole economy of the Lapland province. Even though forests are important to Lapland as a source of raw material for industry, they also have a great significance for recreation and tourism. Especially winter season tourism has developed well, particularly Christmas and New Year's time travelling has been hitting records during the past few years. National parks and other protected areas constitute about 25% of the total area of Lapland.

5.2 Forest Resources

5.2.1 Forest Area and Volume Distribution

The total area of forestry land in Northern Finland is over 14 million hectares, of which 9 million hectares is forest land (Table 17). According to the Finnish classification system forestry land with the potential annual increment of the growing stock being more than 1 m^3/ha is categorised as forest land, whereas land with the potential annual increment of 0.1-1.0 m^3/ha is called scrub land and poor lands with a growth less than 0.1 m^3/ha as waste land. A considerable part of the forestry land in Northern Finland belongs to the categories of poor or non-productive land: 2.3 million hectares are scrub land and 2.8 million hectares belong to the category of waste land. 80% of all the scrub and waste land in Northern Finland is located in the Lapland province. The total volume of growing stock in Northern Finland is 618 million m^3, which is about 30% of the total volume of growing stock of the country. The mean growing stock volume on forest land in Northern Finland is 74 m^3/ha, which is only half of the volumes in Southern Finland. The annual increment of forests is approximately 29 million m^3.

Table 17. Forest resources of Northern Finland.

Region	Forestry land					Proportion of mires, %	Volume, million m³	Annual increment, million m³
	Total, 1,000 ha	Forest land, 1,000 ha	Scrub land, 1,000 ha	Waste land, 1,000 ha	Roads, depots, etc., 1,000 ha			
Finland	26 310	20 149	2 765	3 213	183	34	2 054	95.5
Barents Region	14 260	9 043	2 311	2 833	72	41	618	26.7
Kainuu Region	2 037	1 707	189	125	15	44	142	6.5
Oulu Region	3 098	2 390	308	374	26	51	198	9.3
Lapland	9 125	4 946	1 814	2 334	31	37	279	10.9

1) Forest land: the potential annual increment of the growing stock at least 1.0 m³/ha.
2) Scrub land: the potential annual increment of the growing stock 0.1-1.0 m³/ha.
3) Waste land: unless naturally treeless, the annual increment less than 0.1 m³/ha.

Source: Finnish Statistical Yearbook of Forestry 2007

Proportion of mires from the forestry land is high in Finland, and the share is even higher in Northern Finland. Approximately 5.8 million hectares i.e. 41% of forestry land can be classified as mires. Oulu region has the highest share of mires in the whole country - 51% of the forestry land area - whereas 73% of treeless mires of Northern Finland are located in Lapland. About 42% of the mires in Northern Finland have been drained.

5.2.2 Structure of the Growing Stock

Coniferous tree species are prevailing in Northern Finland (Table 18). Coniferous forests form 82% of the total growing stock volume and 91% of the forest land area, pine (*Pinus spp.*) and spruce (*Abies spp.*) being the most common tree species. The most common deciduous species is downy birch (*Betula pubescens*), which extends farther north than any other tree species, growing also in the mountain areas of Northern Lapland.

Table 18. Growing stock volumes by tree species in Northern Finland.

Region	Volume of growing stock	Dominant tree species			
		Pine *(Pinus spp.)*	Spruce *(Abies spp.)*	Birch *(Betula spp.)*	Others
	million m³				
Finland	2189	1093	667	357	73
Barents Region	720	453	138	119	10
Kainuu Region	157	92	37	25	3
Oulu Region	209	132	36	37	4
Lapland	354	229	65	57	4

Source: Finnish Statistical Yearbook of Forestry 2007

Finnish forests are divided into eight development classes. In young seedling stands, the height of the dominant tree storey is less than 1.3 metres. In young thinning stands, the removal consists mainly of pulpwood. In advanced thinning stands the growing stock includes a lot of large-sized stems, and a part of the thinning removal consists of logs. In mature stands, the stand will next be subject to forest regeneration. Table 19 shows the development class distribution of forest land available for wood supply in Northern Finland. Young thinning stand is the most common development class with a 44% share, except for the most northern part of Lapland where mature stand is the most common class occupying 40% of the forest land area.

Table 19. Forest land available for wood supply by stand development class in Northern Finland.

Region	Open regeneration site	Young seedling stand	Advanced seedling stand	Young thinning stand	Advanced thinning stand	Mature stand	Shelterwood stand	Seedtree stand	Forest land, total
	1,000 ha								
Finland	266	1 534	2 491	7 122	4 826	2 593	49	179	19 059
Barents Region	83	687	1 176	3 591	1 395	1 061	17	120	8 132
Kainuu Region	13	144	236	734	278	219	1	6	1 630
Oulu Region	37	174	310	1 030	494	241	3	9	2 295
Lapland	34	370	631	1 827	624	602	14	106	4 207

Source: Finnish Statistical Yearbook of Forestry 2007

Forests of Northern Finland are fairly evenly distributed between age classes (Table 20). The largest age classes are middle-age classes from 41 to 60-year-old and 61 to 80-year-old stands just in the brink of reaching maturity as well as over 141-year-old over mature stands. The share of the oldest age class is particularly high in the northernmost part of Lapland - over 48%. In all, Northern Finland has almost twice the amount of over 140-year-old forests compared to the whole country.

Table 20. Age of forest stands on forest land in Northern Finland.

Region	Age class									Forest land, total
	Treeless	1-20	21-40	41-60	61-80	81-100	101-120	212-140	141+	
	1,000 ha									
Finland	26	3 418	3 857	3 544	3 133	2 359	1 226	636	1 708	20 149
Barents Region	84	1 270	1 298	1 531	1 539	1 077	438	279	1 528	9 044
Kainuu Region	14	304	342	303	254	142	74	70	204	1 707
Oulu Region	37	323	379	488	455	327	163	79	142	2 390
Lapland	34	644	577	740	830	609	201	129	1 183	4 946

Source: Finnish Statistical Yearbook of Forestry 2007

5.3 Forest Ownership and Administration

In general, private individuals and families own slightly over half of the Finnish forests. However, forest ownership structure in the Northern Finland differs from the country average. In Northern Finland 57% of all forests are owned by the state (Table 21). This is due to the fact that most state owned forests are situated in Northern Finland and especially in Lapland, where the share of state owned forests is as high as 70%. In Oulu region, on the other hand, forest ownership is strongly in private hands - 61% of the forests are in private ownership, which clearly exceeds the country average. The ownership category 'Others' includes forests owned by municipalities, parishes, etc.

Table 21. Ownership of forestry land in Northern Finland.

Region	Private	Companies	State	Others
	Ownership of forestry land, %			
Finland	52	8	35	5
Barents Region	35	4	57	4
Kainuu Region	39	14	44	3
Oulu Region	61	5	27	7
Lapland	25	2	70	3

Source: Finnish Statistical Yearbook of Forestry 2006

State owned forests in Finland are managed by the Finnish Forest and Park Service Metsähallitus. Metsähallitus is a state enterprise, which runs on a commercial basis when it comes to harvesting state forests, but receives also budget funding for providing public services and carrying out administration duties. Approximately 85% of Metsähallitus's revenues come from the business unit 'Forestry' i.e. harvestings. Other commercial activities are eco-tourism services, forest real estate business, tree seed and seedling production and soil resource business. One of the most important public administration duties of Metsähallitus is the management of nature conservation and hiking areas on state lands.

Typically, privately owned forest holdings are small in Finland - 65% of all the 440 000 holdings are under 20 hectares. In Northern Finland holdings are slightly larger in size, but nevertheless, 56% of

the holdings remain under 20 hectares, whereas 7% are over 100 hectares. According to the statistics, the most productive forest land is owned by companies and private owners, annual increment percentage being 4.4 - 4.9%, whereas state forests fall behind by about one percentage each year. 'Common Forest' is a term one comes across in Northern Finland. It describes a special form of ownership, where several private forest owners have joint together, and manage their forests as a one unit like shareholders in a joint-stock company. Currently there are 57 Common Forests in Northern Finland.

5.4 Nature Conservation and Multiple Use of Forests

Contribution of Northern Finland to the total protected land area of the country is huge - almost 2.7 million hectares, which is 95% of all the protected land area in Finland. Conservation area types occupying the largest land areas are national parks, strict nature reserves, mire conservation areas and wilderness areas (Table 22). National parks are large (>1,000 ha) conservation areas open for everyone, whereas strict nature reserves have been established solely for research and protection purposes and, therefore, majority of them are closed for the public. Due to the large number and rich variety of mires in Finland, mire conservation areas comprise a significant proportion of the protected land area. Mire conservation areas are often important bird sanctuaries. Wilderness areas occupy the largest share from the total protected land area in Finland. However, they are not as strictly protected as, for example, national parks. Construction of roads and mining is forbidden, but restricted harvestings are allowed in a number of wilderness areas.

Table 22. Land area of the statutory nature conservation and wilderness areas on state land in Northern Finland, October 11, 2007.

Region	Protected land area, 1 000 ha							Total land area, 1,000 ha
	National parks	Strict nature reserves	Mire conservation areas	Protected herbrich forest areas	Protected old-growth forest areas	Other protected areas	Wilderness areas	
Finland	799.1	150.6	448.1	1.2	9.3	42.7	1380.4	2831.5
Barents Region	718.6	144.8	416.0	0.9	1.5	26.3	1380.4	2688.5
Kainuu Region	4.9	5.4	28.6	0.1	0.8	23.0	-	62.9
Oulu Region	42.1	10.5	62.4	0.1	0.7	1.1	-	116.8
Lapland	671.6	128.8	325.0	0.8	-	2.2	1380.4	2508.8

Source: Finnish Statistical Yearbook of Forestry 2007

In Finland, 12 of 35 national parks, 11 of 19 nature reserves and all 12 wilderness areas are located in Northern Finland (Table 23). Altogether 93% of the protected area of Northern Finland is located in the Lapland province.

Table 23. Conservation areas in Northern Finland in 2006.

Conservation area	Location	Year of founding	Surface area, 1,000 ha
STATE NATURE RESERVES			
Kevo	Lapland	1956	71.2
Malla	Lapland	1916	3
Sompio	Lapland	1956	17.6
Värriö	Lapland	1982	12.5
Maltio	Lapland	1956	14.7
Sukerijärvi	Oulu region	1982	3.4
Pisavaara	Lapland	1938	4.9
Runkaus	Lapland	1956	7.1
Olvassuo	Oulu region, Kainuu region	1982	27
Paljakka	Kainuu region	1956	2.8
Pelso	Oulu region	1982	12
NATIONAL PARKS			
Lemmenjoki	Lapland	1956	285
Urho Kekkonen National Park	Lapland	1983	255
Pallas-Yllästunturi	Lapland	2005	102
Pyhä-Luosto	Lapland	2005	14.2
Oulanka	Oulu region, Lapland	1956	27
Riisitunturi	Lapland	1982	7.7
Perämeri	Lapland	1991	15.7
Syöte	Oulu region, Lapland	2000	29.9
Rokua	Kainuu region	1956	0.43
Hiidenportti	Kainuu region	1982	0.45
WILDERNESS AREAS			
Hammastunturi	Lapland	1991	182.5
Kaldoaivi	Lapland	1991	292.4
Kemihaara	Lapland	1997	30.2
Käsivarsi	Lapland	1991	220.6
Muotkatunturi	Lapland	1991	157
Paistunturi	Lapland	1991	157
Pulju	Lapland	1991	61.4
Pöyrisjärvi	Lapland	1991	128
Tarvantovaara	Lapland	1991	67
Tsarmitunturi	Lapland	1991	15
Tuntsa	Lapland	1997	21.2
Vätsäri	Lapland	1991	155

Source: Metsähallitus

Finland, like other Nordic countries, has public rights of access to both public and private forests. So called "everyman's rights" allow picking berries, mushrooms and herbs from the forests. Most of the crop is collected for direct household use, but berry and mushroom picking are also a source of income for many in Northern Finland. In 2005, the amount of commercial wild berries and

mushrooms collected from the forests in Northern Finland was 10.2 million kilograms, which was over 80% of the total market supply in Finland.

In addition to berry and mushroom picking, forests in Northern Finland are utilised in reindeer husbandry, tourism and recreation. Reindeer husbandry is an important activity in the northernmost part of Finland and the requirements of reindeer herding should be taken into account also in forestry. In 2006-2007 the winter herd of reindeer was reckoned to amount to 197 000 reindeer.

5.5 Wood Harvesting

The maximum sustainable removal from the forests of Northern Finland is approximately 16.5 million m^3 per year (Table 24). This is about one fifth of the total sustainable cutting removal in the whole country. The mean annual removal, however, has been around 11 million m^3 i.e. the potential removal exceeds the actual removals by 30%. In 2006, the total roundwood removal in Northern Finland was 11.7 million m^3, from which 62% was pulpwood, 30% logs and 8% fuelwood. In Northern Finland, the share of pulpwood from the total removal is slightly higher than in the country on average.

Table 24. Cutting possibilities and total roundwood removals in Northern Finland in 2006.

Region	Maximum sustainable removal	Mean annual total removals during 1997-2006	Total roundwood removals in 2006			
			Logs	Pulpwood	Fuelwood	Total
	milion m³/year		milion m³			
Finland	72.1	56.4	24.6	27.1	5.2	56.9
Barents Region	16.5	11.0	3.5	7.3	0.9	11.7
Kainuu Region	4.4	2.9	1.3	1.7	0.1	3.1
Oulu Region	5.8	4.3	1.2	2.9	0.5	4.5
Lapland	6.4	3.9	1.0	2.7	0.3	4.0

Source: Finnish Statistical Yearbook of Forestry 2007

In 2006, the total area treated with fellings in Northern Finland was 187 700 hectares (Table 25), which was approximately one third of the total harvested area in the whole country. From all fellings, the proportion of intermediate fellings in Northern Finland was almost 70%, regeneration fellings amounted to 29%, other fellings occupying the remaining 1%. Other fellings include, for example, fellings done along ditch and road construction lines as well as fellings when clearing land for agriculture.

Table 25. Area treated with fellings in Northern Finland in 2006.

Region	Intermediate fellings, 1,000 ha				Regeneration fellings, 1,000 ha			Other fellings, 1,000 ha	TOTAL, 1,000 ha
	First thinnings	Other thinnings	Removal of seed trees and shelterwood trees	Total	Clear fellings	Seed tree and shelterwood fellings	Total		
Finland	191.0	193.5	53.1	**437.5**	145.3	26.6	**171.9**	9.6	**619.0**
Barents Region	62.6	46.4	21.8	**130.7**	42.5	11.3	**53.9**	3.2	**187.7**
Kainuu Region	17.0	9.9	3.5	**30.4**	11.6	2.2	**13.8**	0.4	**44.7**
Oulu Region	22.8	17.4	3.4	**43.5**	14.1	1.6	**15.8**	2.0	**61.3**
Lapland	22.8	19.1	14.9	**56.8**	16.8	7.5	**24.3**	0.7	**81.8**

Source: Finnish Statistical Yearbook of Forestry 2007

Non-industrial, private forests are the main source of roundwood for the Finnish forest industry also in the northern part of the country. In 2006, 58% of all commercial roundwood came from private forests, 33% from state forests and 9% from company-owned forests.

In 2006, the total consumption of roundwood in Finland was 81.5 million m^3, of which 13.5 million m^3 in Northern Finland (Table 26). The share of imported roundwood from the total consumption was 24% for the whole country and 11% for the northern part. More than 92% of the roundwood in Northern Finland was consumed by the forest industries. The most important consumers are pulp and sawmilling industry.

Table 26. Roundwood consumption by source of origin in Northern Finland in 2006.

Region	Domestic roundwood		Imported roundwood		Roundwood total
	Forest industries	Energy generation	Forest industries	Energy generation	
	1,000 m^3				
Finland	56 343	6 020	19 176	-	81 539
Barents Region	11 032	1 042	1 459	-	13 531
Kainuu Region	1 822	182	134	-	2 138
Oulu Region	3 611	542	211	-	4 363
Lapland	5 599	318	1 114	-	7 030

Source: Finnish Statistical Yearbook of Forestry 2007

In Northern Finland, in addition to roundwood, 1.1 million m^3 of sawmill chips and dust were consumed by the forest industries in 2006. The corresponding figure for the whole country was 11 million m^3. For energy generation Northern Finland consumed one million m^3 of roundwood and 2.3 million m^3 of forest industry by-products and other wood residues.

5.6 Forest Industry

Pulp and paper industry forms the basis for forest industry in Northern Finland. In addition, sawmill industry plays an important role locally especially in Oulu and Kainuu regions. As a whole, the importance of forest industry to the regional economy is clearly above the country average in Lapland and Kainuu, whereas in Oulu region it remains below the average. What is noteworthy is that there are no plywood, particle board or fibreboard mills in Northern Finland.

Cornerstone of the forest industry in Northern Finland is pulp and paper manufacture. In total, the annual production of pulp and paper industry in Northern Finland was 3.8 million tons in 2005, from which 2 million tons was paper and 1.8 million tons pulp. Northern Finland produces approximately 15% of the total annual pulp and paper production of the whole country. In addition, one of the world's leading manufacturers of coated and uncoated kraftliner is situated in Kemi in Lapland. The annual production of the Kemiart Liners mill is 287,000 tons, which is 11% of the annual cardboard production of the country.

Currently there are six pulp and paper mills located in Northern Finland (Table 27), some of them being the largest mills in Europe. Stora Enso Oulu and Veitsiluoto mills and Botnia Kemi mill are located on the coast of the Gulf of Bothnia, where integrated mill harbours ensure frequent weekly connections to the biggest European harbours all year round. UPM-Kymmene Kajaani mill is situated in the capital of Kainuu region. Stora Enso Kemijärvi mill, located in Eastern Lapland, produces softwood pulp for high quality grades of printing and writing papers. However, the Kemijärvi mill will close down in spring 2008 as a part of Stora Enso's plans to decrease the overall use of fibre by reducing production capacity.

Table 27. Pulp and paper producers in Northern Finland.

Name	Products	Annual production in 2005, tons/year
Oulu Region		
Stora Enso Oulu mill	Art quality coated woodfree papers and boards	769 000
Kainuu Region		
UPM-Kymmene Kajaani mill	Super-calandered magazine paper, newsprint, directory paper	499 000
Lapland		
Botnia Kemi mill	Softwood and hardwood pulp for tissue papers and liners	464 000
Kemiart Liners, Kemi (M-real)	Coated and uncoated kraftliner	287 000
Stora Enso Veitsiluoto mill	Office papers, coated mechanical papers	767 000
Stora Enso Kemijärvi mill	Softwood pulp for high quality grades of printing and writing papers	201 000

Source: Finnish Forest Industries Yearbook 2006

Variety of end products of the pulp and paper industry covers different types of papers, boards and pulp. Pulp is mainly produced for own use, only Botnia Kemi mill and Stora Enso Kemijärvi mill

have been producing market pulp. Stora Enso Oulu mill is one of the world's largest and most modern facility manufacturing art quality coated woodfree papers and boards.

Sawmilling industry is the most important branch of wood products industry in Northern Finland, and large independent sawmills have a strong position in the regional economies. In addition to large sawmills the region has hundreds of small size sawmills, which provide work for 1-5 persons. Annually the three northernmost provinces of Finland produce approximately 2.1 million m^3 of sawn wood, which is about 16% of the production of the country. Some of the most significant producers of sawn wood in Northern Finland are Pölkky Oy in Oulu region, Kuhmo Oy in Kainuu as well as Finnforest sawmill in Kemi in Lapland (Table 28).

Table 28. Larger sawmills in Northern Finland.

Name	Annual production, m^3
Oulu region	
Pölkky Oy	260 000
Hasa Oy	200 000
PRT Wood Oy	n/a
Junnikkala Oy	130 000
Lappipaneli (Ruukki Group)	120 000
Kainuu region	
Kuhmo Oy	350 000 *
UPM Kajaani Sawmill	150 000 *
Lapland	
Finnforest Karihaara sawmill	150 000

* production capacity

Sources: Company web-pages

Closeness to the main markets has never been the advantage of the forest industry in Northern Finland, and therefore northern regions have been compelled to get by in the competition with other assets. Traditionally the competitive advantages of the northern forest industry have been the availability and affordable prices of raw material and energy as well as efficiency of production due to investments in latest production technology. Lately some of the competitive edge related to the availability of wood resources has been lost. Unfavourable harvesting conditions due to mild winters changes and problems in wood export have resulted in a deficit of raw material, which has, together with blooming construction markets, resulted in a rapid increase in wood prices. Another thing affecting the development possibilities of the forest industry in Northern Finland, are the demands to preserve new forest areas particularly in the northern parts of Lapland, which have lead to disputes between nature conservationists and local forestry actors.

The current problems of the forest industry are common for the whole country, but their economic and social consequences are much more severe in small, remote communities with few alternative options for economic growth. The large forest industry corporations have demanded for drastic actions to restore the competitiveness of the Finnish forest industry. According to them, measures should be taken within the near future, otherwise Stora Enso Kemijärvi pulpmill might not be the last factory to be closed down.

6 Forest Sector in the Russian Part of the Barents Region

6.1 Overview of the Russian Part of the Barents Region

The Republic of Karelia, Arkhangelsk region including the Nenets Autonomous Area (NAA), Murmansk region and the Republic of Komi form the Russian part of the Barents Region.

The Arkhangelsk region (*Arkhangelskaya oblast*) consists of 20 administrative districts, the Nenets Autonomous Area and archipelagos of Novaya Zemlya and Franz Joseph Land. Total area of the region is 587 000 km^2. Administrative centre of the region is the city of Arkhangelsk. Other large cities are Severodvinsk, Kotlas, Novodvinsk and Koryazhma. Population density is 2.5 people per km^2; 74% of the inhabitants are living in cities and 26% in rural areas. The climate of the region shows characteristics of both a continental and a maritime climate. The region has extensive forest and water resources. Several large forest industry companies are located in the Arkhangelsk region.

The Nenets Autonomous Area (NAA) is a subject of the Russian Federation and on regional level an autonomous part of the Arkhangelsk region. Surface area of the NAA is 177 000 km^2. The region is almost completely located above the Arctic Circle, which influences both climate and nature. The population of the region is around 41 000 inhabitants, population density being very low - only 0.2 people per km^2. The administrative centre and only town of the region is Naryan-Mar. The indigenous population of the region is the Nenets. The region has considerable resources for extractive industry. Forest resources, on the other hand, are insignificant - only 127 000 hectares of mainly pretundra forest.

The Republic of Komi covers an area of 417 000 km^2. The republic is divided into 20 administrative districts and has a total population of 996 000 inhabitants. Population density is 2.44 people per km^2. Capital of the republic is Syktyvkar with 244 000 inhabitants. Komi is rich in natural resources. About 74% of the republic's territory is covered by forests and, thus, Komi is considered as one of the leading centres of forest industry in Russia. A considerable part of the large Timano-Pechorskaya oil and gas province as well as a large part of the Pechorskaya coal deposit are located within the republic’s territory. Consequently, the most important sectors of industry in the republic are wood processing, oil and gas industry and coal mining.

Surface area of the Murmansk region is approximately 145 000 km^2. The region consists of 5 administrative regions and 14 cities with a total population of about 872 000 inhabitants. The administrative centre of the region is the city of Murmansk. It is the largest administrative, industrial and cultural centre in the world located above the Arctic Circle. Beneficial geographical location, a non-freezing bay and the proximity to the European Union border gives Murmansk a competitive advantage compared to other Russian regions. Industry is the back bone of the region's economy, mining industry and fishery occupying the first places. Due to the northern location of Murmansk, forestry does not have a significant role in the region's economy.

The Republic of Karelia consists of 18 municipalities and in total the republic has 716 000 inhabitants. Population density is 4 persons per km^2. The main cities are the capital Petrozavodsk with 282 000 inhabitants, Kondopoga, Segezha, Kostomuksha and Sortavala. Total surface area of the republic is 181 000 km^2. Approximately half of the territory is covered by forests, forestry and wood processing industry being the backbones of the republic's economy.

6.2 Forest Resources

6.2.1 Forest Area and Volume Distribution

The total forest area in the Russian part of the Barents region is 93 million hectares, of which forest land area is 69 million hectares. The total volume of growing stock is 6.7 billion m^3 and the average annual increment 74 million m^3. These figures include both forests under the control of the Ministry of Natural Resources and Ministry of Education (so called *forest fund* of the Russian Federation) as well as town forests and forests governed by the Ministry of Defence. More than half of the forest resources in the Russian part of the Barents Region are located in the Republic of Komi and the Arkhangelsk region (Table 29).

Table 29. Forest resources of the Russian part of the Barents Region in 2003.

Region	Forests included in forest fund 1)			Forests not included in forest fund 2)			TOTAL		
	Area 3a), 1,000 ha	Forest-land 4), 1,000 ha	Volume, million m³	Area 3b), 1,000 ha	Forest-land 4), 1,000 ha	Volume, million m³	Total volume, million m³	Share of mature and over mature forests, % of the total volume	Mean annual increment 5), million m³
Russian Federation	1 173 089	878 138	81 538	5 913	4 838	592	82 130	54	994
Barents Region in total	92 873	68 457	6 622	525	335	43	6 665	67	74
Arkhangelsk region 6)	29 318	22 713	2 488	223	173	34	2 522	69	28
Republic of Karelia	14 833	9 737	940	75	60	6	946	45	14
Republic of Komi	38 891	30 635	2 965	10	10	1	2 966	73	30
Murmansk region	9 831	5 372	229	217	92	2	231	62	2

[1] *Lesnoy fond*
[2] *Lesa, ne vhodjaschie v lesnoy fond*
[3a] *Zemli lesnogo fonda*
[3b] *Zemli, ne vhodjaschie v lesnoy fond*
[4] *Lesnye zemli*

[5] The mean annual increment (*obschij srednyj prirost*) is calculated by adding the average annual growth (*srednyj prirost*) according to age-classes.
Srednyj prirost = volume of the stand / age of the stand
[6] Includes the Nenets Autonomous Area

Source: Lesnoy fond Rossii 2003

6.2.2 Structure of the Growing Stock

Dominance of coniferous species is characteristic to the forests of the Russian part of the Barents Region (Table 30). Coniferous forests form over 84% of the total volume of growing stock of the region, pine (*Pinus spp.*) and spruce (*Abies spp.*) being the most common tree species.

Table 30. Tree species composition of forests managed by the Ministry of Natural Resources in 2006.

Region	Volume of growing stock	Dominant tree species				
		Pine *(Pinus spp.)*	Spruce *(Abies spp.)*	Larch *(Larix spp.)*	Birch *(Betula spp.)*	Aspen *(Populus spp.)*
	million m³					
Russian Federation	76 868	15 072	9 935	23 201	10 303	3 207
Barents Region	6 492	1 934	3 523	32	820	146
Arkhangelsk region *	2 283	565	1 374	9	297	38
Republic of Karelia	963	564	282	0.07	104	11
Republic of Komi	3 009	691	1 778	23	384	98
Murmansk region	236	114	88	0.01	34	0.02

* Includes the Nenets Autonomous Area

Source: Ministry of Natural Resources 2006

Russian forests are divided into five development classes: young (0-40 years for conifers, 0-20 for deciduous species), middle-age (41-80 or 21-40), maturing (81-100 or 41-50), mature (101-160 or 51-80) and over-mature stands (over 161 or over 81). Over 54% of the forest area of the Barents Region belongs to the mature and over mature classes and over 67% of the total volume of forests is in mature and over mature forests (Table 31).

Table 31. Development class structure in the forests of the Russian part of the Barents Region managed by the Ministry of Natural Resources in 2006.

Region	Young	Middle-age	Maturing	Mature and over mature	Total
	million m³				
Russian Federation	3 692	19 408	10 605	43 163	76 868
Barents Region	346	1 237	532	4 376	6 492
Arkhangelsk region *	101	427	135	1 621	2 283
Republic of Karelia	129	264	134	436	963
Republic of Komi	100	482	251	2 176	3 009
Murmansk region	17	64	13	142	236

* Includes the Nenets Autonomous Area

Source: Ministry of Natural Resources 2006

Almost 99 000 hectares of forest were regenerated either naturally or artificially in the Barents Region in 2005 (Table 32). Approximately 15% of the area was regenerated artificially by planting or sowing. The rest 85% was left to be regenerated naturally. In the whole Russian Federation as well as in the whole Northwest Russia approximately one quarter of the forests is regenerated artificially every year. Thus, compared to other regions of Russia the method of artificial regeneration is less common in the Barents Region.

Table 32. Forest regeneration in the Russian part of the Barents Region in 2005.

Region	Forest regeneration in total	Natural regeneration	Artificial regeneration
	1,000 ha		
Russian Federation	812	625	187
Barents Region	99	84	15
Arkhangelsk region *	43	38	5
Republic of Karelia	28	21	7
Republic of Komi	26	23	2
Murmansk region	3	2	1

* Includes the Nenets Autonomous Area

Source: Osnovnye pokazateli…2006

6.3 Forest Ownership and Administration

In Russia, forests resources are owned by the state with very few exceptions. Over 99% of the total forest land area belongs to the so called federal forest fund of the Russian Federation, which basically includes all commercial and protected forests of the country. Most of the forest fund is administrated by the Ministry of Natural Resources. The remaining shy of 1 percent are town forests or forests belonging to the Ministry of Defence. Administratively these forests are often referred to as 'forests not belonging to the forest fund'.

Forest administration in Russia is currently under a massive reorganisation, and in the beginning of 2007 the administration of the federal forest fund was transferred from the Ministry of Natural Resources to regional administration, i.e. to the subjects of the federation. This transfer of power made the regions responsible for the management, rational utilisation and protection of forests. Ministry of Natural Resources, on the other hand, is responsible for controlling the work of the regions, providing the regions with necessary financing as well as developing and carrying out of consistent forest policy.

In the Russian part of the Barents Region 99.4% of all forests are under the regional administration, 0.5% belongs to the armed forces and the rest are town forests or forests belonging to the Ministry of Education. Only in the Murmansk region the share of army forests is slightly more significant - 2.1% - in other regions forests are almost fully under the administration of the federation subjects.

When adopting the new Forest Code in the beginning of 2007, the traditional Russian classification of forests into three management groups was changed, and nowadays forests are divided into protection forests, production forests and reserve forests.

6.4 Nature Conservation and Multiple Use of Forests

Nature conservation areas in the Russian part of the Barents Region cover an area of over 9 million hectares, which is 6% of the surface area and nearly 10% of the total forest area of the region. The Barents Region holds over 92% of the protected area of the whole Northwest Russia. The most significant of the Russian nature conservation area types are nature reserves (*zapovednik*) and national parks. Nature reserves are the most strictly protected nature conservation areas. The nature

reserve network has been developed for over 80 years, whereas national parks are a relatively new phenomenon in Russia. The conservation areas of the Russian part of the Barents Region are presented in table 33.

Table 33. Conservation areas in the Russian part of the Barents Region.

Conservation area	Location	Year of founding	Area, 1,000 ha
NATURE RESERVES (zapavednik)			
Kandalakshsky	Murmansk region, Republic of Karelia	1932	71
Kivach	Republic of Karelia	1931	11
Kostomukshsky	Republic of Karelia	1983	48
Laplandsky	Murmansk region	1930	278
Nenets	Nenets Autonomous Area	1997	313
Pasvik	Murmansk region	1992	15
Pechoro-Ilychsky	Republic of Komi	1930	721
Pinezhsky	Arkhangelsk region	1974	52
NATIONAL PARKS			
Kenozersky	Arkhangelsk region	1991	140
Paanajarvi	Republic of Karelia	1992	105
Vodlozersky	Arkhangelsk region, Republic of Karelia	1991	468
Yugyd Va	Republic of Komi	1994	1,892
STATE WILDLIFE RESERVES (zakaznik)			
Franz Joseph land	Arkhangelsk region	1994	4,200
Kanozersky	Murmansk region	1989	66
Kizhsky	Republic of Karelia	1989	50
Murmansky Tundrovy	Murmansk region	1988	295
Nenetsky	Nenets Autonomous Area	1985	309
Olonetsky	Republic of Karelia	1986	27
Siysky	Arkhangelsk region	1988	43
Tulomsky	Murmansk region	1987	34

Source: Protected Areas in Russia 2003

In Russia, the use of non-wood forest products is more popular and diverse than in Western countries. The Forest Code of the Russian Federation ensures every Russian citizen a free access to forests and allows collecting of berries, mushrooms, wild fruit, nuts, herbs and resin for personal consumption. Picking of berries and mushrooms either for personal consumption or for sale is common, similarly to collecting and selling of birch sap. Use of medical herbs is significantly more common in Russia than in Western countries and public health service recommends medicine made of them as a supplement to synthetically produced drugs. In addition to this, raw material, such as tanning agents, dying pigments and resin, are collected for chemical industry.

6.5 Wood Harvesting

In 2006, the sustainable annual allowable cut (AAC) in the Russian part of the Barents Region was 56 million m^3, which is approximately one tenth of the annual allowable cutting volume of the whole Russian Federation. In Russia, AAC includes only final fellings, whereas the annual allowable yields from intermediate and other fellings are calculated separately. The yield from annually executed final fellings in the Russian part of the Barents Region is about 19 million m^3, which is 34% of the AAC. Intensity of harvestings varies significantly from one region to another. In the Republic of Karelia approximately 62% of the volume of AAC is harvested, whereas in the Murmansk region slightly over 13%.

In addition to final fellings, 4.3 million m^3 of timber is harvested in the Russian part of the Barents Region through intermediate and other fellings. The intermediate fellings include, in addition to thinnings, other fellings that manipulate the stand composition. The category of other fellings consists of fellings such as clearing building sites, road areas or firebreaks. Also the share of intermediate and other fellings of all the fellings varies significantly from one region to another.

Due to the better accessibility of forest resources and the proximity of the European markets, over a half of all the industrially used timber in Russia is logged in the forests situated in the European part of the country. Logging operations are concentrated especially in the Barents Region, where over 33% of forest resources of European part Russia are located. Arkhangelsk region has been the biggest logger and for example in 2006 the region produced about 5% of all the Russian merchantable roundwood. Table 34 shows the forest use in the Russian part of the Barents Region.

Table 34. Forest use in the Russian part of the Barents Region in 2006.

Region	Final fellings		Intermediate fellings	Other fellings	Total
	Planned harvesting	Realised harvesting			
	milion m³				
Russian Federation	571.0	127.6	30.5	27.2	185.3
Barents Region	56.0	19.3	2.2	2.1	23.5
Arkhangelsk region	19.5	7.5	1.1	1.4	9.9
Republic of Karelia	8.9	5.5	0.6	0.5	6.6
Republic of Komi	26.9	6.2	0.4	0.2	6.8
Murmansk region	0.7	0.1	0.05	0.01	0.2

Source: Ministry of Natural Resources 2007

Poor condition of the road network system, low-level of mechanisation and obsolete harvesting technology are reasons for the low annual yield in timber harvesting. However, during past years many larger harvesting companies have invested in Nordic cut-to-length harvesting technology, which promotes more intensive forest utilisation, among other things, thinnings. In the Republic of Karelia, the share of cut-to-length method is already about 70%.

Roundwood has been for years the most important export product of the Russian forest industry, and it has been even more so to the Russian part of the Barents Region. In 2003, the Republic of Karelia exported 66% and the Murmansk region 56% of their total production of merchantable wood outside

the country borders. The rapid increase in roundwood exports since the beginning of the 1990's has awoken the Russian decision-makers into action. In hopes of attracting more foreign investors into Russian forest industry by making the roundwood export unprofitable, Russian government issued in 2006 a resolution to gradually increase the export tariffs for roundwood. A complete halt in the export is expected in the beginning of 2009, when the export duties reach 50 euros/m^3. As a result, regions close to the border with substantial export of roundwood are likely to experience difficulties as a consequence of rapidly decreasing and eventually ending export of roundwood, if domestic demand will not compensate the former export.

6.6 Forest Industry

In the Russian part of the Barents Region the foundations of forest industry have been the vast but under-utilised forest resources, adequate infrastructure, cheap energy and available labour.

In comparison with the more remote regions of Russia, enterprises located in the Russian part of the Barents Region have an advantage being geographically close to the main Russian and European markets. Although, compared with the Western countries, the road network is sparse and the utilisation of information technology is still limited, the infrastructure in the Russian part of Barents Region is relatively developed. With regard transportation and availability of energy, enterprises are dependent on state monopolies, whose tariffs are on the increase. The increasing demand, especially in the domestic market for forest industry products creates opportunities for further development of this industry.

During the past five years, the foreign trade of the Russian forest industry products has increased with regard to the quantity and monetary value of the products. In the Barents Region the greatest exporters are the Arkhangelsk region and the Republics of Karelia and Komi, where numerous export orientated saw mills and pulp- and paper mills are situated.

The Russian forest sector has started to attract foreign investors because of its vast markets and increasing demand. For example the domestic demand for paper and cardboard is estimated to double in the near future. Thus far in the Russian part of the Barents region foreign enterprises have not made green field investments in pulp and paper industry.

6.6.1 Wood Products Industry

The most important branches of wood products industry in the Russian part of the Barents Region are plywood and sawn wood industries followed by fibre and particle board production.

Currently the plywood industry is one of the most profitable branches of Russian forest industry. In 2004, Russia produced over two million m^3 of plywood. Share of the Barents Region was almost 17% of the total production (Table 35). The Republic of Komi is the greatest producer with 277 000 m^3, being also the number one producer of plywood in the whole of Russia. Currently the majority of Russian plywood is bulk production but the production of coated plywood and other special products is developing. Most of the produced plywood is exported.

Table 35. Production of sawn timber and plywood in the Russian part of the Barents Region in 2004 and fibreboard and particleboard production in 2003.

Region	Sawn timber 1,000 m^3	Plywood 1,000 m^3	Fibreboard million m^2	Particleboard 1,000 m^3
Russian Federation	21 200	2 246	321	3 181
Barents Region	3 705	380	39	401
Arkhangelsk region	2 233	85	19	-
Republic of Karelia	778	19	-	106
Republic of Komi	676	277	20	295
Murmansk region	17	-	-	-

Source: Regiony Rossii 2005, Karelijastat 2003

In 2004, Russia produced 21 million m^3 of sawn timber, of which 3.7 million m^3, i.e. 17%, was produced in the Russian part of the Barents Region. Arkhangels region has been the largest producer of sawn wood in the whole of Russian Federation with a 10% share of the total production. Currently sawmilling in Russia is one of the least productive branches of the forest industry. Underdeveloped infrastructure, difficulties in securing a constant flow of raw material and obsolete means of production lower the productivity of the work as well as result in poor quality of the end products. Furthermore, quality problems make it impossible to produce value-added special products. In the future, the volumes of sawn timber production in the Russian part of the Barents Region will increase due to the launching of several projects for building sawmills with increased capacity.

Russia produced 321 million m^2 of fibreboard in 2003. The Russian part of the Barents region is not specialised in producing fibreboard and thus its share of the Russian production is about 12 %. Fibreboard is produced only in the Arkhangelsk region and in the Republic of Komi.

In 2003, Russia produced 3.2 million m^3 of particle board, share of the Russian part of the Barents Region in the production being 13 % of the Russian particle boards. One of the largest producers of particle boards in Russia is the Syktyvkar Plywood Mill in the Republic of Komi. During recent years, the production of particle boards has been increasing. Almost all the Russian particle boards are sold in domestic markets.

6.6.2 Pulp and Paper Industry

The Barents Region has an important role in the production of chemical forest industry products in Russia. Northwest Russia is the number one federal district both in the production of pulp and paper as well as in cardboard manufacture, and most of the largest production plants are located in the Barents Region. The Barents Region produces almost half of the produced pulp in Russia, 45% of paper and over one third of all produced cardboard.

Of all the branches of Russian forest industry, pulp and paper industry is the most significant and the most stable, and its share of the monetary value of the gross output of the forest sector is 40%. In 2004 the Russian part of the Barents Region produced 2.9 million tonnes of pulp. Arkhangelsk region was the largest pulp producer in Russia with 2.0 million tonnes, the Republic of Komi came third with 0.5 million tonnes and the Republic of Karelia fifth with 0.4 million tonnes (Table 36). Large pulp mills produce mainly sulphate pulp, whose share of the total volume of production is thus

greater. During past few years companies have invested in modernising the existing production units by introducing, among other things, non-chlorine bleaching technology.

Table 36. Pulp, paper and cardboard production in Russia in 2004.

Region	Pulp 1,000 tonnes	Paper 1,000 tonnes	Cardboard 1,000 tonnes
Russian Federation	5922.4	3 903	2927.1
Barents Region	2933.7	1777.7	977.5
Arkhangelsk region	1973.9	336.8	727
Republic of Karelia	413.5	862.4	54.8
Republic of Komi	546.3	578.5	195.7
Murmansk region	-	-	-

Source: Regiony Rossii 2005

In 2004, Russia produced 6.8 million tonnes of paper and cardboard. The shares of the Barents Region in the total paper and cardboard production in Russia were 45% and 33% respectively. Five of the seven largest paper mills in Russia, as well as two of the largest cardboard plants are located in the Barents Region. The largest paper producers in the Barents Region are Kondopoga pulp and paper mill, Mondi Business Paper Syktyvkar and Kotlas pulp and paper mill, whereas the largest cardboard producers are Arkhangelsk and Kotlas pulp and paper mills. Since the late 1990's, the volumes of both the paper and the cardboard production have increased steadily mainly due to a constant increase in domestic demand. Almost 100% of the production capacity of the plants is in use and increasing the production volume would require significant investments. About a half of the paper and cardboard produced in the Russian part of the Barents Region is exported. On the international market, newsprint is one of the most competitive products of the Russian pulp and paper industry. Similarly to the other branches of forest industry, the focus of paper and cardboard production is in low value-added products.

7 Significance of the Forest Sector in the Barents Region

7.1 Northern Norway

For Norway as a whole, forestry and forest industry represents 0.3% of the gross national product. For northern Norway, forestry is of minor significance. The region has the least forests in the country: although Nordland, Troms and Finnmark constitute a third of the country's land area, their forests contain only 7% of the growing stock volume of Norway's forests. Industrial utilisation of forests is also small-scale. Less than 3% of Norway's harvested timber comes from the three northernmost counties.

The forest land area in northern Norway has been on the increase during the past years, and it is estimated that in the future the forested area will continue to increase on the cost of field land and pastures, mainly due to reduced activity in farming. Also the increase in the growing stock and in annual increment is likely to continue. Reasons for the increase in growing stock and annual increment are the afforestation programmes, which started first in Northern Norway in the late 1960's and 1970's. Most reforestation work will be directed towards regeneration of old planted spruce stands. An increased proportion of the forestry activity will take place in spruce plantations, due to the increased pressure on the labour cost and productivity.

In a Nordic and Barents region perspective there seems to be a development towards an increased size of the players in the processing industry, further marginalizing the forest industry sector in Northern Norway. Major forest industry actors in Finland and Sweden have expanded their sphere of influence, and also Northern Norway could be more attractive in the future. On the other end of the scale, the small scale sawmills, enterprises and specialized forest industry should also have good possibilities to further develop, serving the local spot market and the regional demand.

Public awareness on climate change and international obligations to decrease greenhouse gas emissions has increased the interest on renewable energy sources. As a consequence, the use of wood as a raw material for heat and power generation has increased considerably. Both in the counties of Nordland and Troms the use of wood for energy has increased substantially during the last decade, and the renewable energy sector has also a great future potential. Increases in the amount of biomass or raw material that can be merchantable depend mainly on the efficiency of harvesting technology and organisation of transportation. Research and development projects studying the possibilities of enhanced forest biomass utilization for a diverse energy production have recently been started. The increased focus on the oil and gas resources in the Barents Sea, and the Barents Region as the most important region serving the European energy market in the future, might also bring in multiplier effects to other parts of the energy sector.

In the future a large part of the forested landscapes in northern Norway will be under conservation. Nature based tourism is a major industry already nowadays in Norway and the possibilities to develop it further are good. One of the challenges is to extend the tourist season.

7.2 Northern Sweden

Forestry has played an important role in the development of the northern regions of Sweden. Both Västerbotten and Norrbotten have a long history in wood processing, and the sector is expected to remain as a major source of livelihood also in the future.

It is estimated that in the counties of Västerbotten and Norrbotten the annual harvesting volume will most likely stay at the current level during the next 10-20 years. Later the annual cutting volumes are expected to increase by 10-20%. The reason for the increase is that large areas of currently medium-age forests, mostly of pine, that will reach the age for final cutting. A larger proportion of harvested timber will come from thinnings due to the age class distribution in the northern Swedish forests. In the county of Norrbotten there is a shortage of wood, both sawlogs and pulpwood. The county has been importing a significant amount of wood from Finland and Russian Karelia. Competition in the roundwood market is becoming harder due to the increasing Russian export duties on roundwood, which propably also reduces possibilities to import wood from Finland.

Challenges of the global markets are affecting also the Swedish forest industry and closing down of production units has occurred. However, it is expected that the four large chemical forest industry mills in Västerbotten and Norrbotten will maintain their level of production as they have been doing regular investments into their production capacity. Sawmill industry has been booming during recent times due to the positive development in the construction industry, but changes in the global demand of sawn products and shortage of reasonably priced raw material may bring challenges to the industry.

There is an emerging market for different kinds of wood based biofuels in the counties of Västerbotten and Norrbotten. This will put even more pressure on the timber market and result in more or less increasing prices for the raw material. The winners will be the forest owners, if industry will be able to pay higher prices. One example of the growth in the wood energy sector is the construction of a wood pellet mill in Storuman, in Västerbotten. The mill is owned by a large energy company Skellefteå Kraft.

Particularly Norrbotten has good possibilities to develop its nature based tourism. The varied landscapes from mountains to major rivers are assets for the growing experience and adventure tourism sector. Among others, the highest mountain of Sweden - Kebnekaise - is located in Norrbotten.

7.3 Northern Finland

Forestry and the forest industry will continue to be of considerable importance for the regional economies in Northern Finland also in the future. The importance of the forest sector is particularly high, and is likely to remain high, in the regions of Kainuu and Lapland. However, in the near future forest sector of Northern Finland has to overcome several challenges, which are common for the whole forest sector of Finland, but will have a particularly severe effect on the northern parts of the country due to the high importance of the sector to the local economy.

Maintaining the competitiveness of the region on global markets is a big challenge for the northern regions. Issues related to the profitability of production, prices of raw material and labour as well as shifting of the main markets towards the East have already resulted in a reduction of production capacity in the region. The increasing export duties for Russian roundwood will have a major impact on the industry, and will create a need to intensify domestic wood procurement. In the northernmost Lapland and partly in Kainuu the public pressure towards conservation and multiple use of forests has been high, which has also influenced the public image of forestry. In order to maintain the competitiveness of the region, measures should be taken to ensure better utilisation of the cutting potential, timely execution of silvicultural operations and maintenance of the operational preconditions related to infrastructure and supply of trained workforce. These issues have been

emphasised also in the regional forest programmes and recently updated National Forest Programme. The local disputes between different forms of forest use should be solved in order not to do more damage to the reputation of northern forestry on international markets.

Despite the big challenges, possibilities of the forest sector are also good. According to the recent calculations, the volume and annual growth of the forests of the Northern Finland are on the increase. Increase of the annual growth is mainly due to the growing area of young forests, which creates a considerable cutting potential in thinning stands in the future. The growing cutting potential and need for silvicultural operations create also possibilities for energy wood production, which is one of the most rapidly developing sectors in forestry in the near future.

Nature based tourism has good opportunities to develop especially in Lapland but also in the Kainuu region. Currently in Finnish Lapland tourism employs 7.5% of all the employed, which is almost double the country average.

7.4 Russian Part of the Barents Region

Forestry has been an important part of the local economy in the Russian part of the Barents Region, and also in the future its significance is expected to remain high. After the collapse of the Soviet Union many of the production units in forestry were left to deteriorate for several years during the first years of the reform process. However, currently forest industry is experiencing a turnaround with several new investments into production capacity and machinery in existing production plants as well as construction of completely new mills. Many of the production plants need, however, complete reconstruction, thus forest industry sector will still need massive investments before it will reach the western standards.

Despite the new investments, the forest cluster of the Russian part of the Barents Region occupies an important position still only in products with low value added. In many places the machinery and equipment are outdated and productivity is low. Also export of roundwood has been a major source of income for several companies. In order to increase the domestic wood processing, the Russian government has taken action by increasing export duties of roundwood as well as by issuing reductions in forest lease prices and exemptions from forest auctions for large scale investments. These measures are hoped to attract more foreign investors into Russian market.

According to the Federal Forest Agency and bank “Vneshtorgbank” analysis “Development Scenarios of the Russian Forest Sector until 2015”, forest harvestings could increase 60% and the amount of investments could be as much as 50 times higher than today, providing that the forest industry continues its strong development. One of the goals is to increase the domestic production so that export of roundwood would end and all the timber would be processed in Russia. Export of wooden products would amount to 15 billion dollars annually and at the same time the import of wooden products should be reduced from 2.3 billion dollars to 1.4 billion dollars.

Expectations for positive development in the forest industry in Russia are currently high. However, there are certain obstacles that should be overcome in order to achieve the goals set. Lack of stable forest policy results in poor realisation of the annual allowable cuts and uneven distribution of forest resources and wood processing capacity. Important issue is also the intensification of silvicultural operations. Intensification of wood harvesting can be detrimental to the quality of forests, if more resources and attention are not allocated in silviculture. Already now the annual allowable cut of coniferous forests has decreased by more than 20% in Northwest Russia between years 1988 and 2005, which tells about the need to improve the level of forest regeneration, management of young

stands and thinning. Currently 10% of the area treated with clear cuts in the northern parts of Northwest Russia has been left to regenerate without any regeneration measures. The third important question is the development of infrastructure, particularly the transportation network. Insufficient road and railroad networks increase the transportation costs and on the other hand can cause deficiency of raw material all year round.

While improving the efficiency of Russian forest industry also the issues of social sustainability should be considered. Big production plants have traditionally been significant employers in Russia. A typical mill dating from Soviet times offers work for a large number of people, because of the large share of manual labour in different work stages. Large mills have also supported local communities, for example, with issues related to social welfare i.e. health care or day care services. Transforming of the old mills to efficiently-run plants with high productivity may have severe social consequences. Number of employees is likely to reduce into a fraction from the past and companies are trying to be exempted from the additional social duties, which actually should belong to the state, regional or local authorities. The social situation is particularly difficult in former state harvesting companies located in remote regions, where other possibilities for employment are very limited. Change from tree-length method into fully mechanised cut-to-length method is radically reducing the need for workforce in wood harvesting.

7.5 Barents Region

7.5.1 Forest Resources

Forest area of the Barents region is about 87 million hectares, growing stock approximately 8 billion m^3, and annual fellings nearly 48 million m^3 (Table 37). Forest resources of the region are substantial: compared to the European Union, forest resources of the Region equal about 60% of all the forest resources of the EU (Figure 4). About 80% of the forest area and growing stock volume are in the Russian part of the Region. Intensity of forest utilisation is much lower in Russian and Norwegian parts of the Region than in Finland and Sweden. Share of Finland and Sweden in forest resources and fellings varies between 8-10% and 24-26%, respectively. Share of Norway is 3% of the forest resources and 0.3% of all the fellings in the Barents Region.

Table 37. Barents Region forestry in figures.

	Norway	Sweden	Finland	Russia	Total
Forest area, 1000 ha	2 761	6 797	9 043	68 457	87 058
Growing stock, million m^3	45	628	618	6 665	7 955
Increment, million m^3/yr	1.4	18.8	26.7	74	120.9
Fellings, million m^3/yr	0.18	12.5	11.7	23.5	47.9

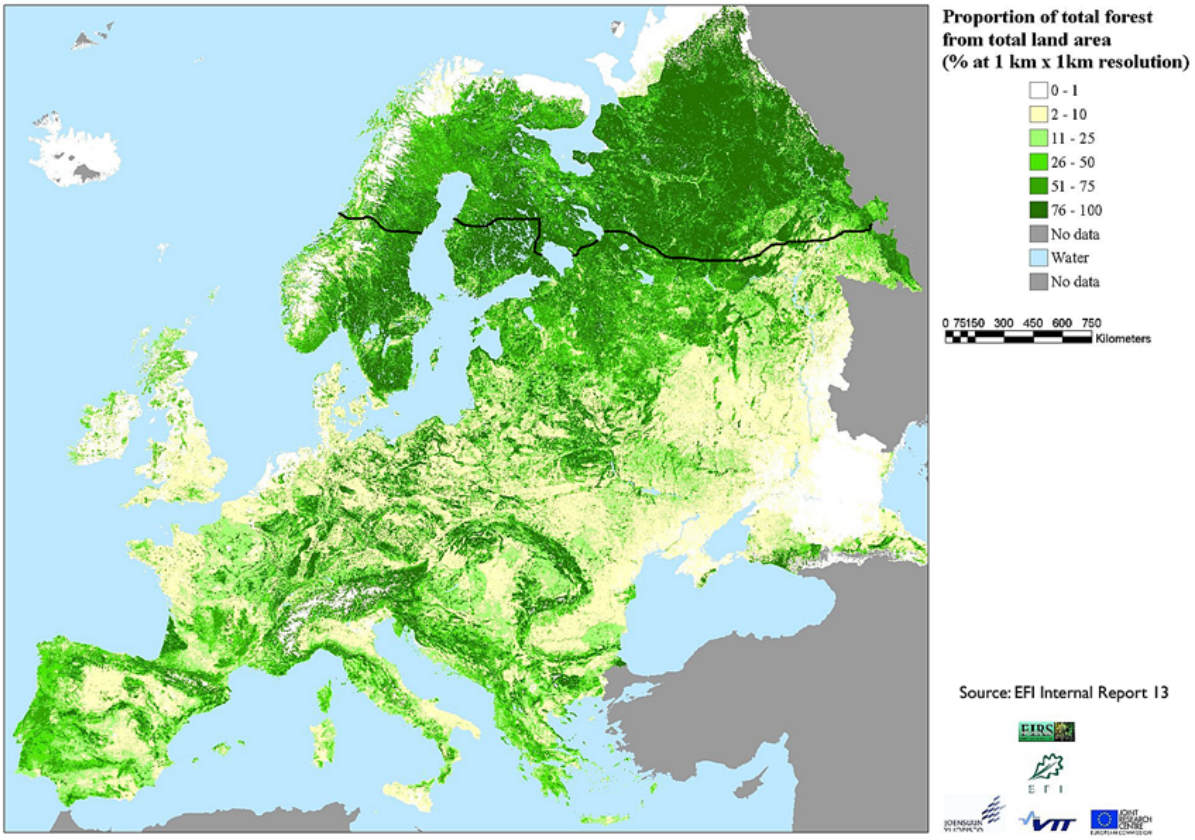

Figure 4. Forest map of Europe illustrating the forest area per square kilometre. The map demonstrates that substantial share of the forest resources are in the Barents region. (Source: www.efi.int/projects/euromap)

A small number of tree species is typical for the northern areas. In general, the most common tree species in the Barents Region is spruce. It composes 48% of the growing stock volume of the Region. However, when looking separately at each country, pine is dominating in Sweden and Finland. Particularly in Finland it is the most common species, forming 63% of the growing stock volume. Downy birch is characteristic of the northernmost parts of the Barents Region.

Common feature for the whole Barents Region is the large amount of preserved territory. In Sweden, Finland and Northwest Russia from all the protected territories a significant part is located in the Barents Region. In Finland the share is as large as 95% from all protected area. In Norway, conservation areas are more evenly distributed from north to south, but also there almost 30% of all protected territory is located in the Barents Region.

One reason for the large share of protected forests in the Barents Region is in the structure of forest ownership. In Russia all forests are state-owned, while private ownership is a common form of ownership in all other Barents Region countries. However, in the northern parts of the Nordic countries, state and other public ownership are prevailing. One exception is the northernmost county of Norway - Finnmark. According to the so called Finnmark Act the people of Finnmark own the land jointly through the so called 'Finnmark Estate', the purpose of which is to ensure the interests of local people in decision making.

7.5.2 Forest Industry

Small number of tree species, large forest territories and slowly maturing, high quality wood are the advantages of the northern areas, and create good conditions for economic exploitation of forests. Utilisation of forest resources and the related forms of industry have been natural fields of economic activity also in the Barents Region. Except for northern Norway, forest industry is one of the primary forms of industry in all Barents countries.

Medium-sized and large-scale companies dominate the forest industry of the Barents Region. Some of the largest pulp and paper producers in Europe have production in the northernmost counties of Finland and Sweden. In general, these countries answer for over 60% of the European Union pulp production, one quarter of paper and cardboard production and over 30% of the production of sawn goods. Also Russian part of the Barents Region is a significant producer of forest industry products: the region produces almost half of the produced pulp in Russia, 45% of paper, over one third of all produced cardboard and 17% of sawn timber.

Even though fellings have been less than the increment, Sweden and Finland have been importing roundwood, the share of which has been approximately 10% and 24% of the wood consumption respectively in 2006. Particularly to Finland, Russia has been an important supplier of roundwood - 78% of all the imported roundwood to Finland came from Russia in 2006. Russian government issued a resolution in 2006 to gradually increase export tariffs on roundwood. It is hoped that the decision will attract more foreign investors into Russian forest industry while making the roundwood export unprofitable. Export of roundwood from Russia has decreased and eventually stops, if the export duties will be increased as planned. Industries in Sweden and Finland have started to adapt to this situation by increasing domestic roundwood supply, importing roundwood and pulp from other countries and adjusting processing capacity to the level of available raw material.

Except for Northern Norway where there are presently only one medium sized sawmill and one fibre board plant, forest industry is the back bone of the economies of the Barents Region countries. The annual production of sawn softwood in Northern Sweden is about 2.75 million m^3, in addition to this, according to the latest available company information, region produces 0.17 million tons of market pulp, 1.46 million tons of kraftliner and 0.13 million tons of kraftpaper. In Northern Finland the forest industry is largely based on pulp and paper industry. According to the latest available company information, paper and paperboard production was about 2.6 million tonnes and pulp 2 million tonnes in 2004. In addition there are many large sawmills in the regions of Oulu and Kainuu. Northern Sweden and Finland are also manufacturers of wooden houses. The Russian part of Barents Region is a big producer of pulp, paper and cardboard. In 2004 the Russian part of the Barents Region produced 2.9 million tonnes of pulp, 1.8 million tonnes of paper, 3.7 million m^3 of sawn timber, 0.38 million m^3 of plywood, 0.41 million m^3 of particle boards and 39 million m^2 of fibre board.

7.5.3 Wood Offers Possibilities in the Barents Region

Wood as a renewable resource provides a lot of opportunities in the future for the Barents Region countries as was discussed and concluded at the Barents Forest Forum in Joensuu, 8th November 2007 (www.metla.fi/tapahtumat/2007/barents). The vast and growing forest resources are one of the advantages of the region having also a significant global importance because of their broad expanse, their biodiversity, their role as a carbon store, and their actual and potential influence on international

trade in forest products. Barents Region forests have still some unused potential while in northern Finland, for example, approximately 80% of the annual allowable cut is used, in the Russian part of the Barents Region only 30%. With good planning and management wood harvesting could be increased without exceeding the sustainable limits. The Region has a long tradition in forest industry with a high production capacity. Advantages of the region also include the good quality of raw material, reasonably priced energy and trained workforce.

Despite having all the necessary elements for prosperous development throughout the region, the near future in the forest sector of the Barents Region appears currently twofold. Nordic countries and the Russian part of the Barents Region are having fairly different expectations for development. On one hand, the Nordic countries with high level of technological development and good infrastructure are struggling with productivity problems, on the other hand Russian part of the Barents Region is working to improve the political and physical conditions in forestry, in order to meet the requirements of – in particular foreign – investors.

Cooperation between different stakeholders is needed to develop the Barents Region forestry and forest industry. Good and viable investments do get financing, it is more a question of good planning and implementation. Creative ideas and people are needed as well as support from the authorities. It is crucial that innovations are implemented into practice. The availability of labour force should be improved by creating work opportunities all year round through networking and entrepreneurship. Also image of the sector should be constantly improved.

Increasing wood harvesting and particularly thinnings would create opportunities for bioenergy production, which is one of the future possibilities and also challenges for the Barents Region. Many of the Barents Region counties have seized the opportunity and have developed their own bioenergy strategies for the future. However, attention should be paid to unnecessary competition between forest product industry and energy use of wood, as the value added of forest products is much higher compared to energy.

Renewability of wood should be emphasised when promoting the wood use for different purposes. The use of wood in public construction should be increased. Value for the customer could be based, in addition to conventional products, also or instead on technology or service. Systematic and continuous analysis is needed to evaluate what kinds of products are needed on the market. Availability of energy will have significant impacts in the future, which could be an opportunity for the forest sector, and thus new energy products may become valuable and profitable in addition to current conventional products. State should not build barriers for trade, instead it should ensure the overall preconditions, functioning of basic infrastructure and necessary funding for education and research.

One of the future challenges and also opportunities for the forest sector of the Barents Region is related to the climate change. Due to warming climate, vegetation zones will move northwards, forests will establish themselves in new areas and the species composition will get more varied. Growing forest land area presents new opportunities, but poses also threats as the insect and fire damages are estimated to become more common. Also unstable and extreme weather conditions may cause local destruction as it happened in Sweden in 2005, when 75 million m^3 were wind thrown or damaged by the storm "Gudrun" that hit southern Sweden in the beginning of January. Warmer winters will also make wood harvesting more difficult on wet terrains.

Remoteness from the main markets and long distances make the development of infrastructure extremely important for the northern regions in order to maintain their competitiveness. This

includes roads, railways, inland water canals, harbours and airports, but also telecommunication and other information technology. The infrastructure in Norway, Sweden and Finland is generally of high standard even though maintenance of lower level road network and railway connections requires attention. In Russia, on the other hand, the maintenance and development of infrastructure has been severely neglected during the last decade and will require massive investments in the future. There exits several large infrastructure plans in the Barents Region, such as a new harbour in Murmansk and expanding of the harbour in Kirkenes. Also extensive expansion of the rail network in Russia and better techniques for shifting between different rail gauges have been planned. So called Barents Link initiative aims at a reliable, operative and competitive route of cargo and passenger transport in the Barents Region between EU and the Northwest Russia. These infrastructure developments will have a positive effect also on the forest sector of the region.

There are good opportunities to combine economic, cultural, social and ecological strategies in the forestry sector in the Barents Region. In addition, there are also good possibilities to develop ecologically sound nature and cultural tourism and the use of non-wood forest products, which both create new employment possibilities for the local people.

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