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Towards sustainable and intensive forest management in Northwest Russia

Vladimir Korotkov, Timo Leinonen, Maria Palenova, Andrey Filipchuk and Yury Nesterenko

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Abstract
Northwest Russia is the most important forest industry district producing 34% of the merchantable wood, 32% of the sawn wood, and 64% of the paper in Russia in 2007. The combination of the rich and diverse forest resources, rather developed forest infrastructure, long forest industy history, and geographical location close to Western markets and the major domestic markets of St. Petersburg and Moscow increase its attractiveness both from the economic and ecological point of view. The purpose was therefore to overview the development of forest management and to describe the main tendencies of forest use, regeneration, and nature conservation for Russia in general and the Northwest in particular towards an intensive model of forest management for this area, which would cover the period from just after the collapse of the Soviet Union up to the passage of the new Forest Code in 2007.

In the Northwest, forest use has been rather extensive during the period 1993–2006, on average, about 40% of the allowable annual cut, which applies solely to final felling, was utlized. The actual volume of intermediate felling has been insignificant in comparison to what is needed to increase the quality of stands; in 2005 and 2006, it comprised about a tenth of the area and a third of the volume.

In the area, during the period 1999–2006, almost every fifth hectare of clear felling was left without active forest regeneration measures. This development threatens the sustainability of forest management by reducing the quality of newly forming stands. The age-class structure is skewed due to this and other past forest management. More than half of the total area of coniferous forests is still composed of mature and overmature stands. These types of coniferous stands prevail in the Komi republic, and the Arkhangelsk and Murmansk regions, this is because of the economically limited accessibility and the significantly low-productivity of these forest resources.

Although the forests of Northwest Russia are of great economic importance, the issues of nature conservation and biodiversity in these forests are still highly recognised. In 2002, 28% of the forested area belonged to different forest conservation categories of the International Union for Conservation of Nature (IUCN).

Keywords
Forest code, forest inventory, forest management planning, forest road, forest lease, thinning, forest plan

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Other information

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Preface

Preparation of this work was done within the framework of the project "Intensification of forest management and improvement of wood harvesting in Northwest Russia" (2004–2007), which was a part of the "Russia in flux"-programme financed by the Academy of Finland. Additional support for this project was provided also by the participating Finnish and Russian organizations listed below.

The authors are Dr. Vladimir Korotkov from the Institute of Global Climate and Ecology (Moscow, Russia); Researcher Timo Leinonen, from the Finnish Forest Research Institute (METLA); and Dr. Maria Palenova, Dr. Andrey Filipchuk, and Researcher Yuri Nesterenko from the All-Russian Research Institute of Silviculture and Mechanization of Forestry – *VNIILM* (Pushkino, Russia).

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Moscow and Joensuu, December 2008

1 Introduction

After the collapse of the Soviet Union, forestry in Russia met with several reforms in its administration, normative basis, and practical implementation. This process included several re-organizations of the state forest management, numerous changes in the responsibilities for management of forests between the federal and regional levels, as well as between the state forest administration and forest lessees, while looming over the whole affair was the consistently inadequate state funding for forestry. The result was that the practical implementation of forestry operations was complicated and the number and quality of these operations were reduced. For example, in several regions in Northwest Russia during the period 1998–2004 the annual areas clear-felled exceeded the areas regenerated by 20–30% (Leinonen et al. 2008).

The downturn in forestry was closely connected to the collapse of the forest industry's production and the Russian economy as a whole (see The World Bank 1997, Dudarev et al. 2002, OAO NIPIEIlesprom 2003), as well as the decrease in importance of the forest sector to the national economy compared with other industries (e.g. gas, oil, and metals). In Northwest Russia, in 2006 the production volumes of merchantable wood and sawn timber were still less than half of those for 1990, but pulp and paper production had recovered to almost 90% of the 1990 level; while veneer and paperboard production volumes already exceeded the 1990 levels (Federal'naja služba gosudarstvennoj… 2007). These figures indicate that the forest industry is recovering from the collapse of the past government. Despite this recovery, new investments to the Russian forest industry are still desperately needed, including any from outside Russia.

International interest in Russian forests and the sustainability of forest management has grown due to increased economic, scientific, and other cooperation between Russia and Western countries. During the last few years, the Ministry of Natural Resources of the Russian Federation and the Federal Forestry Agency (*Rosleskhoz*) have increased transparency in forest management and rather openly provided information about recent development in the utilization, regeneration, conservation, and protection of forest resources. For example, the official websites of the Federal Forestry Agency <www.rosleshoz.gov.ru> and its sub-unit for the inventory and evaluation of forests, the Federal State Unitary Enterprise *Roslesinforg* <www.roslesinforg.ru>, publish openly a great amount of information about these organizations including: information on forest resources and their utilization, various documentation, and more. A problem for forestry professionals of Western countries is that many publications on these sites, as well as the existing forest statistics and much of the research literature are mostly only in Russian. A website <www.iiasa.ac.at/Research/FOR/forest_cdrom/> titled "Russian Forests & Forestry" was created by the International Institute for Applied Systems Analysis (IIASA) and is also available partially in English. In addition there is an Internet based service <www.idanmetsatieto.info> about Russian forestry that is maintained by the Finnish Forest Research Institute (METLA); it, however, is only in Finnish and Russian. Some useful publications about forestry in Russia have been published in English (see: The World Bank 1997, Ministry of Natural Resources… 2003, National report… 2003, Karvinen et al. 2006), but these papers do not cover the latest developments, which are often the most interesting. Moreover, the contents of the new Forest Code from 2006 have still been analyzed rather slightly in English research literature.

The purpose of this work was therefore to overview the development of forest management and to describe the main tendencies of forest use, regeneration, and nature conservation for the whole of Russia, but specifically for the Northwest district, during the period just after the collapse of the Soviet Union up to the passage of the new Forest Code. The long perspective gives valuable background information on previous development and provides a starting point from which to evaluate future plans, as well as the influence of the new Forest Code. The approach is descriptive, but also highlights the main issues and current development needs. This study included the forests administered by the Ministry of Natural Resources, which comprise 92% of the total forest land area (Lesnoj fond… 2003). The data used is mainly based on official statistics from the Ministry of Natural Resources and the Federal Forestry Agency.

2 General overview to forest resources in Russia and Northwest Russia

Russia is one of the major forest powers in the world. Almost all the forests of the Russian Federation belong to the boreal coniferous forest zone. As of January 1, 2006, the total area of lands managed for forestry purposes (the national forest fund) and forests that are not included in the forest fund was estimated in the Russian Federation at 1.2 billion ha with the growing stock of 82.3 billion m^3 (Table 1). The Ministry of Natural Resources of the Russian Federation controls 97% of the forest fund area and 93% of the total growing stock (Ministerstvo prirodnyh… 2007a). The proportion of lands covered with forest vegetation amounts to 65% of Russia's terrain.

After the planning system's transformation, main tendencies in Russia's forests and forestry have been the following:

- forest area, growing stock and the percentage of forest lands have increased
- forest area under the valid forest management plan, volume of actual harvest and ratio of harvest size to increment have strongly decreased
- structure of ownership has not changed (Table 1).

Table 1. General information about the forests of the Russian Federation (Lesnoj fond… 1990, Ministerstvo prirodnyh… 2007a).

Parameters	01.01.2006	1988
Forest fund, 1000 ha	1 174 223	1 182 555
Forest lands, 1000 ha	879 380	884 094
Forest area (lands with forest vegetation)*:		
1000 ha	775 274	771 109
percentage of land area	45	45
Growing stock (mill. m^3)**	82 346	81 645
Final felling:		
mill. m^3 overbark	127.6	302.7

Notes:

* Forest area available for timber production (1000 ha): 2006 – 329 146 (42% of lands with forest vegetation); 1988 – 388 453 (50%)

** Growing stock on forest area available for timber production (mill. m^3): 2006 – 39 634 (48% of total growing stock), 1988 – 47 595 (58%) (National report… 2003, Korotkov 2004, www.roslesinforg.ru).

The Northwestern Federal District is rich of forest resources, as 16% of the growing stock of the Russian forests, available for exploitation, is concentrated in this region (Fig. 1). It is also the most important forest industry district producing 34% of merchantable wood, 32% of sawn wood, and 64% of paper in Russia in 2007 (Federal'naja služba… 2008a, Interfax-CNA 2008). This is a lot compared with the Siberian and Far Eastern Federal districts, having more than half of the growing stock, where the corresponding proportions were 39%, 38% and 1%.

The forests of Northwest Russia make more than half of all forests of Europe (Lesnoj fond… 2003). The forest area of the Arkhangelsk region is equal of that of Finland. More than 70% of lands with forest vegetation are concentrated in the Komi Republic and the Arkhangelsk region. The

northern regions, namely the Republic of Komi, Arkhangelsk region, Murmansk region, Republic of Karelia, and Vologda region, are located mainly in the northern and middle-taiga (boreal) zone, which is characterized by rigorous climate and a growing period of 117–140 days (Fig. 2). The northwestern regions, including Leningrad, Pskov, and Novgorod regions, are located in the southern taiga zone and the zone of mixed forests with moderate climate and a growing season of up to 160 days. The annual precipitation varies from 300 mm in the northern taiga to 600 mm in the southern zone (Kaliničenko et al. 1991). The Vologda region and the Komi Republic have the highest percentage of forest lands in the European part of Russia (Appendix 1).

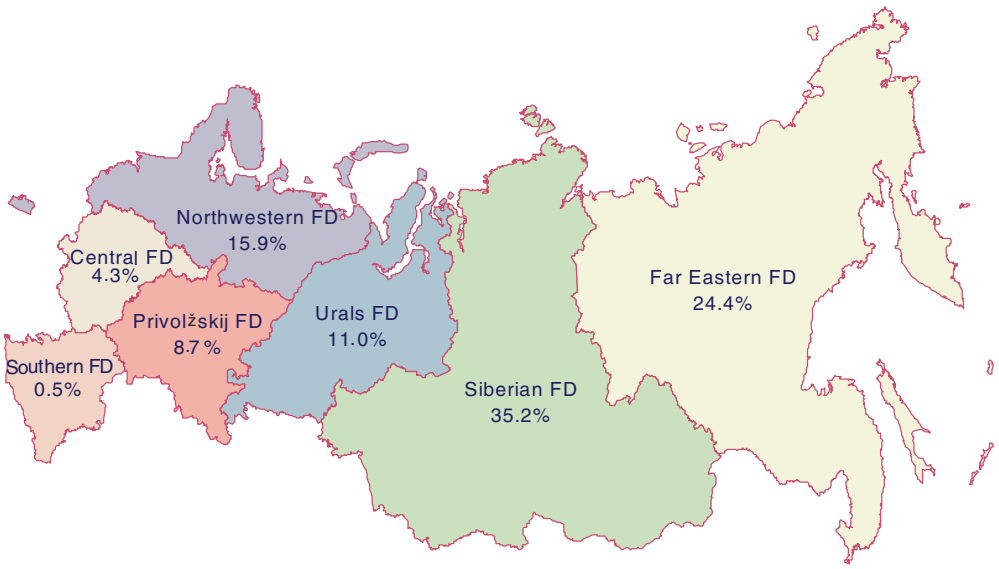


Fig. 1. Distribution of growing stock (%) available for exploitation in federal districts (FD) of the Russian Federation in forests belonging to the Ministry of Natural Resources (Federal'noe agentstvo… 2007).

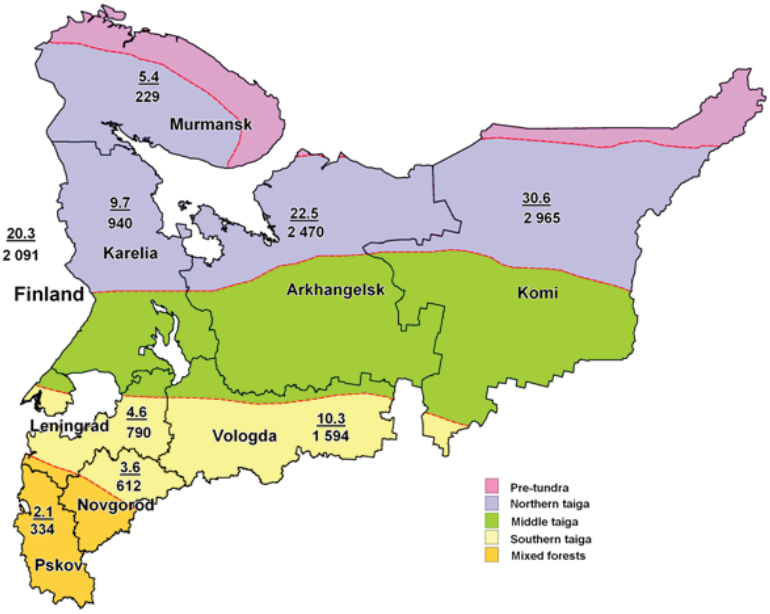


Fig. 2. Zones and sub-zones of forest vegetation and forest resources (numerator – forest land area, mill. ha, denominator – growing stock, mill. m^3) in the Northwestern Federal District and for comparison in Finland (Lesnoj fond… 2003, Finnish Forest Research… 2005).

Traditionally, the forest fund is divided into three management groups in accordance of economic, ecological and social significance of forests, their location and functions. The first management group (Group I) includes forests with water protection, protective, sanitation and health-improving functions comprising 33% of the forest fund in Northwest Russia (Federal'noe agentstvo… 2008c). The second management group (Group II) comprises forests in densely-populated areas with both protective and limited exploitation values where the volume of annual felling may not exceed the annual increment (13%). The majority of the forest fund (54%) belongs to the third group (Group III) including forests in densely-forested areas intended for meeting the timber requirements of the national economy. These forests are divided into exploited and reserved forests. According to the Forest Code § 10, forests on the forest fund lands shall be classified into protection forests, production forests and reserve forests in accordance with their designation. Reserve forests are not intended for timber harvesting within the nearest twenty years.

In the district, the total area of lands with forest vegetation comprises 87.9 million ha with the growing stock of 10.0 billion m^3 and the volume of annual allowable cut 102.4 million m^3. The most important tree species are Norway spruce (*Picea abies* (L.) Karst.), Scots pine (*Pinus sylvestris* L.), birch (*Betula pendula* Roth. and *B. pubescens* Ehrh.) (Fig. 3). Stands with domination of coniferous species prevail in all the regions with the exception of the Novgorod region (Fig. 4). In the Komi republic, about 60% of the coniferous-dominated forests and about 70% of the soft broadleaved forests are possible to exploit. In the Arkhangelsk region, the corresponding shares are about 70% and 80%. The biggest forest-protection categories in the I group forests[1], excluded from exploitation, are pre-tundra forests, restricted forest stripes protecting spawning grounds and forests of national parks and nature reserves.

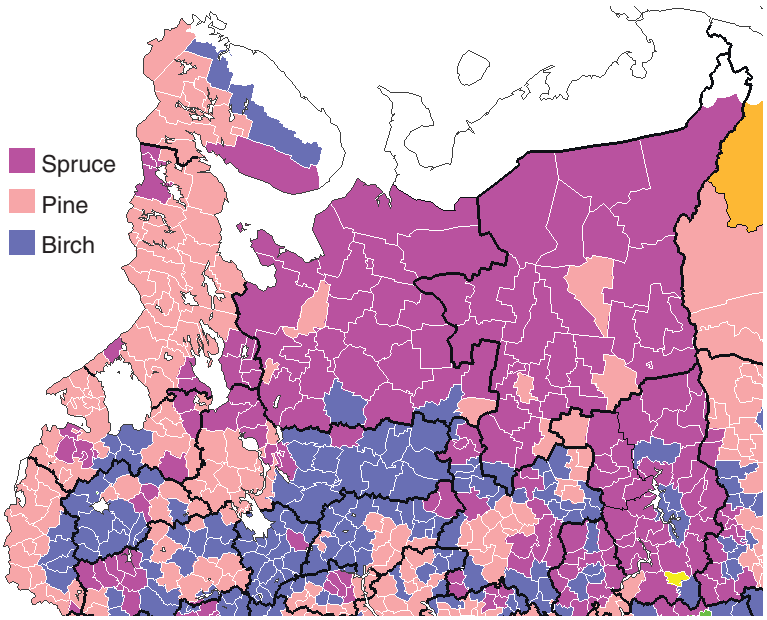


Fig. 3. Dominant tree species in Northwest Russia (Ministerstvo prirodnyh… 2005, with modifications).

1 Include forests whose principal purpose is to perform water protection, protective, sanitation and health-improving functions, as well as forests of specially protected natural areas (Forest Code 1997)

More than half of the total area of coniferous forests is composed of mature and overmature stands (Fig. 5). Mature and overmature coniferous stands prevail in the Komi republic, Arkhangelsk and Murmansk regions, because of difficult economic accessibility of forest resources exists and the significant area of low-productivity forests. About 35% of the total area of soft broadleaved forests are composed of mature and overmature stands. We can see significant share of mature and overmature stands in all the regions of Northwest Russia. This is also connected with low economic accessibility of forest resources.

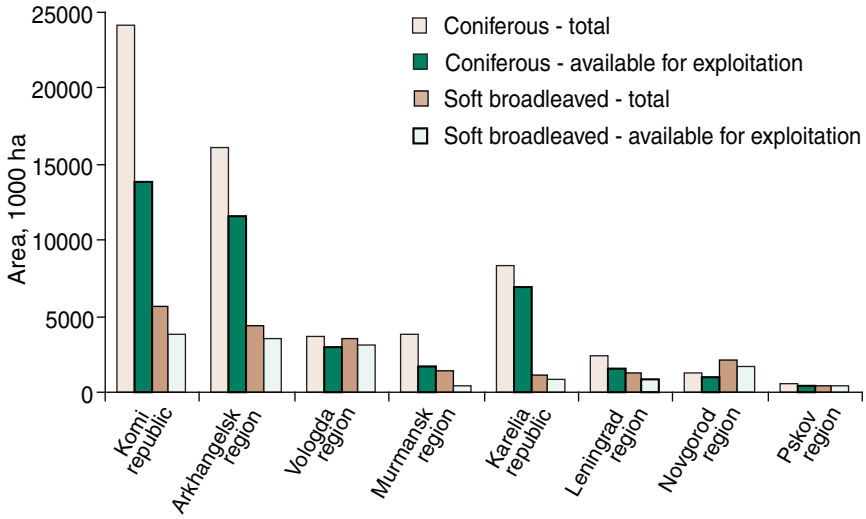


Fig. 4. Area of coniferous and soft broadleaved (birch, aspen, alder) forests in the regions of Northwest Russia (Federal'noe agentstvo… 2007).

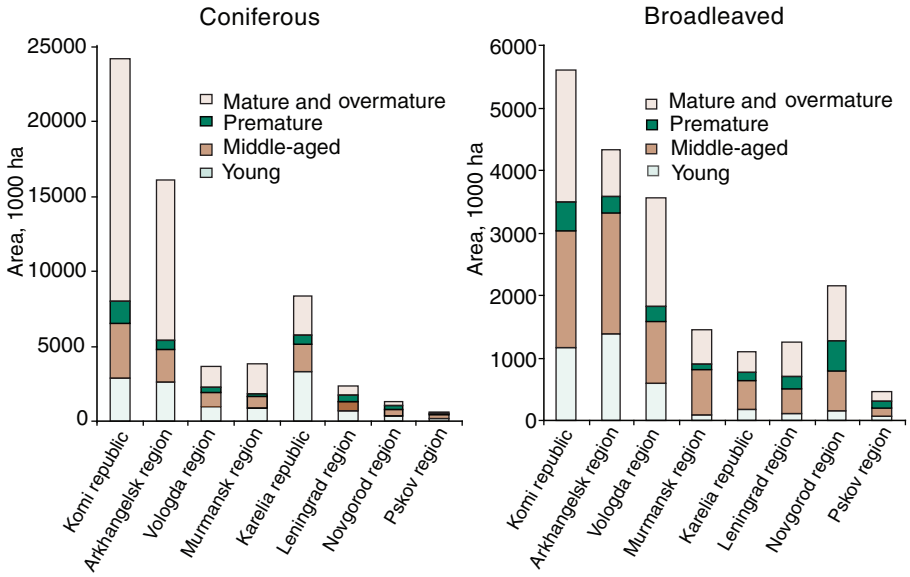


Fig. 5. Forest area of coniferous and soft broadleaved stands by age classes in the regions of Northwest Russia (Federal'noe agentstvo… 2007).

3 Forest inventory and forest management planning

3.1 Structure of forest resource assessment in Russia

At present, the structure of forest resource assessment includes: state forest fund account; state forest cadastre; forest monitoring; forest management and planning; forest pathology and other inspections; inventory of current changes in the forest fund (Fig. 6).

Forest inventory and planning. The state forest inventory consists of activities to examine the status of forests, their quantitative and qualitative characteristics (Lesnoj kodeks… 2006). The Federal Forest Agency sees this as one of its main tasks. The Government of RF approved the act on conducting state forest inventory in June 2007, but till November 2008, the Ministry of Agriculture had not yet approved a corresponding methodological order. Before 2007, the assessment of forest resources was based on a periodic forest fund inventory conducted in accordance with forest inventory and planning procedures (Federal'naja služba… 1995). Each territory must be inventoried every 10–15 years. The actual area of annual forest inventory and planning has been about 30 million ha, which covers 3% of the forest fund area at the most (Potapov 2003). Thus, both the area and the quantity of sites that exceed the inspection period required by the guidelines are accumulating (Fig. 7, 8).

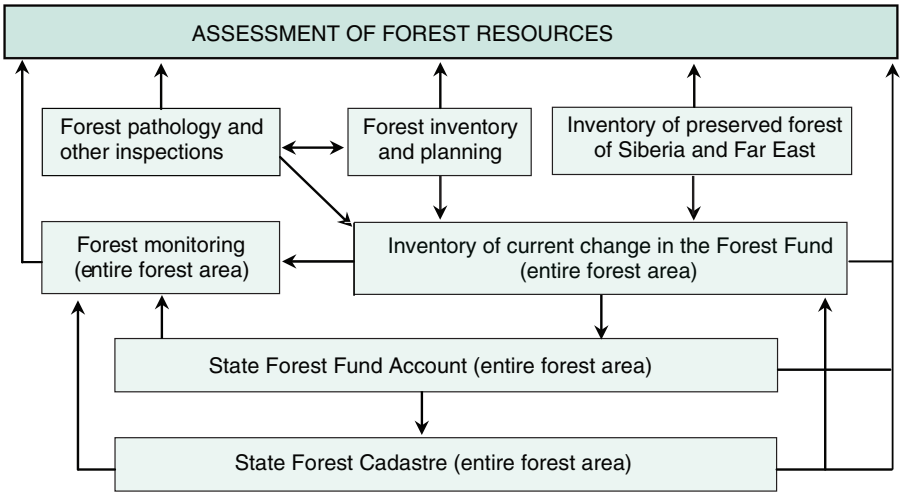


Fig. 6. Structure of forest account (Ministerstvo prirodnyh… 2003).

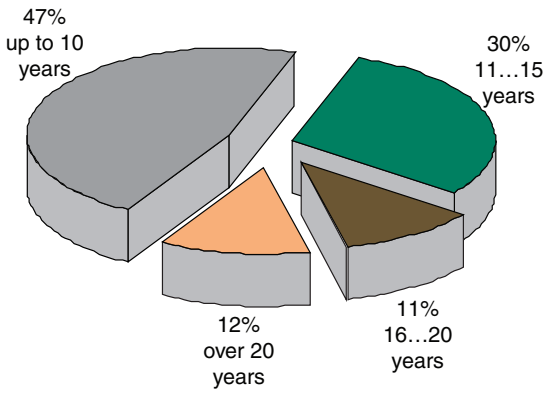


Fig. 7. Inventory periodicity of the forest fund area as of 01.01.2003 (Ministerstvo prirodnyh… 2003).

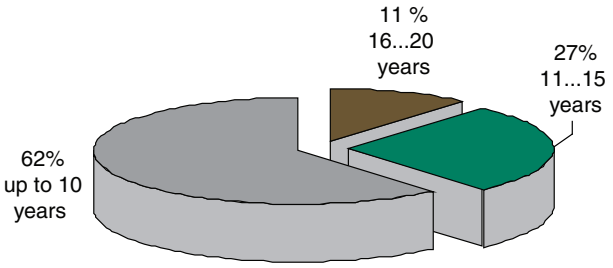


Fig. 8. Inventory periodicity of the forests in Northwest Russia as of 01.01.2003.

In the Northwest region, 38% of the forest area has the interval of forest inventory more than 10 years. The situation in the Leningrad, Novgorod and Pskov regions is better because the forest area with the interval of forest inventory more than 10 years is insignificant. More than 1/3 of forest management units (*leshozes*) had the interval of forest inventory more than 10 years in the Arkhangelsk region, 1/4 of *leshozes* – in the Vologda region.

The traditional and deficient information in forest inventory and planning, conducted every 10 years, will be replaced by annually revised information on the whole forest fund area.

Forest distribution over the land area stipulates specific research methods. The most precise and reliable forest assessment methods are practiced in the regions with intensive forest exploitation. A set of various assessment methods, providing approximate data and preliminary results, are then applied to the rest of the territory.

Forest inventory and planning has been carried on 61% of the forest fund area by aboveground methods, 33% by aerial-visual inspection and remote sensing, while 6% of the area has only data from aerial-visual inspection carried out 40–50 years ago (Fig. 9) (Ministerstvo prirodnyh… 2003, Potapov 2003).

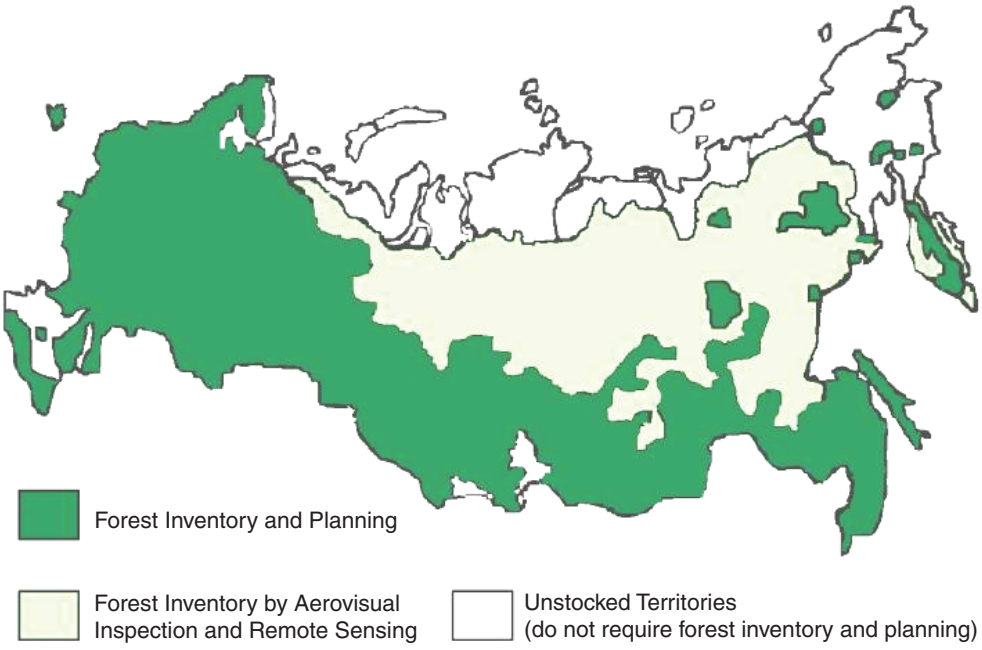


Fig. 9. The extent of exploration of the Russian forests (Ministerstvo prirodnyh… 2003).

At present, basic forest account information is gained from forest inventory and planning. Reliability of the data presented by administrative regions, regions of the Russian Federation and by the federal districts is strongly dependent on the volume and quality of the forest account. Forest inventory and planning is comprised of a system of measures providing for sustainable forest fund use, higher efficiency in management, and common and unified policies in science, technology and research. Forest inventory and planning throughout all the territories of the forest fund is conducted by a federal state unitary enterprise Roslesinforg – Centre for state forest inventory and assessment of forest condition, having 11 regional centres around Russia. Three of them, namely Northern (city of Vologda), Karelian (Petrozavodsk) and Northwestern (Saint Petersburg) are located in Northwest Russia. They follow common and unified rules and approaches, which are established by the federal forest management body. The following parameters are taken into account in the inventory and planning operations: species composition, age distribution, health and condition, other quality and quantity indices.

The traditional full cycle of forest inventory and planning works is carried out during three years (Potapov 2003):

- First year – Development of regulation for organizing and directing forest management of a subject of the Russian Federation; aerial photography and first workings
- Second year – Image interpretation (borders of forest sites); field works (description of stands)
- Third year – Data processing; stand descriptions (database) and forest maps (GIS); forest management plan; explanatory note to the project of organizing and directing forest management; state forest fund account.

3.2 Forest management planning

The Constitution of the Russian Federation, as well as the Civil and Forest Codes of the Russian Federation regulate the ownership of forest resources. According to the forest legislation, the forest fund area and the land under the Ministry of Defense are under the Federal ownership. The federal law allows transferring the forest fund sites to the ownership of the subjects of the Russian Federation. Both the civil legislation and the Forest Code of the Russian Federation guarantee the right for free access to forests for all the citizens of the Russian Federation. Forest fund sites are allowed to be leased, gratuitously used, short-term used and granted in concessions. Individuals and organizations are allowed to practice any of the above-mentioned approaches.

The major principles of forest management are defined in the new Forest Code of the Russian Federation (Lesnoj kodeks… 2006) and in the number of other legal documents. Presently, these principles are designed for:

1. Sustainable forest management, conservation of biological diversity in forests, and enhancement of their potential;
2. Maintenance of habitat-forming, water-conservation, protection, sanitation, recreation and other beneficial functions of forests, to ensure that each person could exercise the right for a healthy environment;
3. Use of forests with due regard to their global environmental significance, as well as taking into account the length of their cultivation and other natural properties;
4. Multiple-purpose, sound, continuous, non-depleting use of forests to satisfy society's needs for forests and forest resources;

5. Renewal of forests, improvement of their quality and yield;
6. Ensured protection of forests;
7. Participation of citizens and civil society associations in decision-making which may affect forests when they are used, protected and renewed, with procedures for and forms of participation to be compliant with the legislation of the Russian Federation;
8. Forest use by methods, which are not detrimental to the environment and human health;
9. Division of forests according to their purpose and establishment of categories of protection forests depending on beneficial functions they perform;
10. Inadmissibility of forest use by public authorities and local self-governance bodies;
11. Payment for forest use.

Rules of forest management are defined by the legislative documents: "Rules of forest logging", "Rules of intermediate felling" and other. Before the new Forest Code, the description of a traditional system on forest management was based on the following legislative documents approved by the orders of the State Forest Service of Russia: "Basic regulation of final felling in the forests of the Russian Federation" (1993); "Basic regulation of intermediate felling in the forests of the Russian Federation" (1993); "Basic regulation of forest regeneration and afforestation in the forest fund of the Russian Federation" (1993), regional rules on final felling; regional instructions for intermediate felling; regional instructions for forest regeneration and afforestation and others. In general, the forest legislation allows performing sustainable forest management and guarantees forest preservation.

According to the Forest Code (2006), forest management and forest harvesting are forbidden without management planning. Any economic activities in forests should be carried out according to recommendations of forest management planning.

Before the new Forest Code, the major principles were defined in the "Instructions for execution of forest inventory and management planning in the forest fund of Russia" (Federal'naja služba… 1995). The Government of RF approved the act on rules of conducting forest management planning in June 2007, but till November 2008, the Ministry of Agriculture had not yet approved corresponding detailed instructions for forest management planning.

By its status forest management planning was regarded as a medium-term (up to 10–15 years) program of sustainable use and management of forests and forestry activities which has been historically developed at the local level (forest management unit – *leshoz*, forest district – *lesničestvo*) within the common set of programs of the entire federal vertical system of forest management including federal, regional and local levels.

According to the Forest Code (2006) § 86, tasks of forest organization also include the development of regional plans of use and reproduction of forest resources (*lesnoj plan sub"ekta Rossijskoj Federacii*). Regional plans are targeted at identification of the main strategic directions of forest use and forestry activities in these forests in the long-run taking into account the entire complex of natural resources and factors of development of national economy of each entity of the Russian Federation, called a subject (*oblast', kraj, republic*). The regional plan is prepared for the period up to ten years. These plans determine lands transformation in the total balance of the territory, targeted designation of forests, prospects of their use, reconstruction of low-productive forests and protective forest cultivation, promising forms of forest management organization, age of maturity and volumes of cutting, measures to balance demand for and supply of main resources

and services provided by forests and evaluation of their impact taking into account the entire set of requirements (economic, social, ecological, cultural). A forest plan is prepared by the public authorities of the subject (usually, they hire an expert organization for preparation on the base of a tender). The prepared draft plan is then submitted to the Ministry of Agriculture for approval. In the case of the positive decision, the draft plan is finally accepted by the head of the highest executive body of the subject of the Russian Federation. By the end of 2008, practically all subjects of the Russian Federation had the approved forest plan.

Taking into account the strategic plans of forest organization (*lesnoj plan*) justified at the regional level, forest management regulations (*lesohozjajstvennyj reklament*) are developed focusing on optimization of development and organization of continuous, inexhaustible use, protection and renewal of forests for the entire set of forest resources and services regarding to their demand and supply and specific economic conditions within each forest district (*lesničestvo*) and forest park (*lesopark*). This document determinates:

- Types of forest use permitted;
- Ages of cutting, allowable annual cut, terms and other parameters of forest use;
- Restrictions for forest use and cutting;
- Requirements for conservation, protection and renewal of forests.

Forest management regulations are, as forest plans, prepared by expert organizations (e.g. regional centres of Roslesinforg, OAO Rosgiproles Institute) and approved by the public authorities of the subjects of the Russian Federation.

Moreover, persons who have forest parcels for permanent use (use for indefinite periods) or on a lease basis will produce forest development plans (*proekt osvoenija lesov*). This plan is obligatory and includes information about allowed forms and planned volumes of forest use, measures on conservation, protection and reproduction of forests, establishment of infrastructure facilities for forest and forest-processing industries, and activities to protect and use wildlife and water bodies (Ministerstvo prirodnyh… 2007b).

Based on a forest lease agreement and a forest development plan, a forest user should present for an authorized authority a forest declaration (*lesnaja deklaracija*) which includes information about all types of forest use and their volume in a forest parcel during a declared calendar year (Ministerstvo prirodnyh… 2007c). This document should be submitted one month before the beginning of the declared calendar year.

Principles of forest inventory and management planning have not changed cardinally during 1980–2006. However, in 1990s, financing reduced, and the extents of management planning strongly decreased. In 2000s, the annual area of management planning works again increased. In 2000, the area of management planning works achieved 18 million ha, in 2003 – 32 million ha vis-à-vis the planned 43 million ha, and in 2006 – 62 million ha (Ministerstvo prirodnyh… 2007a).

According to expert estimates, the quality of forest planning and inventory has decreased in the last 10–15 years. For example, the growing stock is underestimated by 10–30%.

The new program of forest inventory and management planning was developed for the period 2003–2010. The aims of the program are:

- Annual average area of forest inventory and planning – 47 million ha;
- Annual average area of inventory of reserved forests in Siberia and Far East – 19 million ha;
- Inventory of forests of natural reserves (7 million ha) and national parks (6.8 million ha);
- New inventory of forests investigated by aerial-visual inspection in 1950s (50 million ha).

According to the widely accepted program "Introduction of GIS Technologies into the Forest Sector during the Period of 1999-2005", the GIS system has to be introduced in 68 subjects of the Russian Federation (Ministerstvo prirodnyh… 2003). Introduction of the GIS technologies is planned in 1427 *leshozes*. New results of forest management and planning operations are submitted in the electronic format in GIS. Thus, a considerable amount of maps and other information on forest resources are available for further processing and analysis using modern information technologies. The quality and accuracy of forest maps increase after using GIS- technologies in forest management planning (Starostenko 2000). Various GIS-software are used in forest management planning, such as MapInfo, Topol, WinGis, ArcView and another. Using GIS in management planning allow:

- Browsing and viewing attributive and spatial data in tables and map form;
- Filtering data with user-defined criterion;
- Updating maps and databases on alterations during forest exploitation or natural calamity;
- Other data manipulation outside possibility of the GIS;
- Creating and supplying digital forest maps for Stratum level forest maps;
- Creating and supplying databases with information about Russian forest fund;
- Data analysis and calculating derivative information about forest fund and forestry practice;
- Calculating the allowable forest exploitation for a forestry enterprise and for parcels, which may be transferred to leasing or concession;
- Selecting forest sub compartments with defined parameters for a forest fund leasing in the Russian Federation.

Components of forest management planning

a) Types of detailed plans

According to the instructions (Federal'naja služba… 1995), forest management planning is based on the approved standards contained in the "Programme of explanatory note to the project of organizing and directing forest management (1995)". The programme introduces few sections:

- Short description of the area;
- Description of forest resources (inventory of forest fund with assessment of tree species composition and age structure of stands, their state, qualitative and quantitative characteristics of forest resources, inventory of secondary forest resources);
- Analysis of forestry and other activities (execution of previous forest management plan, parameters of economic activities, abidance by rules for forest harvesting provided by the State Forest Service of the Russian Federation, intermediate felling, regeneration actions);
- Calculation of forest exploitation standards and planning of forest management activities

(calculation of volume of annual allowable cut, and volume of intermediate fellings, definition of necessary volumes of natural and artificial forest regeneration, forest fire management, pest control) for the period of 10–15 years.

Forest management planning includes the following types of plans containing optimal decisions on queue of implementation and allocation of forest management activities:

- Final felling;
- Intermediate felling;
- Forest regeneration measures (artificial, assisted natural regeneration);
- Measures for fire prevention;
- Bio-technical measures;
- Land improvement for recreation purposes;
- Management plan for secondary forest use (optional).

Forest management planning may also include:

- Development of cutting plans for leasing or concession;
- Material-monetary estimation of cutting area;
- Development of the project on organization of final felling and forest management plan for the leasing area.

The instruction guide for forest management and planning contains a suggestion about the necessity of forecasting the forest fund dynamic with regard to the scheduled forest management. The development forecast: characterizes the effectiveness of the forest use and forest management activities planned; allows seeing the effect of these activities on the quantitative and qualitative characteristics of a forest stand; allows the assessment of the sustainability of the forest fund use. The forecast of the forest fund development must be planned (felling rotation included) for the prolonged period. It is impossible to design long-term forecasts of stands' development without the use of modern information technologies, including mathematical modeling, GIS, and the database management system. Currently, an informational complex for the development prognoses of the forest fund is being designed (Chumachenko et al. 2003). Two institutions are responsible for its development, namely the All-Russian Research Institute of Silviculture and Mechanization of Forestry and the Moscow State Forest University.

b) Felling maturity and yield regulation

In Russia, wood logging as the main type of forest exploitation is carried out according to three felling types: final, intermediate and other felling. Ages of final felling are separately set for protection forests and production forests. Age of final felling (age of maturity) is determined according to its environmental, economic and social function, stand productivity and biology of tree species (Filipčuk 2003). Ages of felling for main forest forming species are defined by forest regions (*lesnoj rajon*) in forest plans (*lesnoj plan*) of the subjects of the Russian Federation. Forest regions are defined by natural and climatic conditions and forest vegetation zones, having rather similar conditions for use, conservation, protection and regeneration of forests (Forest Code 15 §). The basic valid optimum ages for final felling are presented in the Table 2.

Based on the Forest Code (2006), new rules of felling (Pravila zagotovki drevesiny 2007), forest tending (Pravila uhoda za lesami 2007) and forest regeneration (Pravila lesovosstanovlenija 2007) were approved in summer 2007. They define general requirements for these operations in all the forest regions of the Russian Federation.

Recently, forest cutting regulations become more rigid from 1980 to 1994, but did not change in new felling rules in 2007 which can be construed as emphasizing the economic profitability of wood harvesting and economic aspects of forest use (Table 3).

Table 2. Ages of final felling (age of maturity) in the middle-taiga region of Northwest Russia (Federal'noe agentstvo… 2008a).

Dominant tree species	Stand quality index (Bonitet)	Age of final felling (age of maturity)	
		production forests	protection forests
Middle-taiga region in the European part of Russian Federatotion*			
Pine, larch, spruce, fir	III and higher	81–100	101–120
	IV and lower	101–120	121–140
Birch, common alder	All	61–70	71–80
Grey alder, aspen	All	41–50	51–60

* Parts of Arkhangelsk, Vologda and Leningrad oblasts, Komi and Karelia republics

Table 3. Parameters of final cutting for plain forests of the European part of Russia according to rules for final felling, 1994 (numerator), 1980 (denominator) (Suhih and Žirin 2003) and in 2008* (numerator, bold) (Pravila zagotovky… 2007).

Parameters of harvest (final) felling	Coniferous forests			Soft deciduous forests		
	Group of forests					
	I	II	III	I	II	III
Width of cutting area, m	50-100 50-150	100-200 100-500	300-500 /**500** 200-1000	100-150 200-300	100-250 200-500	300-500/**500** 500-1000
Area of cutting site, ha	5-10 5-15	10-20 10-50	30-50/**50** 20-200	5-15 5-15	10-25 20-50	30-50/**50** 100-200
Cutting cycle, years	4-8 4-5	4-8 2-4	4-8/**6** 3	2-5 3-5	2-5 2	2-5/**4** 1

* For clear fellings in mature and over-mature forest stands in production forests

c) Aspects of nature conservation and biodiversity in forests

Forest management planning has special characteristics depending on a region and categories of protected forests. According to the legislation, for forest management different restrictions exist for nature-protected forests aimed at the biodiversity conservation and restoration of disturbed ecosystems.

The old division of the forest fund to the forest management groups (I-III) and the new classification of forests into protection forests, production forests and reserve forests define general outlines for use, protection and renewal of protection forests, production forests and reserve forests (Lesnoj kodeks… 2006, § 10, § 102–109). Development of protection forests will be aimed at preserving their habitat forming, protection, sanitation, recreation and other beneficial functions while using them provided that their use is compatible with the designation of protection forests and their beneficial functions (Lesnoj kodeks… 2006, § 12). The following categories of these forests can be identified:

1. Forests within specially protected nature areas (see Chapter 7);
2. Forests within water-conservation zones;
3. Forests which perform functions of protecting nature and other sites, such as sanitary protection zones of potable and technical water supply sources, forest shelter-belts along public railways, public automobile roads, urban forests);
4. High value forests, such as state forest shelter-belts, anti-erosion forests, forests in desert, semi-desert, forest-steppe, forest-tundra zones, steppes and mountains.

Moreover, both in protection and production forests special protection parcels of forests (*ocobo zaščitnye učastki lesa*) may be set aside. These are, among others, riparian conservation and soil-conservation parcels of forests along water bodies, slopes and gullies, forest edges adjacent to forestless areas, parcels of forests with relict and endemic plants, and habitats of rare and endangered wildlife species.

Normative-legal acts of forestry, like the Forest Code, rules of felling, rules of forest tending, regional forest plans and forest management regulations for each forest district and forest park include restrictions for forest use both in protection and production forests to conserve beneficial functions of forests and biological diversity. Especially forest management regulations include detailed information about the location of different categories of protection forests with the accuracy of planning compartments (*kvartal*) and restrictions for their use.

d) Sustainable forest management

Annual allowable cut (AAC) is one of the key instruments to secure multiple-purpose, sound, continuous, non-depleting use of forests on the basis of the adjusted cutting ages, conservation of biodiversity, water conservation, protection and other beneficial functions of forests. The state authorities of the Russian Federation determinate a calculation method for AAC and it is indicated in a forestry management regulation (*lesohozjajstvennyj reglament*) for the territory of every forest district (*lesničestvo*) and forest park (*lesopark*). Moreover, general information about the annual wood harvesting volumes for forest parcels is indicated in forest development plans (*proekt osvoenija lesov*). It is prohibited to exceed the annual allowable cut. AAC is computed for each forest district and forest park separately for production and protection forests by tree species groups (coniferous, hard broadleaved, soft broadleaved) dividing the total volume of allowable annual removal of timber for each tree species group by dominant tree species (Ministerstvo prirodnyh… 2007d). AAC is separately calculated for clear cutting and selective cutting of mature and overmature forest stands, selective cutting of middle-aged, maturing, mature and overmature forest stands in harvesting of dead and damaged stands, for forest tending (excluding saplings of the first age-class) on the basis of the material of forest management planning, state forest ledger (*gosudarstvennyj lesnoj reester*) or special forest surveys.

4 Final felling

Traditionally, the notion "forest use" implies wood harvesting. In final felling, timber is harvested in mature and overmature stands. In Northwest Russia, in practice most final-felling (over 80%) takes the form of clear felling (*splošnaja rubka*). Selective (*vyboročnaja rubka*) and continuous felling (*postepennaja rubka*) is more widely used in the Murmansk and Leningrad regions.

A grounded and reasonable volume of final fellings, which is statistically calculated, is referred to as the Annual Allowable Cut (AAC). In the past years, AAC of Russian forests totalled up to 500 million m^3 (2006 – 571.0 million m^3), including 300 million m^3 for the coniferous category. The ratio of AAC and actualised cut illustrates the status in all branches of the forestry sector. In Russia, only 22% of AAC was actually logged in 2006.

In Northwest Russia, AAC decreased from 95.3 million m^3 in 1988 to 92.2 million m^3 in 2006 (for coniferous category, from 67.5 to 52.0 million m^3) (Fig. 10). It is noteworthy that in the beginning of the 1990s, growing demands for environmental protection and the exhaustion of economically accessible forest resources had resulted to a decrease of AAC, especially for coniferous.

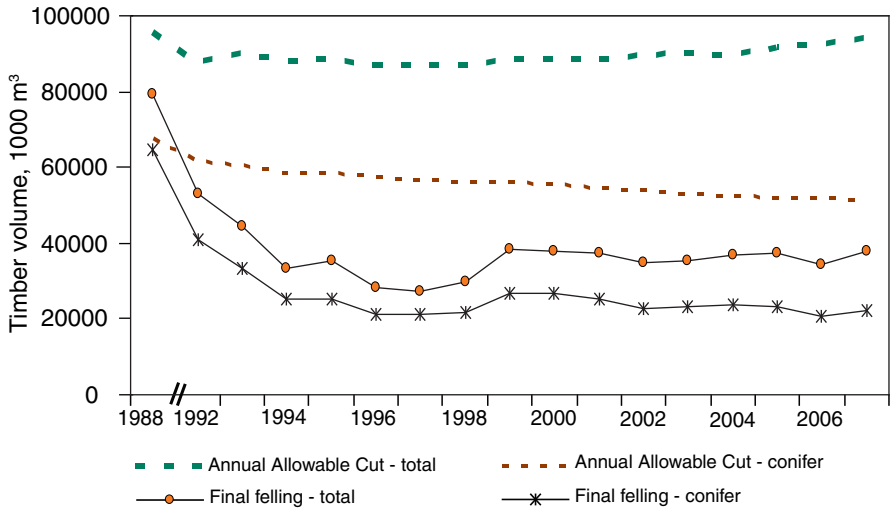


Fig.10. Dynamics of Annual Allowable Cut and the volume of final felling in Northwest Russia in the forests governed by the MNR in 1988, 1992–2007 (Federal'noe agentstvo… 2006; http://www.roslesinforg.ru).

Along with the decrease of forest industry production, Russia is still going through structural reorganization. However, the forest sector has started to move its production facilities to the regions with higher consumption levels and closer location to foreign markets. Thus, based on the economic reasons, the Northwestern part of Russia has been prioritized for forest use and development. The most favourable economic conditions were created in the Karelia Republic and in the Leningrad region, where in 2000s, 50–70% of the AAC was used (Fig. 11). Utilisation of coniferous species was higher than the total AAC meaning that deciduous species were utilised less, especially in the Novgorod and Pskov regions (Fig. 12).

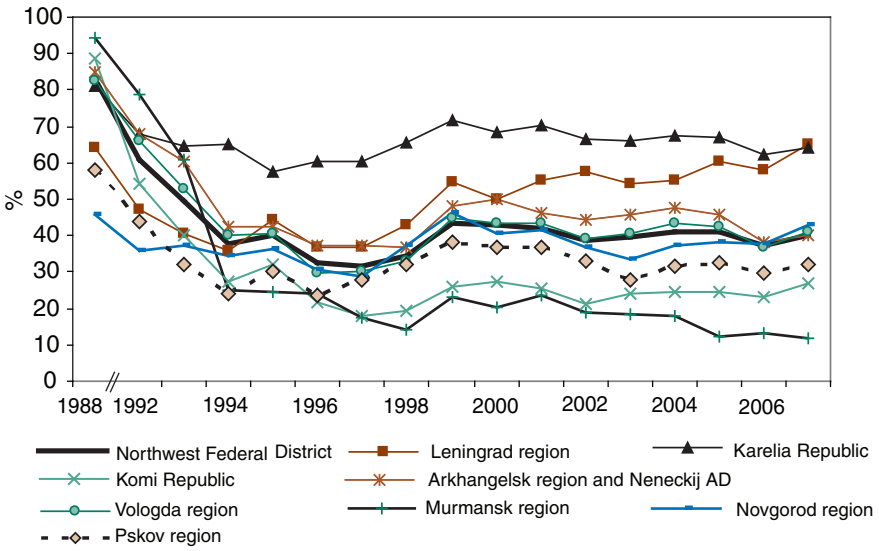


Fig. 11. Utilization of the Annual Allowable Cut in Northwest Russia in 1988,1992–2007 (Federal'noe agentstvo… 2006; http://www.roslesinforg.ru).

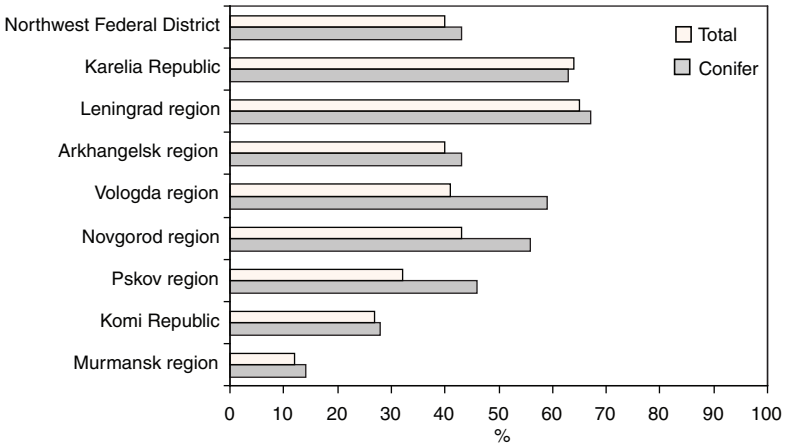


Fig. 12. Utilization of the Annual Allowable Cut in Northwest Russia in 2007 (http://www.roslesinforg.ru).

The significant decrease of violation of felling rules is a positive trend in forest management (Fig. 13). In Northwest Russia, the area of undercuts has reduced to a half and unrefined felling sites by nine times. Moreover, during 1992–2004 the total volume of abandoned timber decreased almost by three-fourths. At the same time, for example, the final-felling volume has decreased by one third. Thus, the relative loss per 1 m3 of timber harvested has decreased as well as damages of undergrowth.

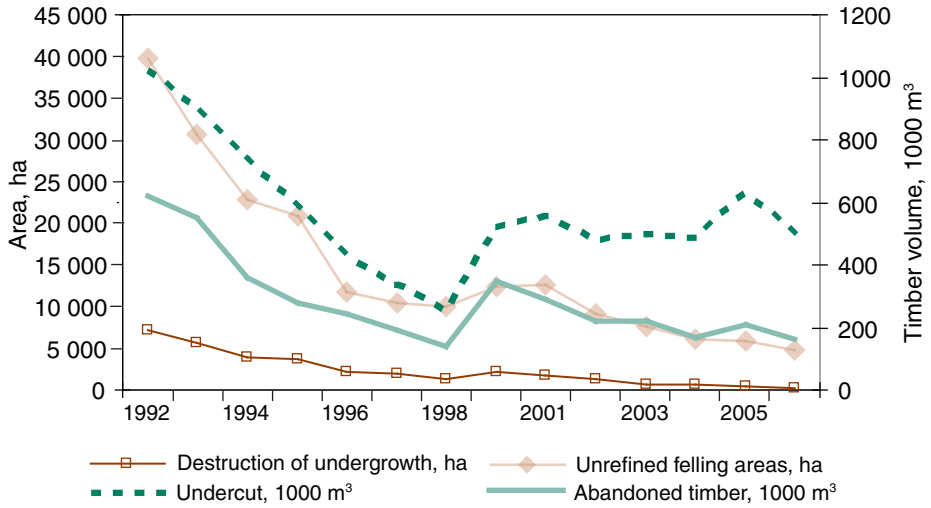


Fig. 13. Violations of rules for forest use in Northwest Russia in 1992–2006 (Federal'noe agentstvo… 2006, Ministerstvo prirodnyh… 2007a).

According the Forest Code, forest lease is the major form of forest use. A lease agreement for a publicly-owned or municipally-owned forest parcel (for 10–49 years) and a sale-purchase contract for forest stands (up to one year) are concluded based on the results of an action. In some regions, where the demand for standing timber exceeds the supply, forest users compete for obtaining forest allotments for lease.

In Northwest Russia, there are nearly 5,000 logging enterprises or organizations, of which 96% are private (Federal'naja služba… 2008b). The most steady and reliable tenants are vertically integrated enterprises having centralized financial flows, market activities and maintenance, and covering the full technological cycle from the felling site to the final product. The largest ones are Arkhangelsk Pulp and Paper Mill, Kotlas Pulp and Paper Mill, Mondi Business Paper Syktyvkar, and Kondopoga Paper Mill. Each of them has a number of logging enterprises. By integrating with logging enterprises, these companies provide raw materials mainly for their own use, thereby having interest in investing into the renovation of logging enterprises. Large owners are increasingly interested about efficient development and maintenance of logging operations.

During the last 10 years, in Northwest Russia both the area and the number of lots of the forest fund leased for wood harvesting, as well as the annual volume of final felling in these lots, have significantly increased. In 2006, about 1.5 thousand allotments were leased, covering the area of 38 million ha and having the annual logging volume of 47 million m^3 (Fig 14, 15). The realized volume comprised 72% of the allowed one reaching the maximum 113% in the Vologda region (Federal'noe agentstvo… 2007). A positive tendency is the increase of stumpage sale in forest auctions since 2002 (Fig. 16).

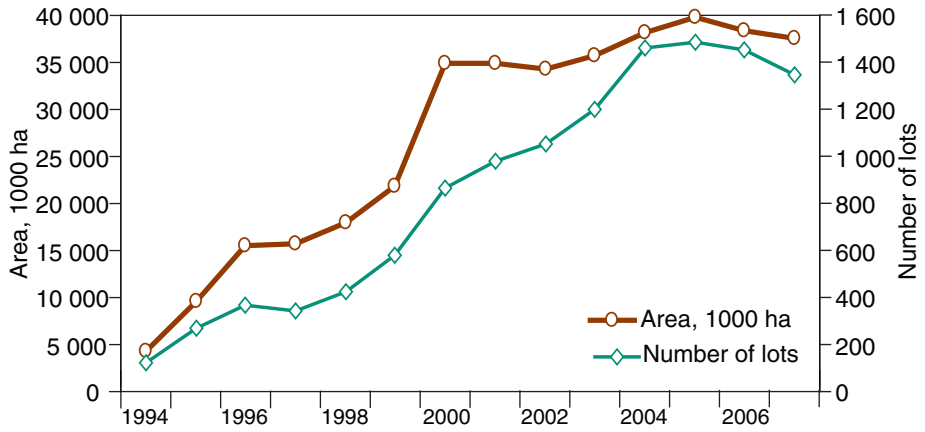


Fig. 14. Area and number of lots of the forest fund leased for wood harvesting in Northwest Russia (Federal'noe agentstvo…2006, Ministerstvo prirodnyh… 2007a).

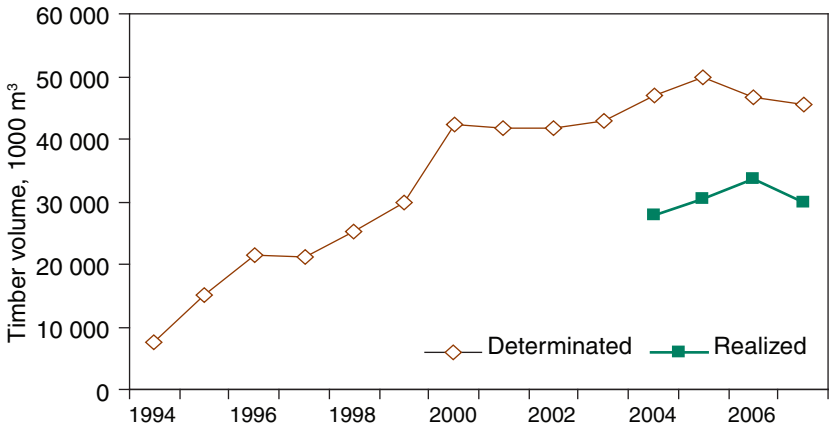
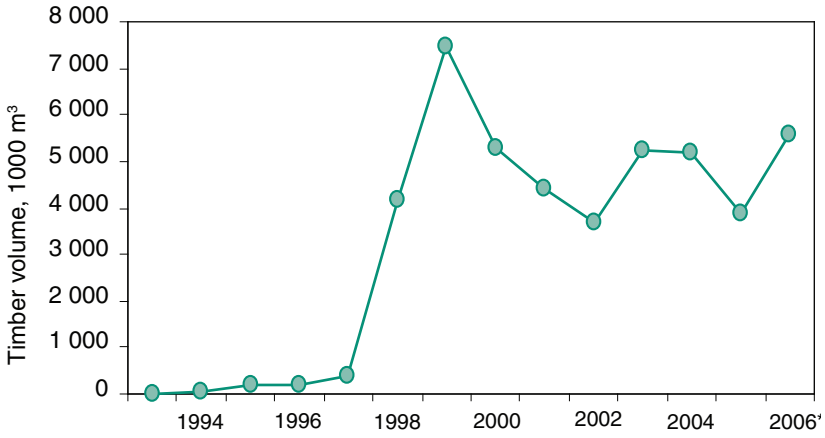


Fig. 15. Determinated and realized annual volume of final felling in the leased lots of the forest fund in Northwest Russia in 1994–2006 (Federal'noe agentstvo… 2006, Federal'noe agentstvo … 2007).



* Estimation based on Ministerstvo prirodnyh… 2007a.

Fig. 16. Stumpage sale of wood in forest auctions in Northwest Russia in 1993–2006 (Federal'noe agentstvo… 2006).

Average prices of coniferous timber on auctions in Northwest Russia rose remarkably after 1998. Then timber-harvesting enterprises were able to increase their cutting volumes, and especially their wood export, due to devaluation of the ruble, increasing prices of timber and other forest products in the world market and more stable functioning of forest industry companies. The increased demand for wood rose the wood prices in auctions, especially for coniferous. From the year 1998 to 2004, the averaged auction price for 1 m^3 of standing coniferous timber increased from 100 rubles to 228 rubles in the Republic of Karelia (Fig. 17), when in Northwest Russia, the average auction price totaled 80 rubles. In the Komi Republic, low demand for wood in the region and long transport distances to other regions and export markets have kept the wood price in auctions rather low and stable.

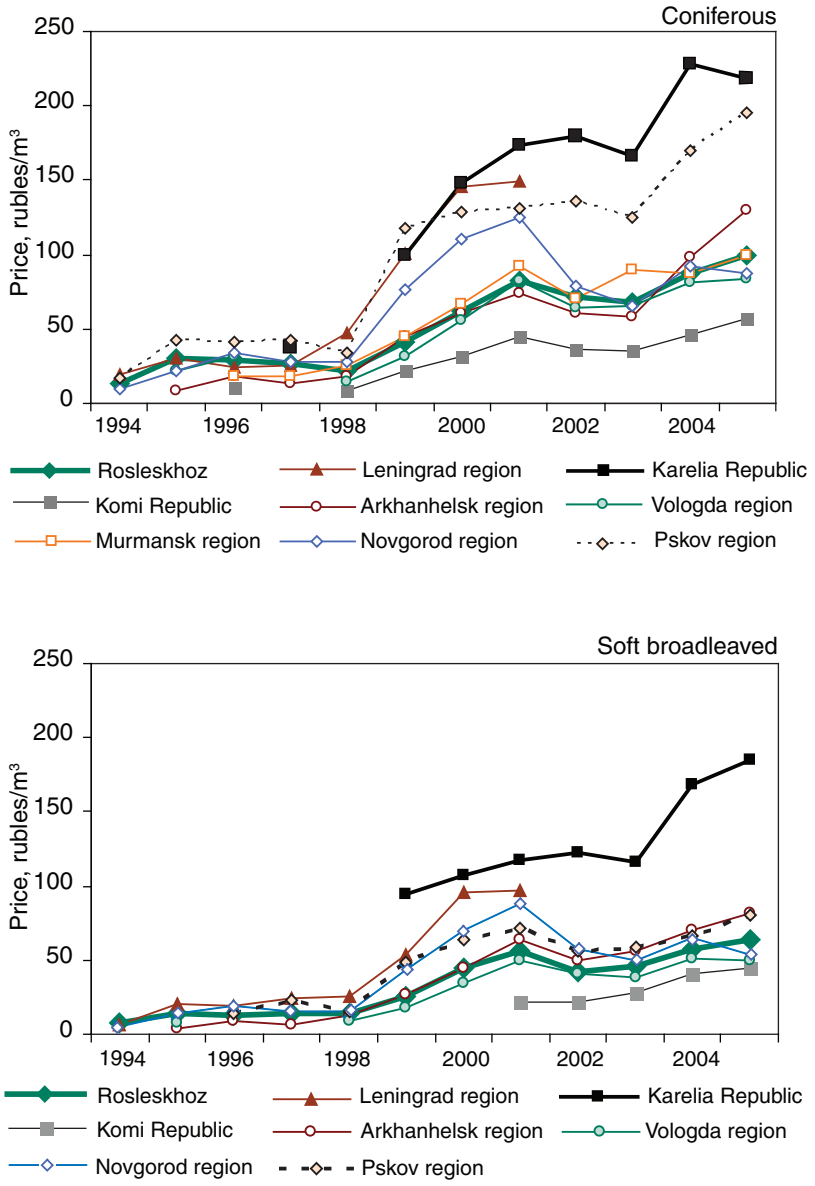


Fig. 17. Average auction prices of 1 m^3 of coniferous and soft broadleaved timber in Northwest Russia in 1994–2005 (Federal'noe agentstvo… 2006).

5 Intermediate felling

Intermediate fellings (*rubki promežutočnogo pol'zovanija*) include thinning, selective sanitary felling (*vyboročnaja sanitarnaja rubka*), renewal (*rubka obnovlenija*) and reconstruction felling (*rubka pereformirovanija*) and other types of felling in low-value stands, as well as removal of shrubs and trees, which are loosing their ability in nature protection.

These different types of felling are conducted to ensure the high productivity of forests, to improve the quality of trees and the sanitary condition of forests. The purpose of sanitary felling is to improve the condition of a stand by removing infected, damaged, dead and perished trees.

Thinning represents a system of selective types of felling in a growing forest stand. Thinning ensures favorable growing conditions for retention trees. Common principles of thinning are very similar to those in Finland. However, in thinning rules there are differences to Finland mainly related to defining the intensity of thinning (relative density vs. basal area), low allowed intensity in tending of sapling stands in one go, and requirements to mark removed trees more than 8 cm of diameter before cutting and to establish experimental plots in sapling and older stands to define the volume of removed trees (Pravila uhoda…2007). These kinds of requirements easily increase harvesting costs and can decrease amounts of these essential operations.

Depending on the age of a stand and the economic purposes of forest growing, thinning is subdivided as follows (Pravila uhoda… 2007):

- Thinning of sapling stands (*osvetlenie*) – early cleaning for improving species composition, quality of a stand and growing conditions of the main tree species.
- Thinning of thickets (*pročistka*) – late cleaning is conducted to regulate the density of forest stands, to improve growing conditions of the main tree species, and to continue the formation of the species and the quality composition of forest stands.
- Thinning in middle-aged stands (*proreživanie*) – thinning is conducted to improve the stem and crown form of trees.
- Thinning in maturing stands (*prohodnaja rubka*) – Late thinning is carried out to provide favorable conditions for the increment of tree growth.

The ages for different kind of thinnings for the European part of the Russian Federation did not change in the new forest tending rules compared to the previous instructions for thinning from the year 1993 (Table 4).

Table 4. Ages for different kind of thinnings for the European part of the Russian Federation (Pravila uhoda… 2007).

Type of thinning	Age of a stand, yrs				
	Coniferous and hard broadleaved		Other tree species		
Thinning of	> 100 yrs	< 100 yrs	> 60 yrs	50-60 yrs	< 50 yrs
Sapling stands	<10	<10	<10	<10	<5
Thickets	11–20	11–20	11–20	11–20	6–10
Middle-aged stands	21–60	21–40	21–40	21–30	11–20
Maturing stands	>60	>40	>40	>30	>20

In Northwest Russia, the actual volume of intermediate felling in comparison with the needed volume is insignificant (Fig. 18); in 2005 and in 2006 it comprised about tenth of the area and third of the volume (Ministerstvo prirodnyh… 2006, 2007a). Especially it is noteworthy the almost total absence of thinnings in middle-aged stands and very small area in maturing stands. Those stands could provide reasonable amounts of wood, economic output and better quality mature stands.

Reasons for small amounts of intermediate fellings have been, among others, concentration to more productive final fellings, inappropriate wood-harvesting technology for thinnings, undeveloped forest-road network and lack of demand for pulpwood in many regions. In Northwest Russia, in 2006 the volume of intermediate fellings made up 3.7 million m^3. It was 11% of timber harvested at the final fellings. In fact, higher volumes could be harvested under the conditions of developed pulpwood markets. The volume of intermediate felling can make up at least half of final fellings volume without breaking the rules of sustainable forest management.

The dynamics of tending of sapling stands in Northwest Russia are reflected on Fig. 19. The actual tending areas in sapling stands have annually been less than half of the planned area (Lesnoj fond 2003, Federal'noe agentstvo… 2006, Ministerstvo prirodnyh… 2007a). Compared with the planned tending areas, in 2005 and 2006 the best actual volumes, in average, was achieved in the Arkhangelsk (100%) and Novgorod regions (84%) and the weakest in the Murmansk region (23%) and the Komi Republic (23%) (Ministerstvo prirodnyh… 2006, 2007a).

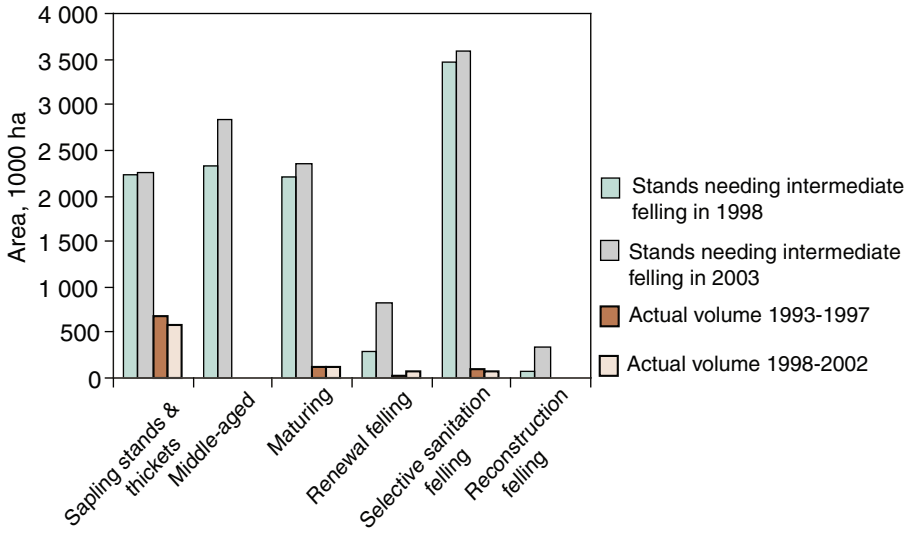


Fig. 18. Target and actual volume of intermediate felling by types in Northwest Russia (Lesnoj fond… 1999, 2003).

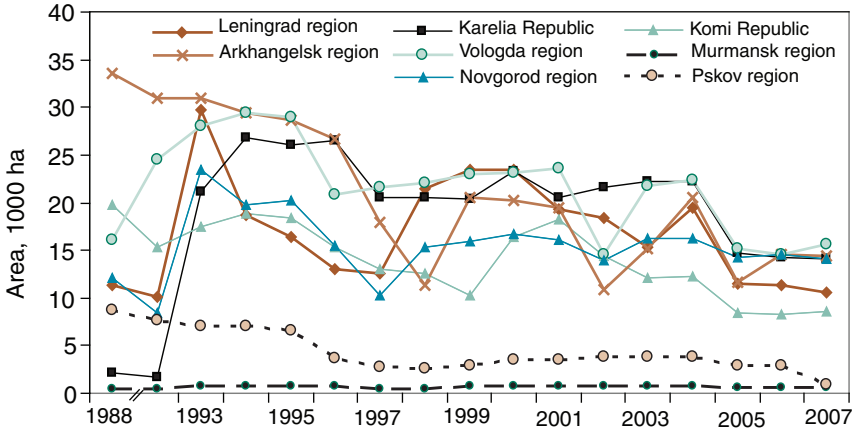


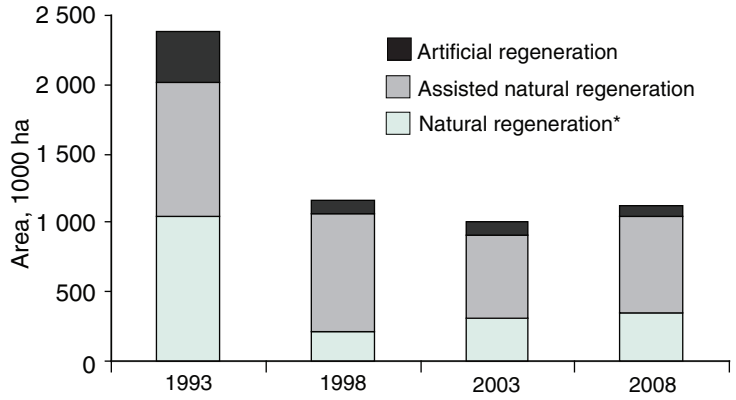
Fig. 19. Area of sapling stand tending in Northwest Russia in 1988, 1992–2007 (Federal'noe agentstvo… 2006, 2008b, Ministerstvo prirodnyh… 2006, 2007a).

6 Forest regeneration

The main goal of forest regeneration is to timely restore economically-valuable stands in the felling sites, burnt areas and dying-off sites, as well as to decrease the land area of the forest fund not covered with forest vegetation.

In Russia, the overwhelming majority of forests are of natural origin, and only 3% of lands covered with forest vegetation are artificially planted. The main regeneration method is assisted natural regeneration. Forest regeneration is closely linked to harvesting. The reduction of harvesting volumes for the last 10 years has decreased clear-felled areas being the main type of forest regeneration sites. According to the state account of the forest fund (Lesnoj fond… 1995, 1999, 2003, Federal'noe agentstvo… 2008c), in Northwest Russia the area of lands without forest vegetation has decreased significantly (Fig. 20). In 2003 and 2008, forest management planning recommended to regenerate 30% of that area by natural regeneration without human intervention, although it is the most inefficient and uncertain method. If forest management is planned to be intensified, the proportion of non-assisted natural regeneration should be minimized, and the proportion of artificial regeneration should be increased in appropriate forest types especially in the southern and middle-taiga zones.

In Russia, the annual forest regeneration area has exceeded the clear-felling area since 1989 (Ministerstvo prirodnyh… 2002, Federal'noe agentstvo… 2006). In Northwest Russia, on the other hand, in 1999–2006 almost every fifth hectare of clear-felling was left without active forest regeneration measures (Fig. 21). This development threatens the sustainability of forest management and worsens the quality of forming stands. According to Pisarenko et al. (1992), in 1966–1989 the ratio between regeneration areas and clear-felling areas averaged 0.84 in Northern and Northwestern regions of Russia. Therefore, the level of forest regeneration has not changed in last 40 years. For that reason, securing on-time and qualified forest regeneration should be highly recognized in forest policy, forest legislation and forest management in practice (Leinonen et al. 2008).



* A method of natural regeneration, in which a cutting area is left for natural regeneration with economically valuable tree species without special or planned measures of assisted natural regeneration. In a cutting area there should be a sufficient number of viable advance growth, or vegetative reproduction of desired tree species is possible and natural seeding is limited.

Fig. 20. Methods of forest regeneration recommended by forest management planning on the lands without forest vegetation in Northwest Russia (Lesnoj fond…1995, 1999, 2003, Federal'noe agentstvo… 2008c).

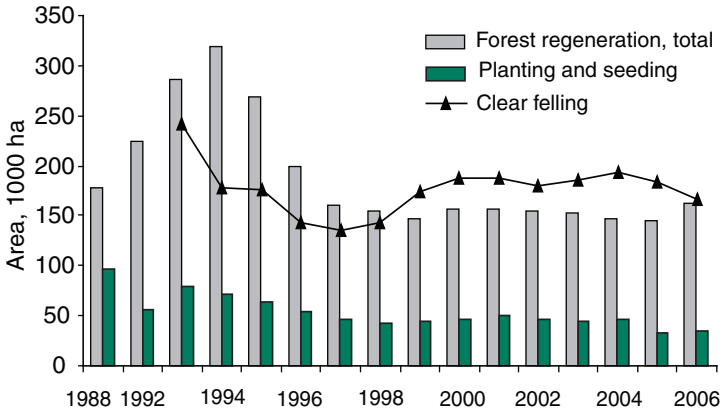


Fig. 21. Realized forest regeneration and clear felling in Northwest Russia in 1988, 1992–2006 (Federal'noe agentstvo… 2006, Ministerstvo prirodnyh… 2007a).

7 Nature protection and biodiversity conservation

A network of specially protected natural areas (*osobo ohranjaemye prirodnye territorii*) plays an important role in conservation of typical and unique natural landscapes, biological diversity, and sites of natural and cultural heritage. According to the Federal law of the Russian Federation "On the Specially Protected Natural Areas" (# 33, dated March 14, 1995), the specially protected natural areas include land plots and water bodies, with the air space above them, within the boundaries of the sites of special value in terms of conservancy and preservation of the environment, science, aesthetics, recreation and health care. These sites are officially excluded from the management regime and are under specific nature protection management. The following categories of specially protected sites are officially in use:

- State nature reserves (*gosudarstvennye prirodnye zapovedniki*), including biosphere reserves;
- National parks (*nacionalnye parki*);
- Nature parks (*prirodnye parki*);
- Wildlife preserves (*zakazniki*);
- Natural monuments (*pamjatniki prirody*);
- Dendrological parks (arboreta) and botanical gardens (*dendrologičeskie parki i botaničeskie sady*);
- Resorts and health-care sites (*kurorty i lečebno-ozdorovitelnye mestnosti*).

Apart from the specially protected areas, the following sites are of due importance and environmental value:

- Protected areas with prohibited final felling
  - Forests of scientific and historical importance
  - Forests for protection of water-supply sources
  - Forests of protection zone of resorts
  - Valuable forests tracts
  - Tundra forests
  - Prohibited belt around spawning places
  - Protected forest plots

- Protected forest areas when final felling is permitted
  - Protected belts along roads
  - Forests of green zones
  - Forests in poorly forested regions
  - Protected belts on shores of reservoirs.

All these play a crucial role in the formation of an ecological framework of a certain region. In Northwest Russia, the proportion of specially protected forest areas is 5.2% of the total forest area, but the proportion of forests in strict nature reserves is insignificant (1.1%). The percentage value of forests on specially protected areas varies from 3.6% in the Republic of Karelia to 10.6% in the Pskov region (Fig. 22, Table 5) (Blagovidov et al. 2002, Janickaja et al. 2003). The Murmansk, region, Komi Republic, Leningrad region, Pskov region, and the Republic of Karelia have significant area of forests for conservancy and preservation of the environment.

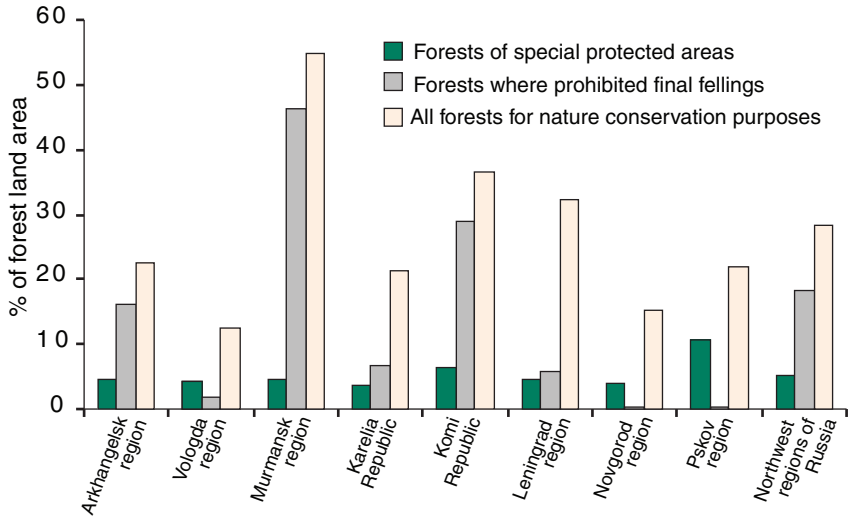


Fig. 22. Proportion of forests for conservation and preservation of the environment (Blagovidov et al. 2002).

Northwest Russia is the region with large areas of intact forests. The total area of intact forest comprises 16.5 million hectares (over 23% of the forest area) (Atlas… 2002, Blagovidov et al. 2002, Identification… 2005) (Appendix II). The intact forest landscapes play a vital role in biodiversity conservation and in maintenance of stable climatic conditions.

IUCN – The World Conservation Union representative office for Russia and CIS countries, together with WWF Russia has generalized data on the areas of nature-protected forests that belong to different categories of IUCN (Blagovidov et al. 2002). Protected forests include stands, growing in the nature protected areas and other stands that belong to the Group I forests. According to the IUCN classification, 28.5% of the land area, covered by forest vegetation, belongs to different forest conservation categories.

According to the IUCN classification, state nature reserves – *zapovedniki* – belong to the Category I of protected lands constituting 1.3% of the total forest area. These are the most strictly protected areas. National parks (*nacionalnye parki*) and nature parks (*prirodnye parki*) (ecosystem conservation and tourism) fall into the Category II (0.8% of the total forest area), Categories III and IV (conservation of natural features and conservation through active management) are represented by the state nature *zakazniks* (wildlife preserves); nature monuments (*pamjatniki prirody*) of federal, regional, and local significance; forests of historical and scientific value, and stands of special value (4.9 % of the total forest area). The Category V (landscape/seascape conservation and recreation) includes state shelterbelt forests and occupies an insignificant area. They fulfil ecological and water protective functions. The Category VI (sustainable use of natural ecosystems) includes most of the Group I forests (15.8% of the total forest area), including sanitary zones of water supply sources, resort areas, buffer zones, ravine forests, fruit stands, nut producing forests, pre-tundra forests, spawning grounds protection forests, forest green belts, pine forest belt, forest stands of sparsely wooded lands, restricted forest areas along the water bodies (Blagovidov et al. 2002).

Table 5. Area of forests for conservation and preservation of the environment, 1000 ha (Blagovidov et al. 2002).

Category of forests	IUCN category of protected areas	Arkhangelsk region	Vologda region	Murmansk region	Karelia Republic	Komi Republic	North region	Leningrad region	Novgorod region	Pskov region	Northwest region	Total for North and Northwest regions of Russia
Forests of strict nature reserves	Ia, Ib	44.922	32.1	171.3	38.9	624.622	911.844	25.215	3.322	4.126	32.663	944.507
Forests of national and nature parks	II	277.9	65.8	0	142.5	961	1447.2	0	132.9	20.7	153.6	1600.8
Forests of other protected areas	III, IV	656.88	319.04	70.15	153.02	375.66	1626.78	195.54	3.15	198.35	397.04	2023.82
Protected forest areas (I-IV)		979.702	416.94	241.45	334.42	1961.282	3985.824	220.755	139.372	223.176	583.303	4569.127
Forests of scientific and historical importance	III	56.9	7	1	0	0	64.9	0.4	0	0	0.4	65.3
Forests for protection of water-supply sources	VI	0	6.1	0	0	0	6.1	7.4	0	0	7.4	13.5
Protected forest zones around resorts	VI	5.1	0	0	5.7	3.1	13.9	6.9	0	5.2	12.1	26
Valuable forests tracts	IV	0	53.3	0	0	745.3	798.6	0.01	0	0	0.01	798.61
Tundra forests	VI	1665.3	0	1858.1	0	5980.1	9671.8	0	0	0	0	9671.8
Prohibited belt around spawning places	VI	1860.3	118.1	578.3	634	1968.5	5181.4	263.3	12.8	0.5	276.6	5458
Protected forest plots	III	0	0	0	2.8	19.8	22.6	0	0	0	0	22.6
Protected forest areas with prohibited final felling		3587.6	184.5	2437.4	642.5	8716.8	15759.3	278.01	12.8	5.7	296.51	16055.81
Protected belt along roads	-	124.9	55	53.1	190.7	162.7	586.4	162.6	52.4	24.4	239.4	825.8
Forests of green zones	VI	185.1	118.3	168.8	161.1	107.5	740.8	613.1	194.5	67.6	875.2	1616
Forest in poorly forested regions	VI	0	0	0	0	0	0	26.2	0	8.6	34.8	34.8
Protected belt on shore of reservoir	VI	198.2	539.6	31.4	859.4	216.4	1845	403.2	187.3	157.5	748	2593
Protected forest areas where final felling is permitted		508.2	712.9	253.3	1211.2	486.6	3172.2	1205.1	434.2	258.1	1897.4	5069.6
Total forest area for nature conservation purposes		4950.6	1259.34	2879.05	1997.42	11001.98	22330.92	1541.265	533.972	462.576	2537.813	24868.74
Total forest area, 1000 ha		22086.1	10028.8	5253.4	9389.5	30051.6	76999.9	4772.5	3491.2	2108.4	10372.1	87372
Proportion of forests for nature conservation purposes, %		22.4	12.6	54.8	21.3	36.6	29.0	32.3	15.3	21.9	24.5	28.5
Proportion of specially protected forest areas, %		4.4	4.2	4.6	3.6	6.5	5.2	4.6	4.0	10.6	5.6	5.2
Proportion of forests with prohibited final fellings, %		16.2	1.8	46.4	6.8	29.0	20.5	5.8	0.4	0.3	2.9	18.4

8 Infrastructure for forestry

In the Russian forestry a significant problem is the insufficient density of forest roads. Russia lags behind many other countries on the extent of roads. The average density of forest roads in Russia is 1.2 km per one thousand hectare. For example, the density of roads in different districts of the Leningrad region makes from 2–3 up to 10 km per one thousand hectare, in Finland – 12.3 km per one thousand hectare on average for the whole country.

The importance of forest roads for the whole development of the forest sector is recognized also in the Government of the Russian Federation. In the development conception of forestry in the Russian Federation 2003–2010, the objective was to build 5,400 kilometres of roads for forestry purposes. In 2003–2006, 2,260 kilometres of forestry roads (42% of planned volume) was built (Koncepcija razvitja… 2007). In some investment programmes, the defined aim for construction of paved forest roads was even 3,000 kilometres annually.

The fact is that during the last 10 years road-building for forestry purposes has decreased significantly (Fig. 23). The main reason for this has been insufficient financing. Mainly *leshozes* have built road on their own funds, and increasingly more also forest lessees. The Federation is ready to co-finance forest road building, in the case subjects and forest users will finance the equal part. This has, however, not happened, as planned due to the absence of precise legislation on definition of financing scheme for forest road construction and the absence of mechanism for consolidation of financing sources of forest users on different forms of ownership (federal, region, private companies).

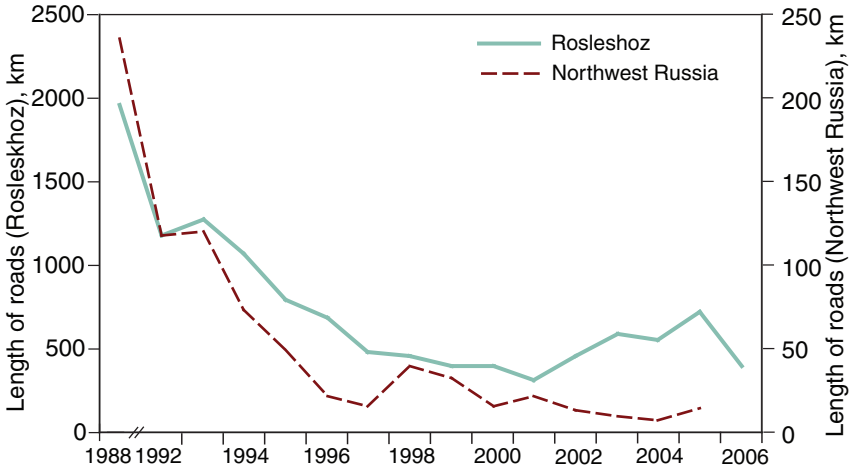


Fig. 23. Annual road-building for forestry purposes by the Federal Forest Agency (Rosleshoz) in Russia and in Northwest Russia (Federal'noe agentstvo… 2006, Ministerstvo prirodnyh… 2007a).

9 Enforcement of the Forest Code and organization of forest management

The Forest Code (2006) specifies the new Russian system of state forestry together with some parts of Civil, Land and Town-planning Codes. The new legislative base has been under preparation since the beginning of 2007, including more then 60 normative documents accepted by the Government, Ministry of Nature Resources and Federal Forestry Agency. The selected decisions of the Government of the Russian Federation and the orders of the Ministry of Natural Resources of the Russian Federation are listed in the Appendix 3. The normative documents can be downloaded from http://www.rosleshoz.gov.ru/

According to the new Forest Code, the subjects of the Russian Federation must to accept nine normative documents:

- Procedures and norms of wood logging by citizens for own needs;
- Procedures of harvesting of non-wood forest resources by citizens for own needs;
- Procedures of harvesting of food forest resources and gathering of medicinal plants by citizens for own needs;
- Rules of using forests for hunting facilities;
- Rates of payment per volume unit of forest resources and rates of payment per area unit of a forest parcel owned by the subject of the Russian Federation;
- Special cases of wood harvesting on the base of sale and purchase contract for forest stands;
- Rates of payment per volume unit of timber harvested on the lands owned by the subject of the Russian Federation;
- Rates of payment for sale and purchase contract of forest stands for own needs;
- Procedures of making sale and purchase contract of forest stands for own needs.

According to the new Forest Code, the forest management system is based on the following principles: the federal ownership on forests; multilevel structure of forest management with division of powers between the federal centre, subjects of the Russian Federation and municipal formations; functions of the state administration and management are divided; unit of forest management – *lesničestvo* (*lesopark*); forest utilization is differentiated according to special-purpose designation of forests (protective, productive and reserve) and to types of use; main form of forest utilization – long-term lease of a forest parcel.

The management structure is multilevel. At the federal level, the tasks of forest management are the maintenance of unity of law-enforcement practice in forest relations, monitoring the quality of transferred powers, state inventory of forests, and planning and execution of subventions. At the level of a subject of the Federation, the tasks of forest management are practically the whole set of questions of the state forest management. At the municipal level, the task of forest management is management of the city forests. Forest users will fulfill forest management actions according to the plan of forest parcel development authorized by a region. According to the Forest Code (2006), in the leased forest parcels responsibilities on silvicultural and forest-improvement works, including road construction, were transferred from the forest administration to forest lessees. Outside leased forests, the public authorities or local self-governance bodies will place procurement orders for forest protection and renewal operations through bidding processes.

The main bases of the state forest management are: 1) forest plan and forest management regulation of a subject of the Russian Federation; 2) forest management regulations for every forest management unit; 3) forest development plans (they are developed by every forest user and then act for examination and the statement in administration of a region; 4) forest declaration (*lesnaja deklaracija*) (forest user's report) as a statement of forest use in accordance with the forest development plan for the administration of a region.

Requirement to prepare a regional forest plan is one of the most important features of the new Forest Code directed on sustainable development of the forest sector of a region. The purpose of the forest plan of a subject is to:

- Create conditions for realization of the strategic tasks put by new Forest Code;
- Increase profitableness of the forest sector;
- Establish private-state partnership;
- Create favourable investment climate in the forest sector;
- Apply international criteria and indicators of sustainable forest management.

The Federal Forest Agency suggests a forest plan as a tool for state forest management and a basis for financial planning and reporting.

The forest-management system includes three blocks: forest regeneration, forest protection against fires, pests and diseases, and forest exploitation. The major principle is inexhaustible forest utilization: new forests should appear in cutting areas and fire-sites. This requirement is unconditional, and automatically results in restrictions on forest utilization. It means the reduction of the size of annual allowable cut, direction of instructions about the elimination of revealed infringements, and, at last, preparation of offers on withdrawal of the transferred powers.

The new Forest Code brings some important innovations in organization of forest exploitation:

- Increasing the set of forest-use types;
- Economic use of forest parcels is mainly based on long-term lease;
- Auction principle of access to forest resources;
- Granting forest resources without an auction for priority investment projects;
- Refusal of gratuitous forest use;
- Use of forest lands for infrastructure development;
- Forest use for works related to geological exploration of mineral resources and development of mineral resource deposits on the basis of a lease.

A regional forest strategy includes forest harvesting for local needs and social purposes, forest harvesting for development of local processing, forest harvesting for export to other regions and other countries, and the use of forest resources for priority investment projects on deep processing of wood.

Russia has been the leading exporter of round wood: about 50 million cubic meters has been recently annually supplied to the world market which has been nearly 40% of the global export. The Government came to a decision to break this tendency according to orders of the President of Russia. The Government decided to set export duties on round wood step-by-step on a prohibitive

level (Pravitel'stvo Rossijskoj… 2007). In a foreseeable prospect, the development of wood processing may be focused basically on a home market. Two segments of internal demand are especially topical: housing construction and bio-energy.

In many regions, regional development programs of the forest industry are already developed or are under preparation. Certainly, these programs are closely coordinated with forest plans of subjects of the Russian Federation.

The Government has made the big work on realization of deep reform in the forest sector. The offered measures will probably serve to the intensification of forest management in forest regions of Russia.

References

Atlas of Russia's Intact Forest Landscapes 2002./ Aksenov, D., Dobrynin, D., Dubinin, M. et al. GFW of Russia, Moscow. 184 p.

Blagovidov, A., Očagov, D. & Ptičnikov, A. 2002. Sohranenie bioraznoobrazija lesov Rossii: vklad OOPT i lesov I Gruppy [Conservation of forest biodiversity of Russia: contribution of protected areas and forests of I group]. Moscow: IUCN – Vsemirnyi sojuz ohrany prirody, Predstavitel'stvo dlja Rossii i stran SNG. 108 p. (in Russian).

Chumachenko, S.I., Korotkov, V.N., Palenova, M.M. & Politov, D.V. 2003. Simulation modelling of long-term stand dynamics at different scenarios of forest management for coniferous–broad-leaved forests. Ecological Modelling No 170: 345–361.

Dudarev, G., Boltramovich, S. & Efremov, D. 2002. From Russian Forests to World Markets. A Competitive Analysis of the Northwest Russian Forest Cluster. ETLA, The Finnish Research Institute of the Finnish Economy. Sarja B 195 Series. Taloustieto Oy, Helsinki. 154 p.

Federal'naja služba gosudarstvennoj statistiki Rossii (Rosstat) 2007. Regiony Rossii. Social'no-èkonomičeskie pokazateli 2006. Statističeskij sbornik [Regions of Russia. Socio-economic indicators 2006. Statistical book]. Rosstat, Moskva. 991 p. (in Russian).

Federal'naja služba gosudarstvennoj statistiki Rossii (Rosstat) 2008a. Rossijskij statističeskij ežhegodnik 2007. Statističeskij sbornik [Russian statistical yearbook 2007. Statistical collection]. Rosstat, Moskva. 825 p. (in Russian).

Federal'naja služba gosudarstvennoj statistiki Rossii, territorial'nyj organ služby po Respublike Karelija (Karelijastat) 2008b. Lesopromyšlennyj kompleks regionov Severo-Zapadnogo Federal'nogo okruga Rossii: Sbornik [Forest industry complex of the regions in the Northwestern Federal district of Russia: Collection]. Karelijastat, Petrozavodsk. 200 p. (in Russian).

Federal'naja služba lesnogo hozjajstva Rossii 1995. Instrukcija po provedeniju lesoustrojstva v lesnom fonde Rossii [The instruction on execution of forest management planning in the forest fund of Russia]. VNIIClesresurs, Moskva. Čast' I: 176 p., Čast' II: 112 p. (in Russian).

Federal'noe agentstvo lesnogo hozjajstva. FGUP "Roslesinforg" 2006. Osnovnye pokazateli lesohozjajstvennoj dejatel'nosti za 1988, 1992–2005 gody [Federal Forest Agency. Federal State Unitary Enterprise "Roslesinforg". Major indicators of forest management activities during 1988, 1992–2005]. Roslesinforg, Moskva. 208 p. (in Russian).

Federal'noe agentstvo lesnogo hozjajstva Rossii 2007. Oficial'nyj sajt Federal'nogo agentstva lesnogo hozjajstva [Federal Forest Agency of Russia. Official site of the Federal Forest Agency]. Available at: http://www.rosleshoz.gov.ru/ (accessed April 8, 2008) (in Russian).

Federal'noe agentstvo lesnogo hozjajstva Rossii 2008a. Prikaz No 37 ot 19 fevralja 2008 g. "Ob ustanovlenii vozrastov rubok [Order No 37 from February 19, 2008 "About determination of cutting ages"].

Federal'noe agentstvo lesnogo hozjajstva 2008b. FGUP "Roslesinforg" [Federal Forestry Agency. Federal State Unitary Enterprise "Roslesinforg"]. Dokumenty i produkty/ Obščie/Statističeskaja otčetnost'// (in Russian). Available at: http://www.roslesinforg.ru (accessed December 5, 2008).

Federal'noe agentstvo lesnogo hozjajstva 2008c. Gosudarstvennyj učem lesnogo fonda po sostojaniju na 1 janvarja 2008g [State accounting of forest resources on 1 January, 2008]. Severo-Zapadnyj federal´nyj okrug. Kniga 3. Roslesinforg. Available at: http://www.roslesinforg.ru (accessed December 5, 2008) (in Russian).

Filipčuk A.N. (ed.) 2003. Spravočnik lesničego [Reference book of forestry officer]. VNIILM, Moskva. 640 p. (in Russian).

Finnish Forest Research Institute 2005. Finnish Statistical Yearbook of Forestry, 2005. SVT Agriculture, forestry and fishery 2005:45. Finnish Forest Research Institute, Vantaa. 424 p.

Forest Code of the Russian Federation 1997. Adopted by the State Duma on January 22, 1997. Translation from the official edition published by ARICFR. Moscow. 67 p.

Identification of "hot spot areas" of forest-cover changes in boreal Eurasia 2005. Achard, F., Stibig, H-J., Laestadius, L., Roshchanka, V., Yaroshenko, A. & Aksenov, D. (editors). Luxembourg: Office for Official Publication of the European Communities, EUR 21684 EN, July 2005. 62 p.

Interfax - Corporate News Agency 2008. Russia's Timber, Woodworking, Pulp and Paper Industry in 2007–2008. Market survey. 76 p.

Janickaja, Ò., Aksenov, D., Dubinin, Ì., Esipova, E., Karpačevskij, Ì. & Purehovskij, A. 2003. Ocenka reprezentativnosti, sostojanija i potencial'nyh ugroz sisteme osobo ohranjaemyh prirodnyh territorij Rossii [An estimation of representativeness, conditions and potential threats to the system of especially protected natural areas of Russia]. Lesnoj bjulleten' 23: 20–25 (in Russian).

Kaliničenko, N.P., Pisarenko, A.I. & Smirnov, N.A. 1991. Lesovosstanovlenie na vyrubkah [Forest regeneration in cutovers]. Ekologija, Moskva. 384 p. (in Russian).

Karvinen, S., Välkky E., Torniainen, T. & Gerasimov, Y. 2006. Northwest Russian Forestry in a Nutshell. Working Papers of the Finnish Forest Research Institute 30. 98 p. Available at: www.metla.fi/julkaisut/workingpapers/2006/mwp030.pdf (accessed December 9, 2008).

Koncepcija razvitija lesnogo hozjajstva Rossijskoj Federacii do 2010 goda. Rasporjaženie Pravitel'stva Rossijskoj Federacii ot 28 sentjabrja 2007g. N 1305-r. 9 p. (in Russian).

Korotkov, V.N. 2004. National report of the Russian Federation // International workshop "Forest management planning status and changes after political and economic transformation in Central Europe". Workshop proceedings. Bialowieza, Poland, 10–12 March 2004. Warsaw. p. 63–82.

Leinonen, T., Sungurov, R., Kolström, T., Sokolov, A., Žigunov, A. & Dorošin, A. 2008. Forest regeneration in Northern and Northwestern Russia in 1993–2004 — Methods, results and development needs. Forest Ecology and Management Vol 255/3–4: 383–395.

Lesnoj fond SSSR (po učetu na 1 janvarja 1988 g.). Statističeskij sbornik [Forest resources of USSR (according to the accounting on January 1,1988). Statistical collection] 1990–1991. Goskomles SSSR, Moskva. Vol. 1: 1005 p. Vol. 2: 1021 p. (in Russian).

Lesnoj fond Rossii (po dannym gosudarstvennogo učeta na 1 janvarja 1993 g.). Spravočnik [Forest resources of Russia (according to the accounting on January 1, 1993). Statistical book] 1995. VNIIClesresurs, Moskva. 280 p. (in Russian).

Lesnoj fond Rossii (po dannym gosudarstvennogo učeta lesnogo fonda po sostojaniju na 1 janvarja 1998 g.). Spravočnik [Forest resources of Russian (according to the state accounting of forest resources on January 1, 1998). Statistical book] 1999. VNIIClesresurs, Moskva. 649 p. (in Russian).

Lesnoj fond Rossii (po dannym gosudarstvennogo učeta lesnogo fonda po sostojaniju na 1 janvarja 2003 g.). Spravočnik [Forest resources of Russia (according to the state accounting of forest resources on January 1, 2003). Statistical book] 2003. VNIIClesresurs, Moskva. 640 p. (in Russian).

Lesnoj kodeks Rossijskoj Federacii ot 4 dekabrja 2006 g. N 200-F3 [Forest Code of the Russian Federation from 4 December 2006 N 200-F3] 2006. Eksmo, Moskva. 96 p. (in Russian).

Ministerstvo prirodnyh resursov Rossijskoj Federacii. Gosudarstvennaja lesnaja služba 2002. Gosudarstvennyj doklad o sostojanii i ispol'zovanii lesnyh resursov Rossijskoj Federacii v 2001 g. [State report on condition and use of forest resources of the Russian Federation in 2001]. VNIILM, Moskva. 109 p. (in Russian).

Ministerstvo prirodnyh resursov Rossijskoj Federacii. Gosudarstvennaja lesnaja služba 2003. Gosudarstvennyj doklad o sostojanii i ispol'zovanii lesnyh resursov Rossijskoj Federacii v 2002 godu [State report about condition and utilization of forest resources in the Russian Federation in 2002]. VNIILM, Moskva. 101 p. (in Russian).

Ministerstvo prirodnyh resursov Rossijskoj Federacii. Federal'noe agentstvo lesnogo hozjajstva 2005. Gosudarstvennyj doklad o sostojanii i ispol'zovanii lesnyh resursov Rossijskoj Federacii v 2004 godu [State report about condition and utilization of forest resources in the Russian Federation in 2004]. VNIILM, Moskva. 82 p. (in Russian).

Ministerstvo prirodnyh resursov Rossijskoj Federacii. Federal'noe agentstvo lesnogo hozjajstva 2006. Gosudarstvennyj doklad o sostojanii i ispol'zovanii lesnyh resursov Rossijskoj Federacii v 2005 godu [State report about condition and utilization of forest resources in the Russian Federation in 2005]. VNIILM, Moskva. 214 p. (in Russian).

Ministerstvo prirodnyh resursov Rossijskoj Federacii. Federal'noe agentstvo lesnogo hozjajstva 2007a. Gosudarstvennyj doklad o sostojanii i ispol'zovanii lesnyh resursov Rossijskoj Federacii v 2006 godu [State report about condition and utilization of forest resources in the Russian Federation in 2006]. VNIILM, Moskva. 199 p. (in Russian).

Ministerstvo prirodnyh resursov Rossijskoj Federacii 2007b. Prikaz No 77 ot 6 aprelja 2007 g. Ob utverždenii Sostava proekta osvoenija lesov i projadka ego razrabotki [Order No 77 from April 6, 2007 About approval of contents of forest development project and procedures of its formulation]. Available at: http://www.rosleshoz.gov.ru/docs/mpr/22 (accessed December 10, 2008).

Ministerstvo prirodnyh resursov Rossijskoj Federacii 2007c. Prikaz No 74 ot 2 aprelja 2007 g. Ob utverždenii Formy lesnoj deklaracii i porjadka zapolnenija i podači lesnoj deklaracii [Order No 74 from April 2, 2007 About approval of a format of, procedures for filling and submitting the forest declaration]. Available at: http://www.rosleshoz.gov.ru/docs/mpr/17 (accessed December 18, 2008).

Ministerstvo prirodnyh resursov Rossijskoj Federacii 2007d. Prikaz ot 8 ijunja 2007 g. N 148 ob utverždenii porjadka isčislenija rasčetnoj lesoseki [Order from 8 June 2007 N 148 on adoption of procedure on computing allowable annual cut]. Available at: http://www.rosleshoz.gov.ru/docs/mpr/4 (accessed December 10, 2008).

Ministry of Natural Resources of the Russian Federation, State Forest Service 2003. Russian Forestry at the Beginning of the XXI Century. VNIILM, Moscow. 176 p.

National report on temperate and boreal sustainable forest management criteria and indicators (Montreal process) 2003. ARICFM, Moscow. 84 p.

OAO NIPIEIlesprom 2003. Russian Federation forest sector outlook study. A study prepared for the European Forest Sector Outlook Study (EFSOS). Geneva timber and forest discussion papers, ECE/TIM/DP/27. United Nations, New York and Geneva. 59 p.

Pisarenko, A.I., Red'ko, G.I. & Merzlenko, M.D. 1992. Iskustvennye lesa [Artificial forests]. Čast' 1. VNIIClesresurs, Moskva. 307 p. (in Russian).

Potapov, I.M. 2003. O programme lesoustroitel'nyh i lesoinventarisacionnyh rabot na 2003–2010 gody [About programme of forest management planning and forest inventory works on 2003–2010]. Lesnoe hozjajstvo 2: 5–8 (in Russian).

Pravila zagotovki drevesiny [Rules of forest cutting] 2007. Utverždeny Prikazom MPR Rossii ot 16.07.2007 № 184.

Pravila lesovosstanovlenija [Rules of forest regeneration] 2007. Utverždeny Prikazom MPR Rossii ot 16.07.2007 № 183.

Pravila uhoda za lesami [Rules of forest tending] 2007. Utverždeny Prikazom MPR Rossii ot 16.07.2007 № 185.

Pravitel'stvo Rossijskoj Federacii 2007. Postanovlenie ot 5 fevralja 2007 № 75 O vnesenii izmenenij v postanovlenie Pravitel'stva Rossijskoj Federacii ot 23 dekabrja 2006 g. № 795 v otnošenii otdel'nyh vidov lesomaterialov neobrabotannyh [Decision from February 5, 2007 № 75 on changes in decision of the Government of the Russian Federation from December 23, 2006 № 795 regarding particular unprocessed timber materials]. Available at: http://www.rosleshoz.gov.ru/docs/enactions/30 (accessed December 12, 2008).

Starostenko, D.A. 2000. Geoinformacionnye tehnologii v oblasti lesnogo hozjajstva [Geoinformation technologies in the field of forestry]. GIS-associacija. Infromacionnyj Bjulleten No 2 (24): 12–13, 23. (in Russian).

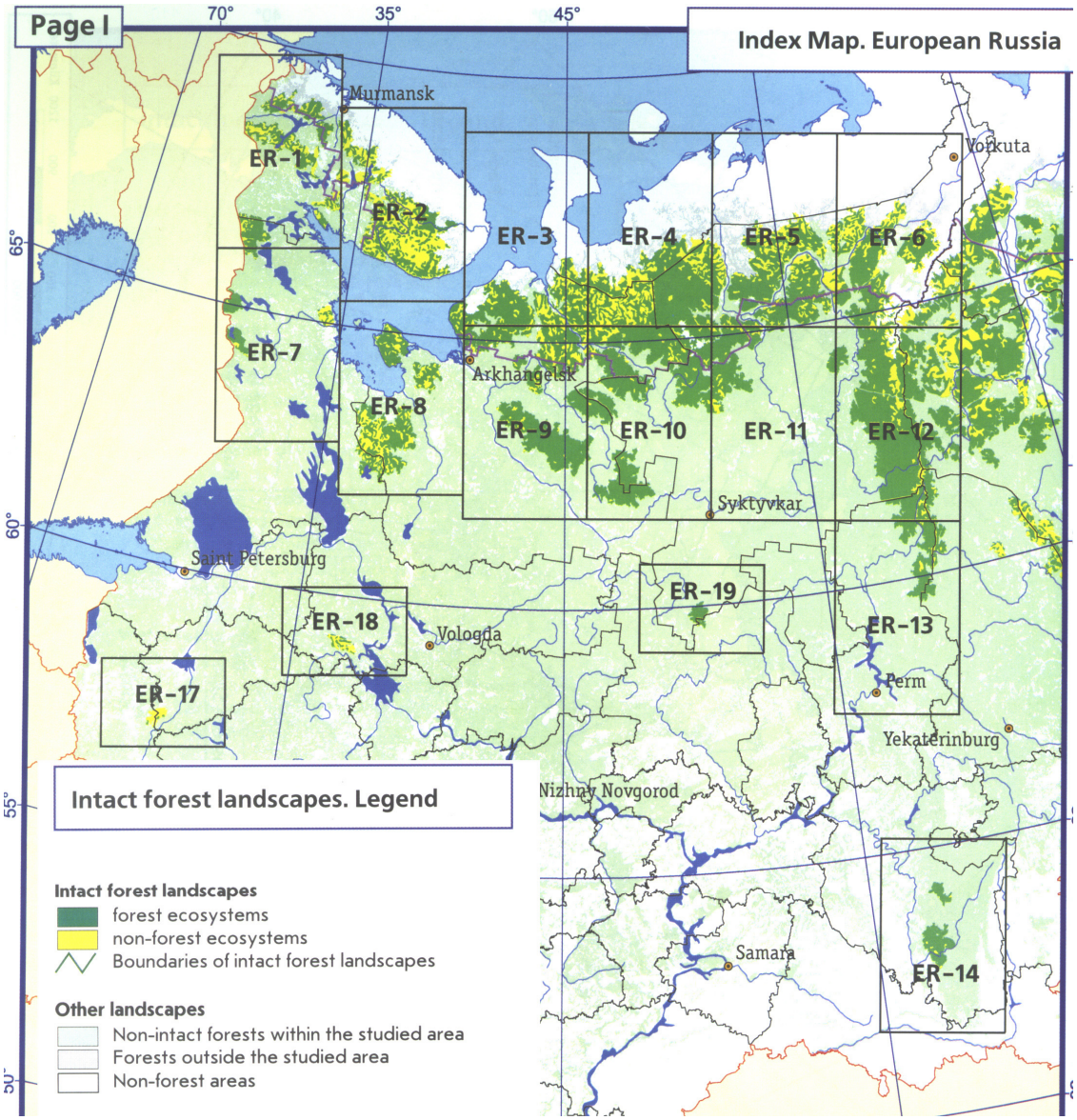
Suhih, V.I. & Žirin, V.M. 2003. Lesopol'zovanie v Rossii v načale tret'ego tysjačeletija [Forest use in Russia at the beginning of third millennium]. Lesohozjajstvennaja informacija. No 6: 37–51. No 7: 31–53 (in Russian).

The World Bank 1997. Russia: Forest Policy during Transition. A World Bank country study. II. Series. 279 p.

Appendix 1. Characteristics of the forest fund lands of Northwest Russia (Lesnoj fond… 2003).

Regions	Area of forest fund lands, 1000 ha		Forest vegetation, % of the total	Percentage of forest land, %	Growing stock, mill. m^3
	Total	Lands with forest vegetation			
Arkhangelsk region	29 094	22 337	77	54	2 504
Nenecky AD	447	190	42	1	18
Vologda region	11 653	10 095	87	70	1 602
Murmansk region	10 048	5 359	53	37	231
Karelia republic	14 908	9 486	64	53	946
Komi republic	38 901	30 184	78	72	2 966
Leningrad region	5 898	4 667	79	56	825
Novgorod region	4 112	3 507	85	64	614
Pskov region	2 467	2 122	86	38	342
Total for the region	117 528	87 947	75	53	10 049

Appendix 2. Distribution of intact forests of European Russia (Atlas of Russia's intact forest landscapes 2002).



Appendix 3. List of selected decisions of the Government of the Russian Federation and orders of the Ministry of Natural Resources of the Russian Federation for enforcement of the Forest Code 2006. Available at: http://www.rosleshoz.gov.ru/

The decisions of the Government of the Russian Federation:

- No 838 from 29.12.2006 "About approval of a technique of distribution of subvention from Federal fund of indemnifications between subjects of the Russian Federation for realization of separate powers of the Russian Federation in the field of forestry which realization is transferred to government bodies of the subjects of the Russian Federation"
- No 138 from 03.03.2007 "About amount of payment for granting of extracts from the state forest register and the order of its collection"
- No 162 from 15.03.2007 "About approval of the list of species of trees and shrubs which wood harvesting is prohibited"
- No 246 from 24.04.2007 "About approval of regulation about preparation of the forest plan of the subject of the Russian Federation"
- No 273 from 08.05.2007 "About penalties to valuate the damages caused to forests due to forest offences"
- No 310 from 22.05.2007 "About forest resource volume unit rates of payment and forest parcel area unit rates of payment under the federal ownership"
- No 313 from 24.05.2007 "About modification of regulation on the Ministry of Natural Resources of the Russian Federation"
- No 314 from 24.05.2007 "About powers of the Federal Forest Agency in the field of forest relations"
- No 315 from 24.05.2007 "About powers of Federal service on supervision in sphere of nature management in the field of forest relations"
- No 318 from 24.05.2007 "About the state forest register"
- No 324 from 28.05.2007 "About the lease of the forest parcel under the state or municipal ownership"
- No 377 from 18.06.2007 "About rules of realization of forest management planning"
- No 385 from 19.06.2007 "About approval of rule organization and realization of aerial forest conservation and protection"
- No 394 from 22.06.2007 "About approval of the regulation about realization of the state forest control and supervision"
- No 406 from 26.06.2007 "About sale-purchase contracts for forest stands located on the lands of the state or municipal ownership"
- No 407 from 26.06.2007 "About realization of state forest inventory"
- No 414 from 29.06.2007 "About approval of rules on sanitary safety in forests"
- No 417 from 30.06.2007 "About approval of fire-prevention rules in forests"
- No 418 from 30.06.2007 "About approval of regulation about features of placement of procurement orders for works on conservation, protection, reproduction of forests and conclusion of contracts"
- No 419 from 30.06.2007 "About priority investment projects in the field of forest development"
- No 972 from 29.12.2007 Federal target program "Fire prevention in the Russian Federation till 2010"
- No 450 from 12.06.2008 Degree about the Ministry of Agriculture of the Russian Federation

The orders of the Ministry of Natural Resources of the Russian Federation:

- No 68 from 28.03.2007 "About approval of list of forest vegetation zones and forest districts of the Russian Federation"
- No 74 from 02.04.2007 "About approval of a format of, procedures for filling and submitting the forest declaration"

- No 77 from 06.04.2007 “About approval of contents of forest development project and procedures of its formulation”
- No 83 from 10.04.2007 “About approval of forest use rules for cultivating forest fruits, berries, ornamental and medicinal plants”
- No 84 from 10.04.2007 “About approval of rules for harvesting non-timber forest resources”
- No 87 from 11.04.2007 “About approval of target prognosis indicators and forms of reports on payout of subventions from the federal budget to the budgets of the subjects of the Russian Federation for exercising by Public Authorities of the subjects of the Russian Federation separate powers of Russian Federation in the area of forest relations and about achievement of target prognosis indicators”
- No 99 from 17.04.2007 “About approval of forest use rules for construction, reconstruction and exploitation of lines for electricity transfer, communication lines, roads, pipes and other line objects”
- No 106 from 19.04.2007 “About approval of structure on forest management regulation, about their development, terms of their action and about entering changes into them”
- No 108 from 24.04.2007 “About approval of forest use rules for realization of recreational activity”
- No 109 from 24.04.2007 “About approval of order of forest use for performance of works on geological studying bowels, for development of deposits of minerals”
- No 121/148 from 07.05.2007 “ About approval of order of formation and administration of Russian registry on carbonic units”
- No 123 from 10.05.2007 “About approval of forest use rules for processing of wood and other forest resources”
- No 124 from 10.05.2007 “About approval of forest use rules for agricultural purpose”
- No 125 from 14.05.2007 “About approval of order of the state or municipal examination of the project on forest development”
- No 137 from 28.05.2007 “About approval of forest use rules for research activities and education/ training activities”
- No 148 from 08.06.2007 ”About approval of procedures for calculating the allowable cuts”
- No 149 from 08.06.2007 “About approval of afforestation rules”
- No 174 from 09.07.2007 ”About approval of procedures for organization and implementation of forest pest monitoring”
- No 181 from 16.07.2007 ”About particulars of use, conservation, protection and renewal of forests on lands of specially protected nature areas”
- No 182 from 16.07.2007 “About standard form of a forest plan of a subject of the Russian Federation”
- No 183 from 16.07.2007 “About approval of forest regeneration rules”
- No 184 from 16.07.2007 “About approval of wood harvesting rules”
- No 185 from 16.07.2007 “About approval of forest tending rules”
- No 187 from 20.07.2007 “About approval of forms for maintaining the state forest ledger”
- No 190 from 20.07.2007 ”About approval of a list of data to be submitted on a mandatory basis to interested persons and its submission conditions”
- No 190 from 20.07.2007 ”About establishment of interministerial committee on counteraction illegal loggings and turnover of timber”
- No 258 from 04.10.2007 ”About approval of order for arrangement of lease agreements for forest parcels of the forest fund and agreements for gratuitous use of forest parcels of the forest fund according to the Forest Code of the Russian Federation”
- No 13 from 22.01.2008 “About approval of specialties of use, conservation, protection and renewal of forests located in water protection zones, forests, carrying out functions of nature conservation and other objects, valuable forests, and also forests located in specially protected parcels of forests”