



Figure 16. Annual average increment of growing stock in the Russian forests, million m³/ha

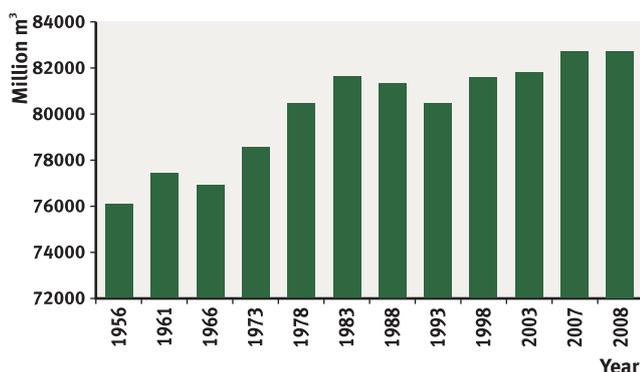


Figure 17. Dynamic of growing stock on the Forest Fund lands and lands outside the Forest fund of RF, million m³

Indicator 2.c. Area, percent, and growing stock of plantations of native and exotic species

The Russian forest management uses different methods to develop forest plantations and support natural reforestation.

Overall, the percentage of forest plantations in the country is 2.4% of forested area. These plantations are generally made up of native species. The percentage of forest plantation's area is bigger in the South regions of Russia (Fig. 18). The forest plantation stock does not have its own section in the industry statistics.

In 2003–2008, the areas of annual reforestation practice exceeded the clear cutting areas. In

2008 reforestation was accomplished on the total area of 826.8 thousand ha; seeding and planting were done on the area of 192.1 thousand ha. The forest plantations' share in total reforestation area was 23%, and it is constantly increasing since 2005 (Fig. 19).

The main species using in forest plantation are as follows: pine – 39%, spruce – 41 %, Siberian stone pine (Cedar Siberian) – 9%, larch – 3%, oak – 3%, birch – 1%, others – 4%. The forest plantations are created mostly by planting: in 2008 the proportion of planting plantations was 92% that is 14% more than in 2007. Usually, the seeding and planting of forest plantation have been performed with seeds and/or seedlings of the same specie. The following mixture of species on plantations appears naturally. The proportion of exotic tree species cultures is negligible.

Reforestation works provide decrease of unforest-ed area, which supports productivity of the forest ecosystems.

Indicator 2.d. Annual harvest of wood products by volume and as a percentage of net growth or sustained yield

According to the Forest Cadastre as of 01.01.2009, in the Russian Federation exploitable

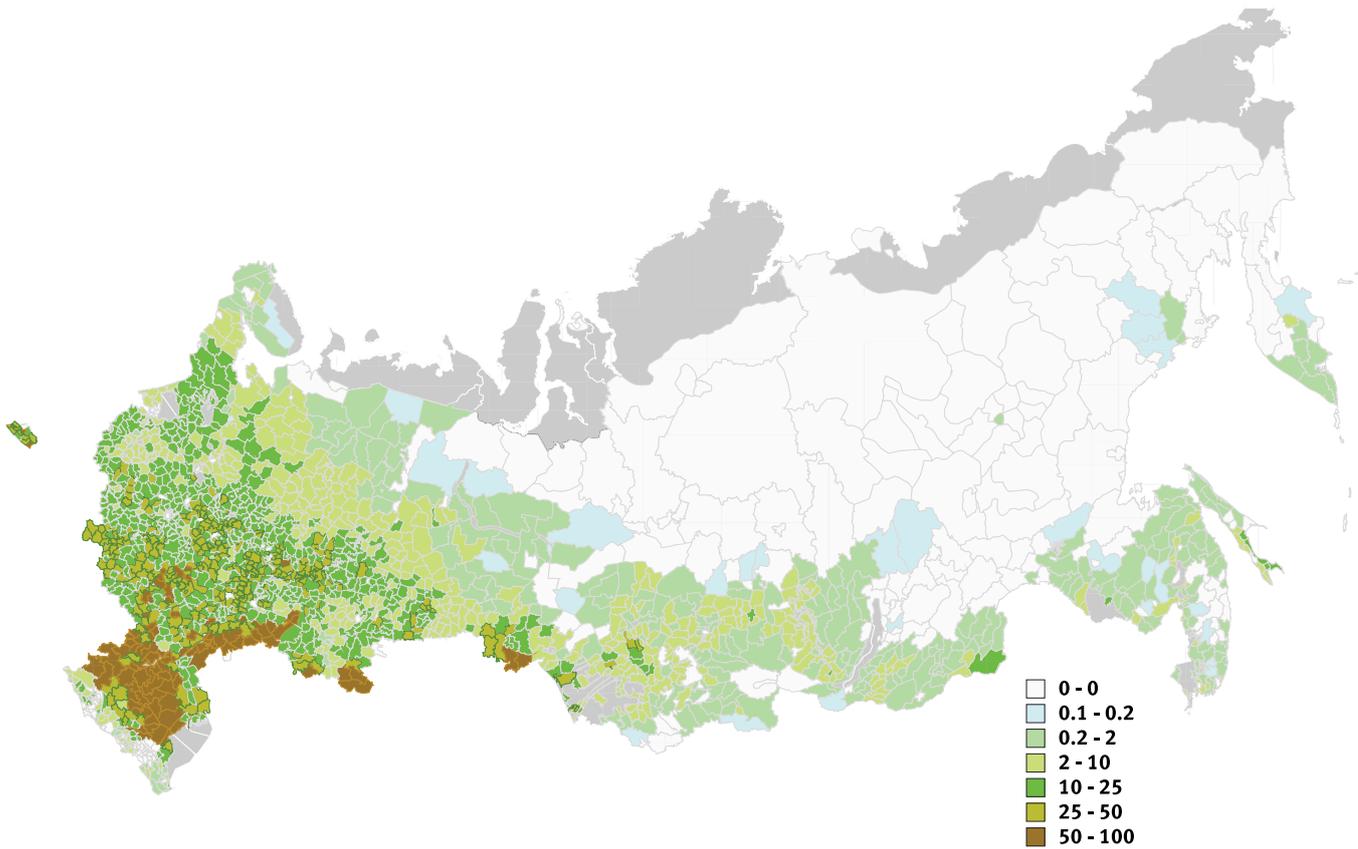


Figure 18. The percentage of forest plantation's area in forest covered area, %.

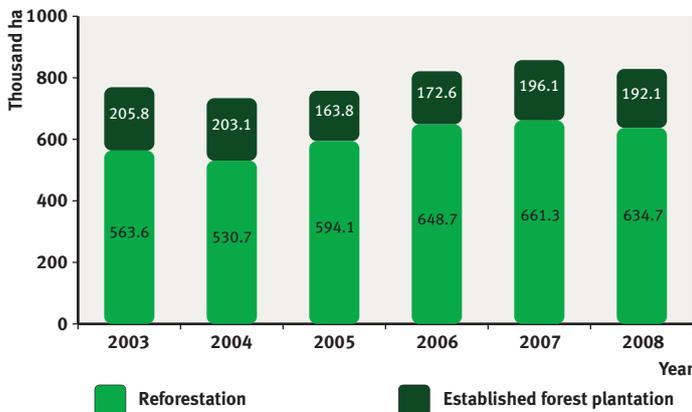


Figure 19. Dynamics of reforestation area and forest plantation area, thousand ha

forests 165.0 million m³ of timber was harvested, which is 31% of average increment of growing stock (Table 8).

Table 8.

Dynamics of average increment, timber removal (thousand m³) and its share (%) of average increment of growing stock in forest available for exploitation

Year of account	Average increment	Annual removal	Share %
2008	576,590	166,400	28,8
2007	550,370	187,000	34.0
2005	552,660	186,000	33.6
2000	553,540	166,000	30.0
1990	644,830	340,000	52.7

The feature of Russian forest recourses is the outstanding disbalance between availability and actual usage of them. The mature growing stock in the European and Ural part of Russia is 18% of all the country's mature growing stock; however, over 60% of the total harvested wood is from this part. Under the most intensive usage are forests in the North-Western, Northern, Central, and Eastern regions of the European part. The Annual Allowable Cut (AAC) for coniferous forest in the European-Ural part of the Russian Federation is exploited for only 40–60%.

The total average increment of growing stock in the forests available for exploitation is 550.3 million m³ (see Table 8). In several regions of the country, determined Annual Allowable Cut (AAC) for coniferous forests far exceeds the average annual increment of growing stock.

The significant amount of cutting has been conducted in the coniferous forests of the European part and in neighboring areas of the Far East of Russia (Fig. 20).

Over 230 million m³ of timber of deciduous species can be cut annually without any harm for country's forests. Due to low demand for the timber of deciduous species in numbers of regions, the aging of small-leaved forests has been in progress, which is increasing the mortality. Also the forest floor becomes more debris-strewn, the increment declines, and the sanitary state deteriorates. There is an especially critical situation with aspen forests.



Figure 20. Share of timber removal from average increment of growing stock in forests available for exploitation, %.

Their stands are dominated by over-mature trees, which are highly susceptible to stem rot. As a result, they are losing the technical quality which makes it complicated to sell them.

Despite the existence of significant forest resources, in connection with the intensive exploitation of the accessible forests in Russia, in the coming decades there will remain a deficit of qualitative coniferous timber, and especially it will increase in the European part of Russia. Easily accessible forests adjoining the industrial timber processing centers are exhausted. The development of low-accessible forest areas needs construction of infrastructure and large investments. The elaboration of regional programs for effective development and reproduction of forests is required for the prospective increasing of timber production, the development of timber processing, and pulp and paper industry.

Indicator 2.e. **Annual harvest of non-wood forest products**

The usage of non-timber forest resources is carried out in the following ways (Article 25 Forest Code RF):

Harvesting and collecting of non-timber forest resources;

Harvesting of food forest resources and collecting medicinal plants;

Agriculture;

Cultivating forest fruit, berries, ornamental plants, medicinal plants.

The non-timber forest resources (non-food) include stumps, birch-bark, bark of other trees and shrubs, brushwood, woody forage, spruce's, fir's and pine's branches for New Year, Christmas and Holyday decorations, moss, forest floor litter, reed, cane, and similar forest resources (Part 2 Article 32 Forest Code RF). The stocks of the above mentioned resources in Russia are very high.

The food forest resources include wild fruits, berries, nuts, mushrooms, seeds, birch sap, medicinal plants, and similar forest resources (Part 2 Article 34 Forest Code RF). The medicinal plants are plants that used in medicine with preventive or therapeutic purposes.

A large number of the species of wild fruits, berries, and plants that is growing in the Russian forests are widely used as a food or medicine. The most important are cranberry, cowberry, blueberry, raspberry, cloudberry, bog bilberry, and others. Biological and exploitable stocks* of these species are considerably (sometimes extremely) large (Table 9).

The three species of Pine have the greatest value among the wild nut-bearing plants. Their seeds are

* Exploitable stock is the amount of raw materials, that can be harvested on the given territory with taking into account the biological (natural mortality, pest's damage, disease, etc.) and economic factors. In average, it is 50% of the biological stock, but depending on specific conditions can vary from 10 to 75% and sometimes more.

Table 9.

Stocks of the essential food forest resources in forests
of the Russian Federation

Resources	Average productivity, kg/ha	Biological stock, thousand tonnes	Exploitable stock, thousand tonnes (% from biological stock)	
			50	10–75
Fruits				
Hawthorn (<i>Crataegus</i>)	110–200	136.0	68.0	13.6–102.0
Pear (<i>Pyrus</i>)	36–460	186.4	93.2	18.6–139.8
Raspberry (<i>Rubus idaeus</i> and other sp.)		142.8	71.4	14.3–107.1
Cloudberry (<i>Rubus chamaemorus</i>)	40–200	453.1	226.5	45.3–339.8
Rowan tree (<i>European Mountain Ash</i>) (<i>Sorbus</i>)	30–120	183.6	91.8	18.4–137.7
Blackthorn (Sloe) (<i>Prunus spinosa</i>)	110–180	248.9	124.5	24.9–186.7
Bird cherry tree (<i>Padus avium</i> and other sp.)	40–120	106.2	51.6	10.6–79.6
Apple tree (<i>Malus</i>)	45–500	174.7	87.4	17.4–131.0
Berries				
Cowberry (lingenberry) (<i>Vaccinium vitis-idea</i>)	100–300	3,021.3	1,507.8	302.1–2,266.0
Cranberry (<i>Oxycoccus palustris</i>)	150–300	1,600.1	800.0	160.0–1,200.1
Bog bilberry (<i>Vaccinium uliginosum</i>)	50–450	1,020.4	510.2	102.0–765.3
Blueberry (bilberry) (<i>Vaccinium myrtillus</i>)	150–300	2,618.2	1,309.1	261.8–1,963.7
Nuts				
Siberian and Korean Stone Pine (<i>Pinus sibirica</i> , <i>P. koraiensis</i>)	10–300	1,071.8	535.9	107.2–803.8
Dwarf pine (<i>Pinus pumila</i>)	20–200	2,614.2	1,307.1	261.4–1,960.0

widely known and used as a delicious food product. They are Siberian Stone pine or Siberian cedar (*Pinus sibirica*), Korean pine or Korean cedar (*Pinus koraiensis*) and Siberian Dwarf Pine (stlanik) (*Pinus pumila*).

The total area of the Siberian and Korean cedars' forests in Russia is 41,047.3 thousand ha, of which middle-age, maturing, mature and over-mature cedar forests cover 37,498.7 thousand ha. The many-years average biological stock of nuts is 1 million tonnes. The area of middle age, maturing, mature, and over-mature Dwarf pine stands in the Russian Federation is 37.3 million ha. The many-years average biological stock of nuts – 2.5–2.6 million tonnes.

About 3 000 fungi species grow in the Russian Federation; more than 200 of them are edible. According to the Sanitary Regulations for harvesting, processing, and selling of mushrooms, commercial harvesting is permitted for 57 species of wild edible mushrooms. Overall, the fungi production area in the Russian Federation is 81.8 million ha, including the area in the Asian part of the country – 64.1, and in the European-Ural part – 17.7 million ha. The biological stock of mushrooms is 4.3 million tonnes, including in the Asian part – 3.5, European-Ural – 0.8 million t.

One of the important non-timber forest products is the birch sap. About 40 species of birches grow in Russia, but for the industrial production of birch sap we use mainly European (common) (*Betula pendula*) and white (*Betula pubescens*). The total exploitable stock of birch sap in the Russian Federation is 572.8 million tonnes. The largest reservoirs are concentrat-

ed in the Siberian (42.4% of the total stock), Ural (21.7%), and Northern-West (15.5%) Federal Okrugs.

Over 12 thousand species of vascular plants grow in Russia. From them 3 000 species are used in traditional (folk) medicine and scientific medicine. Currently, almost 200 species of plants are allowed to be used in scientific medicine, and 65 % of them are growing in the wild. Some species of the wild medicinal plants were brought under cultivation, so harvesting for them in nature is not necessary. The stocks of some other species of medicinal plants are large and sometimes hundreds of times larger than the demand. There are more than 35 species with large stock-low demand, and among them are: European birch (*Betula pendula*), Labrador Tea (*Ledum palustre*), Cowberry (lingenberry) (*Vaccinium vitis-idea*), Prostrate Knotweed, (*Polygonum aviculare*), stinging nettle (*Urtica dioica*), Colt's-foot (*Tussilago farfara*), common dandelion (*Taraxacum officinale*), Grey alder (*Alnus incana*), Broadleaf Plantain (*Plantago major*), Absinth Wormwood (*Artemisia absinthium*), Common Mugwort (*Artemisia vulgaris*), Santonica (*Artemisia cina*), and others. Some species of medicinal plants are the sources of scarce, difficult-to-obtain medical raw materials. There are more than 40 of such species, some of them are, for example: Sandy Everlasting (*Helichrysum arenarium*), Common Bistort (*Polygonum bistorta*), Spring Adonis (*Adonis vernalis*), and Great Burnet (*Sanguisorba officinalis*). The resources of the majority of them are still understudied.

CRITERION 2

MAINTENANCE
OF PRODUCTIVE
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Forest can be used for agricultural purposes such as hay harvesting, pasturage of livestock and domesticated animals, lacing apiaries and beehives, reindeer herding in the North, establishing of plantations and other agricultural activities (Part 1 Article 38 Forest Code RF).

The nectariferous forest plants are widely used in the apiculture as sources of nectar and pollen. The main nectariferous plants between trees and shrubs of the Russian forests are Lime (several species) (*Tilia* spp.) (honey production up to 1000 kg/ha), maple (*Acer* spp.) (up to 250 kg / ha), willow-tree (*Salix* spp.) (up to 150 kg/ha), Black Locust (*Robinia pseudoacacia*) (up to 800 kg/ha), and other. The areas occupied by these species are quite significant (Table 10). Over the past 15 years we have seen an increase in the land occupied by forest nectariferous trees, above all, by lime and maple.

The hay harvesting is carried out on specially assigned forest plots. According to the State Accounting of Forest Fund (as of 01.01.2009), the total area of the hayfields under the Rosleskhos management is 1,858.1 thousand ha (in the European-Ural part – 879.0, in the Asian part – 979.1 thousand ha).

The analysis of the dynamic of forest hayfields for the years 1961-2008 (according to the Forest Fund accounts) shows a steady reduction. During the period under review, the area has decreased by more than 75%, mainly due to reducing livestock in individual households. The most significant decrease in hayfields occurred in the Ural (83%) and the Far Eastern (88%) Federal Okrugs. Productivity of forest hayfields is low and ranges, in most cases, from 4 to 15 hundred kg/ha (hay in air-dried condition). The forest pastures are used for grazing domestic animals and livestock. The area of forest pastures is 11,537.9 thousand ha (including in the European-Ural part – 363.3, in Asian part – 11,174.6 thousand ha).

The northern reindeer herding uses as a forage base the forest plots in the ecoregions of tundra, forest-tundra, sparse taiga, and also taiga forest. Reindeer pastures in the Russian Federation occupy more than 300 million ha.

In the Russian Federation legislation more than 70 species of mammals and more than 90 species of birds are considered to be objects of hunting*.

The number of game animals has been changing in the distinct long-term fluctuations caused by periodic weather changes (affecting the availability of forage, in particular), epizooty, and some other reasons (Annex 3, Table 1). In the Russian Federation, hunting quotas have been determined for hunting the main game species (Annex 3, Table 2).

The Requirements for the implementation of the above types of forest use are governed by the following documents: The Rules of Harvesting and Collecting of Non-timber Forest Resources (2007), The Rules of Harvesting Food Forest Resources and Collecting Medicinal Plants (2007), The Rules of Agriculture (2007), the Rules of Forest Cultivation of Fruit, Berries, Ornamental Plants, Medicinal Plants (2007), and several other documents.

The use of forest land by citizens and legal persons (companies) for harvesting and gathering of non-timber forest resources, harvesting of food forest resources and gathering medicinal plants, cultivating of forest fruit, gathering berries, ornamental plants, and medicinal plants is a business activity and it is done on the basis of leasing contracts of forest lots. For agricultural use, the rental of forest lots has been provided in accordance with Article 9 Forest Code RF.

The rental of forest lots for the use of non-timber forest resources so far has not received wide distribution in Russia (Table 11). Thus, in the year 2004, 926 lots (not including lots for Christmas trees cutting) were transferred to the lease (the lease agreement was concluded). In the year 2005

Table 10. Areas occupied by main nectariferous species in the Forest Fund of Russia, thousand ha

Nectariferous plants	Russian Federation	Federal Okrug						
		Central	North-Western	Southern	Privolzhsky	Ural	Siberian	Far Eastern
Lime (<i>Tilia</i> spp.)	3,323.8	87.0	7.4	24.1	2,225.7	148.1	7.5	824.0
Maple (<i>Acer</i> spp.)	339.7	18.3	0.2	44.2	242.4	14.2	1.3	19.1
Willow-treelike (<i>Salix</i> spp.)	1,198.4	18.5	68.4	61.9	39.2	53.0	116.6	840.8
Willow-shrublike (<i>Salix</i> spp.)	4,211.2	8.3	4.9	35.1	39.9	253.9	2,281.6	1,587.5
Black Locust (<i>Robinia pseudoacacia</i> L.)	53.4	1.3	0.0	50.9	1.2	0.0	0.0	0.0

* «List of Objects of wild animals, considered as objects of hunting» approved by the Government of the Russian Federation, December 26, 1995, № 1289.

Table 11.

Area of forest lots leased for using non-timber forest recourses and amounts harvested (according Rosleskhoz information)

Using	Area of leased lots and approved limits for harvesting							
	2004		2005		2006		2007	
	Area, thousand ha	Amount harvested, hundred kg	Area, thousand ha	Amount harvested, hundred kg	Area, thousand ha	Amount harvested, hundred kg	Area, thousand ha	Amount harvested, hundred kg
Christmas tree cutting	407.0	n/a*	0.7	n/a	0.7	n/a	7.0	n/a
Hay harvest	38.6	n/a	58.0	10,103.0	4.0	17,344.1	2.4	10,167.4
Pasturage	2,651.9	n/a	3,984.5	n/a	1,828.6	n/a	2,222.9	n/a
Lacing apiaries and beehives	79.8	n/a	0.2	n/a	1.0	n/a	1.5	n/a
Harvest tree sap	n/a	n/a	n/a	125.0	n/a	n/a	n/a	n/a
Collecting wild fruits and berries, total	1,029.1	n/a	34.3	3,981.0	37.7	385.8	46.3	5,404.4
Including:	7.3	n/a	10.9	3,242.4	1.6	25.4	8.3	2,143.3
berries	7.3	n/a	10.9	3,242.4	1.6	25.4	8.3	2,143.3
nuts	4.2	n/a	4.1	309.8	27.1	160.0	29.7	3,029.1
mushrooms	1,017.6	n/a	19.3	428.8	9.0	200.4	8.3	232.0
Collecting other food forest products	94.9	n/a	18.6	476.0	31.5	1246.0	31.5	1,246.0
Collecting medicinal plants	n/a	n/a	n/a	n/a	0.01	n/a	0.2	2.0
Collecting moss, lichens, floor litter, and fallen leaves	n/a	n/a	n/a	42.0	n/a	n/a	n/a	n/a
Other non-timber usage	10.1	n/a	19.5	n/a	18.1	n/a	21.3	n/a
Total	4,311.5		4,115.8		1,921.6		2,333.1	

there were 442 lots, in 2006 – 874, and in 2007 – only 699 lots. The dynamics of renting forest lots for hunting looks a little better: 544, 464, 658 and 832 lots, in years 2004–2007 respectively. Nevertheless, it is without doubt that rental agreements in this field will grow, because only in this way can we implement the commercial use of non-timber forest resources.

In 2008, the harvesting and collecting of non-timber forest resources took place on the area of 720 thousand ha; harvesting of food forest resources and collecting of medicinal plants – on 254.7 thousand ha; game farming and hunting – on 49,200 thousand ha; agriculture – on 2,254 thousand ha; the cultivation of forest fruit, berry, ornamental and medicinal plants – on 2.6 thousand ha.

Summary Criterion 2

Maintaining and preserving the productive capacity of forests are the important strategic tasks for Rosleskhoz. The regular monitoring of the forest resource's condition and sustainable forest management are important for the successful execution of these tasks. The most important use of forests is still the timber harvesting. Currently, the forest area available for exploitation is more than 46% of the

area covered with forest vegetation. Inaccessible for timber harvesting forests play a vital ecological and environmental role.

The current use of forest in Russia is characterized by low intensity. From the scientifically grounded amount of possible timber removal (Annual Allowable Cut), which was in 2008 about 635 million m³ per year, only 166.4 million m³ or 26% had been used. The regional programs for effective development and reproduction of forests are elaborated for prospective increasing of timber production, development of timber processing and the pulp and paper industry. Reforestation plays an important role in maintaining forest productivity. Traditionally in Russia, the native tree species are used for reforestation as the most adapted to the environment, and the share of exotic species is negligibly low. The major part of the forest plantations is made up by planting, because they are more stable to unfavorable weather conditions comparing to sowed plantations, they have better quality indexes and require less agricultural care. In 2005–2008, the reforestation area exceeded the area of clear cutting.

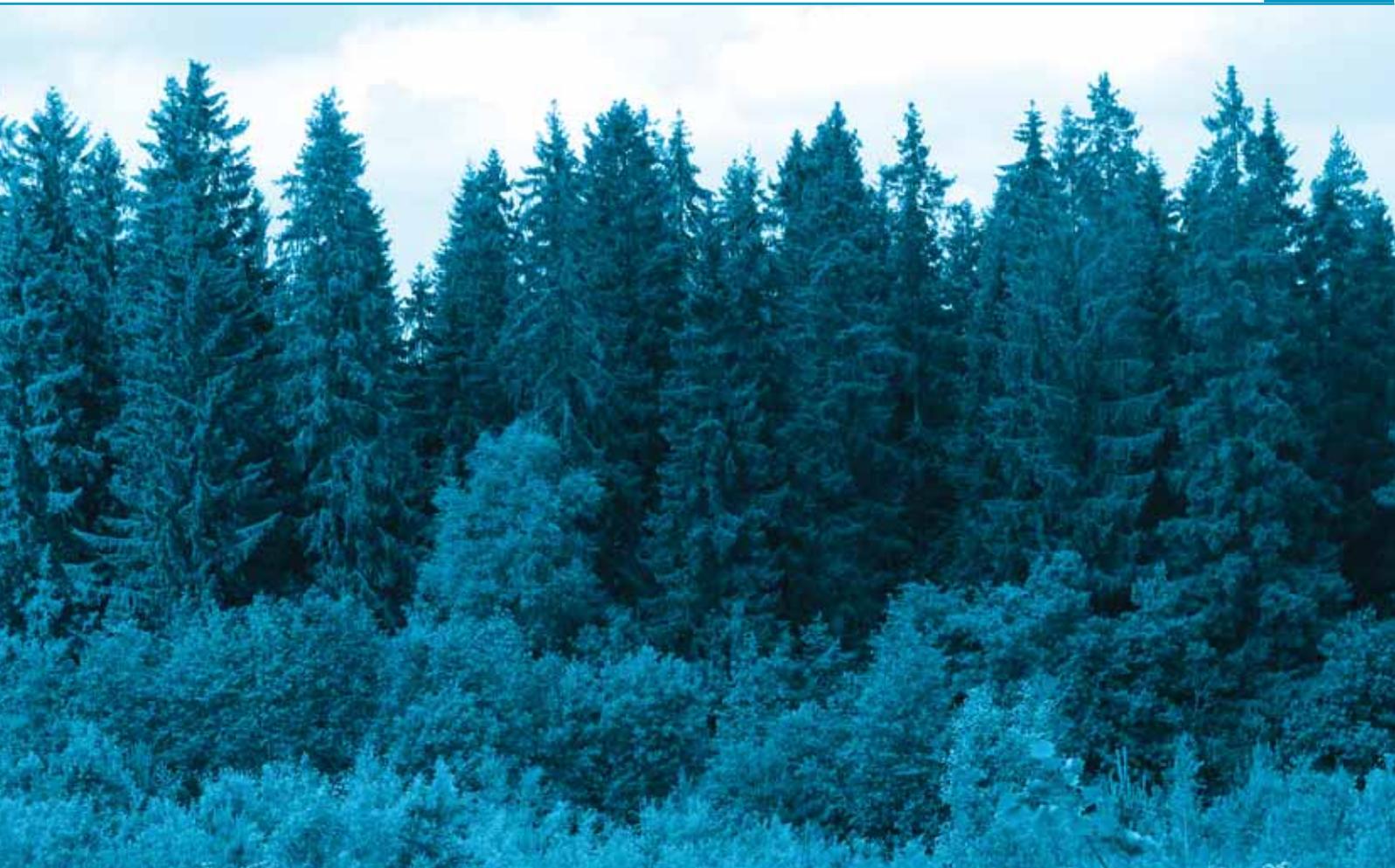
This indicates that the accomplishing amount of work provides timely reforestation of cuts and reduction of area not covered with forest vegetation. Russian forest is a rich source of variable non-timber products; the intensity of their using is still low.

CRITERION 2

MAINTENANCE
OF PRODUCTIVE
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CRITERION 3

MAINTENANCE OF FOREST ECOSYSTEM HEALTH AND VITALITY





Indicator 3.a. Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions

The major biotic agents with negative impact on forest ecosystems are dangerous insects (pests) and diseases of trees. During 1998–2008, the area affected by pests and diseases was 5.37 million ha annually on average.

The increase in affected area in 2000–2002 was due to the outbreaks of needle- and leave-

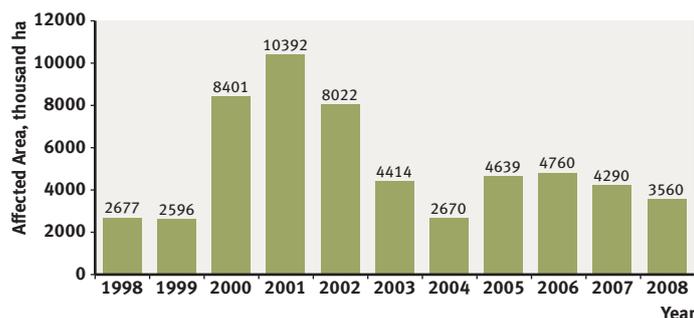


Figure 21. Dynamics of Area of Forest Affected by pests

gnawing pests in the Asian part of country and mainly of Siberian moth and gypsy moth (*Dentroliumus superans sibiricus* Tschetw. and *Lymantria dispar* L.).

In 2008, an area of 2.43 million ha (68%) was affected by pests; an area of 1.13 million ha was affected by disease. Total affected area was 3.62 million ha. Comparing to 2007, affected area has decreased by 710 thousand ha mainly because of reducing the stock's area inhabited by leave-gnawing pests (Fig. 21).

For the forest diseases such fluctuations are not typical. The total area affected by forest diseases for the last 10 years period is relatively stable and has been changing between 0.8–1.3 million ha. Last 4 years the stem pests are the major danger for the forests in the European part of the country. The area affected by stem pests takes 40% of the total area affected by all insects and diseases.

The systematic measures are used to stabilize the pathological situation in the forests. They include extermination measures inside the outbreaks and preventive measures.

In 2008, the localization and extermination measures were applied by Rosleskhoz to the area of 131.1 thousand ha. Preventive biological measures have been done on a territory of 224.7 thousand ha.

In 2008, as a result of the impact of biotic factors, forests had been damaged on an area of 737 thou-