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Models for Growth of Pine Stands in Territories of Northern Eurasia

**Shvidenko, A., Samarskaya, E.A., Venevsky, S.V. and
Nilsson, S.**

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Working Paper

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Foreword

IIASA, the Russian Academy of Sciences, and the Russian Federal Forest Service, in agreement with the Russian Ministry of the Environment and Natural Resources, signed agreements in 1992 and 1994 to carry out a large-scale study on the Russian forest sector. The overall objective of the study is to focus on policy options that would encourage sustainable development of the sector. The goals are to assess the forest resources, forest industries, and infrastructure; to examine the forests' economic, social and biospheric functions; with these functions in mind, to identify possible pathways for their sustainable development; and to translate these pathways into policy options for Russian and international agencies.

The first phase of the study concentrated on the generation of extensive and consistent databases of the total forest sector of Siberia and Russia.

In its second phase, the study has encompassed assessment studies of the greenhouse gas balances, forest resources and forest utilization, biodiversity and landscapes, non-wood products and functions, environmental status, transportation infrastructure, forest industry and markets, and socio-economics.

This report, carried out by Prof. Shvidenko, Dr. Samarskaia, Dr. Venevsky and Prof. Nilsson of the study's core team, is a contribution to the analyses of the topics of greenhouse gas balances and forest resources, and forest utilization.

Models for Growth of Pine Stands in Territories of Northern Eurasia

*A.Shvidenko, E.Samarskaia, S.Venevsky
and S.Nilsson*

1. Introduction

Pine is often called the national tree of Russia. Forests with Pine (*Pinus sylvestris*; there also exist seven other Pine species of genera *Pine* which establish natural stands in Russia, but cover less than 1% of all Pine forests) are the second most distributed forest formations in Russia after Larch. Pine forests cover 16% of the Forested Area and have 20% of the growing stock of all Russian forests; corresponding figures for all coniferous forests are 23% and 25% respectively. On a global scale, Russian Pine forests make up about 35% of all Pine forests.

In addition to the large extent of Pine forests, there are several other features of the species which define a significant role in any resource or ecological estimate of the Russian forests. Firstly, Pine forests are widely distributed in densely populated areas (contrary to Larch stands) with a developed infrastructure. Secondly, Pine wood, due to its excellent physical properties and wide distribution in early populated areas, was historically and is currently the most used tree species in Russia. Thirdly, Pine is a species with an extreme adaptability to soil fertility, is quite tolerant to water availability, and is one of the main forest forming species in forest steppe and even steppe regions, where protective functions of forests are of extremely high importance.

This Working Paper has the following main tasks:

- to develop a relevant regionalization of Pine forests with respect to homogeneity of stand growth and dynamic regularities;
- to select relevant existing Russian yield tables, different dynamic models, and data for modeling the growth and productivity of Pine forests;
- to develop a framework of regional models to estimate the dynamics and productivity of Pine stands;
- to prepare yield and growth tables for further examination and validation in Russia;

- to estimate, at an aggregated level, basic indicators for productivity of Pine stands, such as gross growth, net growth and mortality.

2. Short Description of Russian Pine Stands

Pine forests are distributed practically over all the Russian territory which is suitable for forest growth (Figure 1, showing regions for forest taxation of Pine forests in Russia): from sparse taiga (excluding regions of Northern East Siberia) to forest steppe (islands of Pine stands are located in the steppe zone). Pine generates a typical intrazonal forest formation. Forested areas (closed forests) in Russia covered by Pine forests comprise 114 million ha with a growing stock of 14636 million m³ (data for forests managed by state forest authorities by January 1, 1993, FSFMR 1995). The share of Pine forests in the European-Ural part is higher (40 million ha forested area with 4816 million m³ of growing stock comprise 29% respectively 28% of forests in the European part) than in the Asian part (forested area 74 million ha, with a growing stock of 9820 million m³, or 13% respectively 18% of the forests in Asian Russia).

Pine forests have been investigated in Russia for many years, and there are many publications describing forest formations of Pine (e.g., Tjurin, 1952; Shukov, 1961-1965). Below we briefly considered a few features dealing with the needs to model the growth and dynamics of Pine forests.

Covering vast areas with significantly different climatic and soil conditions, Pine forests vary by forest types, species composition, productivity, morphological structure, types of age structure, disturbance regimes, regularities of natural successions, etc. From a topological point of view, Pine forests of large areas are usually divided into *groups of forest types*. For instance, for the European part (along the gradient of increased humidity) there is the *lichen* group of forest types, *clusterberry* (with *Vaccinium vitis-idaea*), *bilberry* (with *Vaccinium myrtillus*), *shamrock* (with *Oxalis acetosella*), *long-mosses*, *sphagnum* and *grasses-bog* groups of forests. The most productive forests are located in the middle of this grouping (e.g., mature shamrock Pine forests have a growing stock of about 500-600 m³/ha while the sphagnum types only have a growing stock of 100-150m³/ha). For the North-Eastern edge of the Pine area (Southern Yakutia), 4 basic groups have been identified: *lichen-Arctostaphylos* Pine stands (dry sites), *clusterberry* (medium humidity sites), *marsh-tea-bilberry* (wet sites) and *sphagnum* Pine stands (bogged areas), (Sherbakov, 1975).

Pine forest types can be indogenous and derivative. After harvesting and fires, Pine usually regenerates quite well, although on reach sites the species can be replaced by soft deciduous species (Aspen and Birch). Postfire derivative Pine successions are common in some types of Spruce and Larch indogenous sites of middle and southern taiga subzones.

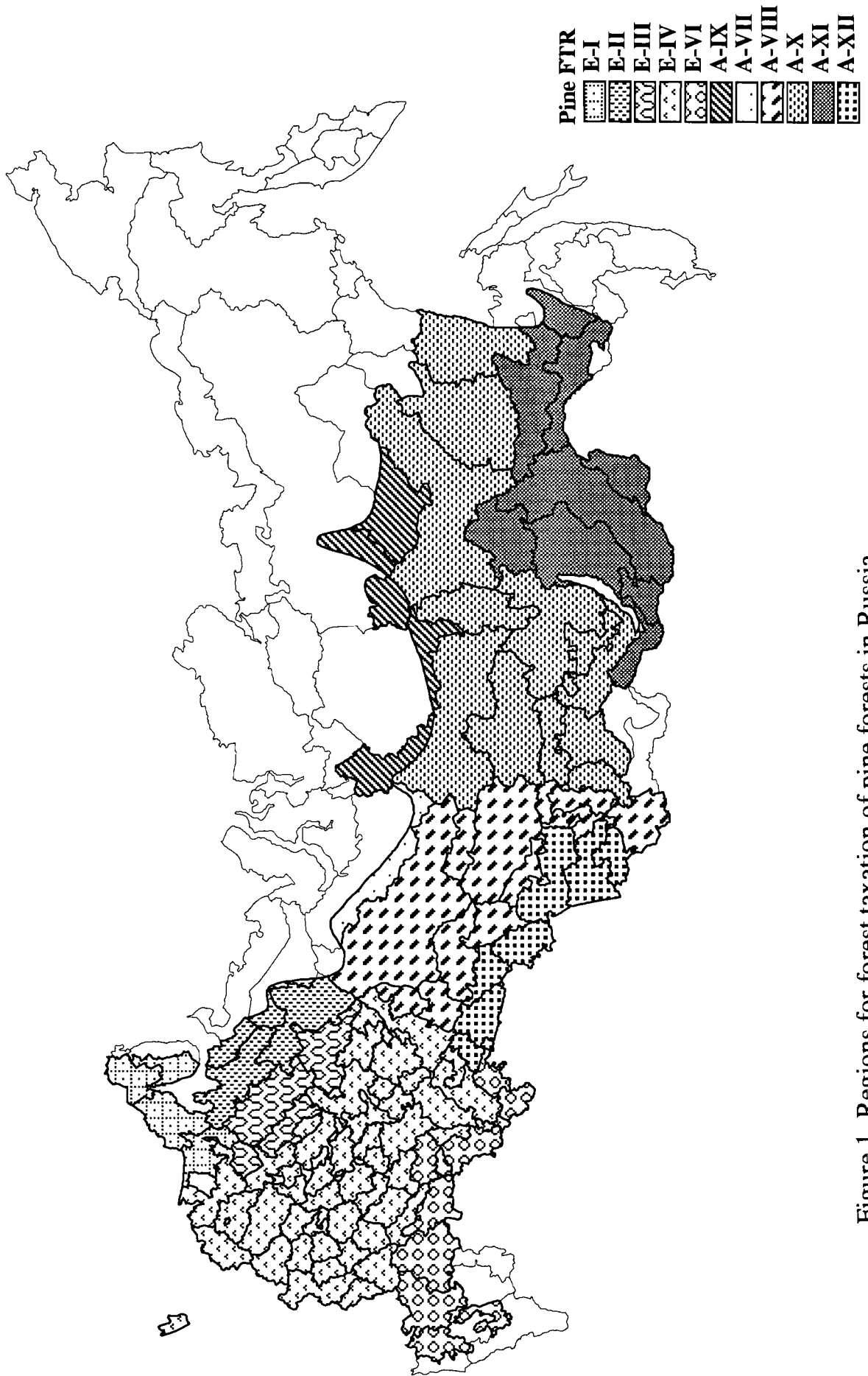


Figure 1. Regions for forest taxation of pine forests in Russia.

The actual productivity of Pine forests depends upon climatic and soil conditions. In major regions of the European Northern part, Siberia and Far East regimes of disturbances (such as fire and insects) can play a crucial role. Potential productivity can be characterized by an average site index (the Russian classification of site indexes use average height and average age of stands as indicators). Examples of such productivity estimates are presented in Table 1. There is an evident gradient of increased productivity from the north to the south and some decrease from the west to the east, although to some extent masked by mountains.

Table 1. Average site indexes of Pine stands. Source: VNIIZlesresourse (1992).

Zones and subzones ¹	Longitude, degrees										
	31-40	41-50	51-60	61-70	71-80	81-90	91-100	100-110	111-120	121-130	131-140
FT+SpT	5.7	4.5	5.7	-	4.7	-	-	-	-	-	5.5
NT	4.8	5.0	5.0	-	-	4.9	-	-	-	4.9	-
MT	3.5	4.0	3.8	-	-	4.0	4.0	3.6	4.0	4.2	4.1
ST	3.5	3.4	2.6	2.8	4.1	3.5	3.8	3.5	4.3	3.6	3.7
MF(NS)	2.7	2.0	2.3	-	-	-	-	-	-	-	-
MF(SS)	2.1	2.2	2.1	-	-	-	-	-	-	3.3	2.6
DF	1.5	2.0	1.7	2.4	3.2	3.1	-	-	-	-	2.9
FS	1.7	2.1	2.5	2.5	2.4	2.2	2.4	3.5	4.1	3.1	3.0
NS	2.3	1.9	2.6	-	2.1	2.6	-	3.8	3.9	-	-
SS	-	2.9	2.3	-	3.3	-	-	-	-	-	-
NSD	-	2.7	-	-	-	-	-	-	-	-	-

¹ Abbreviations of zones (Z) and subzones (SZ): FT+SpT-forest tundra zone (Z) and sparse taiga subzone (SZ); NT-northern taiga (SZ); MT-middle taiga (SZ); ST-southern taiga (SZ); MF(NS) and MF(SS)-respectively northern (with a dominance of coniferous) and southern (with a dominance of deciduous) (SZ) of mixed forests Z; DF-Z of deciduous forests; FS-forest steppe Z; NS and SS-subzones of northern and southern steppe; NSD-northern semidesert (SZ). Zones and subzones are given according to Kurnaev (1973).

The same pattern is observed for growing stock of immature and mature stands, although different regimes of disturbances bring additional features into the territorial distribution of productivity (Table 2).

Table 2. Average growing stock of immature and mature Pine stands (m³/ha).
Source: VNIIZlesresource (1992).

Zones and subzones ¹	Longitude, degrees										
	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140
FT+SpT	64	99	63	-	-	-	-	-	-	-	80
NT	110	114	81	-	-	176	-	-	-	90	-
MT	164	137	162	-	-	107	212	192	138	148	172
ST	145	184	194	210	130	158	188	199	141	136	145
MF(NS)	177	224	203	-	-	-	-	-	-	-	-
MF(SS)	209	228	235	-	-	-	-	-	-	119	103
DF	233	254	253	273	93	147	-	-	-	-	122
FS	266	240	237	231	148	196	184	164	140	175	-
NS	131	129	146	-	-	162	-	164	-	-	-
SS	-	-	153	-	123	-	-	-	-	-	-

¹ See footnote to Table 1.

Pine stands are represented by different categories of types of age structure (for types of age structure definitions (TASS) see Shvidenko et. al., 1996a). A major part of Pine forests in the European part of Russia is presented by evenaged stands. In the north alone, unevenaged stands comprise up to 20-30% of forested areas. On the contrary, Asian Pine forests are mostly unevenaged (Table 3). The driving forces for the development of unevenaged stands in different parts of Pine growing areas are different. In many areas of the European part (the North-Tkachenko, 1911; Tjurin, 1952; Brjansk oblast'-Tjurin, 1952) natural postfire regeneration is rather intensive and, consequently, generates evenaged Pine stands. But regular forest fires (with a stable average interval of 12-15 to 150-200 years are dependent on landscape properties) which are usually not completely stand replacing disturbances generate a significant part of unevenaged stands. In some forest types of Siberia, a slow intensity of regeneration and formation of stand canopy is an additional reason for the development of unevenaged stands.

Table 3. Distribution of areas of immature, mature and overmature Pine forests by types of age stand structures (TASS).

Zones and subzones	Distribution of Pine forests by TASS (%% of forested areas)							
	In European part				In Asian part			
	EVA	RUE	UEV	GUE	EVA	RUE	UEV	GUE ¹⁾
Northern/sparse Taiga	60	25	15	-	20	55	25	-
Middle taiga	70	20	9	1	23	51	25	1
Southern taiga	70	10	7	3	38	49	12	1
Mixed forests	88	6	2	4	-	-	-	-
Forest steppe	95	2	1	2	80	17	2	1

¹⁾ EVA - Evenaged Stands; RUE - Relative Unevenaged stands; UEV - Unevenaged stands; GUE - Gradually Unevenaged stands.

Note: Aggregated estimates given in Table 3 are based on available publications and evaluations by regional experts as well.

3. Methods and Approaches. Regionalization of Growth Peculiarities of Pine Stands in Russia

Models for the Pine stands were developed as a part of a modeling system (MS) developed to evaluate the dynamics and productivity of Russian forests. The general description of the MS is presented in Shvidenko et. al. (1996a), and some specific types of models in Shvidenko et. al. (1996b). Normative and model concepts of the MS is generated by unified models of growth and productivity of stands of main forest forming species using all available reference and experimental information, which have been collected during the last decades in Russia, as well as in adjoining states including different types of yield tables (general and regional; normal and modal, i.e., actual stands, single-species and mixed stands, etc.), different models and tables of gross and net growth, results of measurements on permanent sample plots, etc.

With respect to the model development, the following basic approaches have been used in the modeling system (MS).

1. The dominating type of models used in the MS is regional models for actual stands (*models for modal stands*). This type of model has an evident advantage as it describes the average features of stand growth in a specific region taking into account actual species composition, peculiarities of growth, type of age stand structures, etc. The basic shortcoming of this model type is the close dependence of regimes of anthropogenic and natural disturbances which formed the stands historically, i.e. these models reflect the stand development by a historical development for a specific period. If the growing conditions change, the models become inadequate. Changes of forest fire regimes in natural forests of Siberia due to improved fire protection or changes of thinning intensity in managed forests are examples of possible systematic errors generated by such models. Nevertheless, regimes of disturbances for many large regions of the taiga zone were rather stable during the last 20-30 years when the major part of the data used for the MS development were collected.
2. Unfortunately, models for modal stands can not be developed for a significant part of areas of Pine forests (specifically in Siberia and Far East) due to a lack of initial data. An aggregation of the approach mentioned above is the development of models of productivity of stands with variable growing stock, which present age dynamics of gross and net growth for stands over site indexes and different stocking levels. Such models have been developed for Pine stands, together with

other main forest forming species, and are presented in Shvidenko et al. (1996b). We only emphasize here that such types of models present average values of indicators by a definite age and stocking level independently of the stand's previous history. Thus, they can only be used for estimates of averages for a large number of estimated stands. Validation of such models for a number of regions has shown that the models give fairly accurate results for a separate stand if a) the stand is evenaged, and b) if the relative stocking of the stand has not changed significantly during its development.

3. Two types of models for fully stocked (or *normal*) stands were included in the MS: regional and general. The practical use of these models are 1) to define the relative stocking of actual stands, 2) to use them if the modal stand models are not available.
4. Finally, some specific types of models could be developed for a specific species for practical needs, e.g., models for forest plantations, models for mixed or unevenaged stands, models for some specific ecological conditions, etc.
5. The models used were unified as much as possible and kept as simple as possible. As a base model, the modified Richard-Chapman growth function was used for the description of dynamics for 5 basic indicators of forest stands (average height H and diameter D , basal area BA , growing stock (i.e., total stemwood volume of all living trees at age A) GS , and total productivity or total volume (i.e., all stemwood produced by a stand during the period from its origin to age A) TV . For instance, the model for GS is

$$GS = c_1 (1 - \exp(-c_2 A))^{c_3}, \quad (1)$$

where the coefficient c_1 is the maximum value of the growth function (the asymptote), $c_1 c_2 (1 - 1/c_3)^{(c_3 - c_1)}$ is the maximum of the current increment of the indicator described by function (1), and $\ln(c_3)$ is the turning point of the growth function. Function (1) describes the growing phase, i.e., when an indicator being modeled strongly increases. In a modified form (Venevsky and Shvidenko, 1996), that is designated to characterize both growing and the destructive phases (e.g., for such indicators as basal area and growing stock which can decrease after the age of maturity, or after impacts of some types of disturbances), the growth coefficient c_2 depends on age:

$$c_2 = \text{const}, \text{ if } A < A_d, \text{ and}$$

$$c_2 = c_2^* \exp(-c_4 (A - A_d)), \text{ if } A > A_d,$$

where A_d is the age when destruction (decrease of the indicator) starts. Such an approach assumes that the velocity of growth is exponentially decreasing from the beginning of the destructive phase. The derivatives of the basic indicators mentioned above present the current increment (e.g., dGS and dTV are net respectively gross growth, i.e., basic indicators of current productivity of forests).

6. The major part of the Russian tables and models of forest dynamics was established by using two basic classifiers: site index (different numerical indicators for the definition of a site index were used) and forest type. In this respect, we will not elaborate on the many discussions which took place in Russia during 1920-1980 (e.g., see reviews in Orlov, 1925; Tretjakov, 1927; Nikitin, 1966; Kozlovsky and Pavlov, 1967; Svalov, 1979; Anuchin, 1984), but will only list the main conditions used for the unified classifiers of the site index defined by Orlov (1925):

- forest type in current Russian classifications does not have any strong quantitative definitions;
- within the limits of a single forest type (the initial unit of classification used by the Russian forest inventory) there could be up to 3-4 site index classes;
- for all tables developed over forest types, the recalculation in the models of the site index system gave satisfactory results if the limits for ecological modifications of the forest formation were provided (e.g., automorphic and hydromorphic);
- all quantitative applications of forest inventory data and a major part of forest management in Russia are based on site index classifications;
- State Forest Account data, which is the single source of aggregated data for Russian forests does not include any quantitative data on forest types.

It should be pointed out that the general site index developed by Orlov (1925) is only used as a classifier for a specific age (as a rule 100 years), while the dynamics in the models use initial data.

7. The territorial (spatial) distribution of the models and the algorithm for the usage of the MS play a crucial role in the reliability and accuracy of all applications.

Russian forest science historically paid great attention to different types of natural regionalizations due to the huge territory and large diversity of the Russian forests. The forest inventory regionalization (FIR) is a partition of the forest territory, based on homogeneity of growth, structure and quality of stands (Sagreev, 1978). It is

assumed that within a specific FIR region, the same yield tables and growth models could be applied with sufficient accuracy. In order to identify the FIRs, different principles and criteria were used: climatic indicators in combination with productivity of the main forest forming species (Gorev, 1968; Rubtsov, 1970; Voropanov, 1970a; Lositskiy, 1971), different biometric indicators such as the “indicator of normality” D/H or H/D (D and H -average diameter and height of a stand respectively), Schiffel’s indicator (N/D , N -number of stems per ha), “life potential indicators” Z_{cur}/Z_{ave} , where Z_{cur} and Z_{ave} are current and average increment respectively, etc. (Voropanov, 1970b; Krest’jashin et al., 1971). Sagreev (1978) provided detailed analyses of growth regularities of Pine stands (basically in the European part of the former Soviet Union) and recommended as a basic criterion for the identification of FIRs the change of site index class and the intensity of growth (growth type by height; Seide, 1968). He divided the Pine forest area of the European part of the former Soviet Union into four regions, based on differences in growth peculiarities, from which three cover the Russian territory (see Figure 1):

Region II (by Sagreev, 1978)–Pine stands with good growth, divided into two subregions (the second subregion closely follows the southern boundary of the natural area of pine distribution as this part has smaller productivity). Generally, Pine stands in region I have a high productivity. Average site index is I.8.

Region III–Pine stands with moderate growth, covers large areas of zones of middle and southern taiga. Basic growing conditions are characterized by some heat deficit under sufficient (sometimes redundant) water availability. Average site index is III.8.

Region IV–Pine stands with low growth, includes Pine forests of the Extreme North (Kol’sky peninsula, Komi Republic), which belong to forest tundra and the northern taiga. The region is characterized by unfavorable conditions for Pine growth due to a significant lack of heat and surplus of humidity. Average site index is IV.7.

Sagreev’s forest inventory regionalization of Pine stands in the European part has a clear geographical basis with similar features for structure and productivity of forests, specifics of forest types, level of anthropogenic changes and successional dynamics. Nevertheless, the approach developed by Sagreev can not be used in many areas of Siberia and the Far East for several reasons. Firstly, forests in these regions are strongly impacted mostly by natural disturbances, which are linked to landscape (geographical) nature. Secondly, large shares of Pine stands are unevenaged.

The general FIR of the FSU which was established during 1975-1990, divided the total territory of Russian forests into 8 forest inventory regions: European North-West, European North-East, European Center and European South, Mountain Ural, Northern Caucasus, Siberia, (continental) Far East, Sakhalin and Kamchatka.

Different approaches were used to divide these regions into subregions based on regularities of growth. For instance, the European North-Eastern region has been divided into 4 subregions for all species (Voinov, 1986) based on a forest vegetational regionalization (Subtundra, Northern Taiga, Middle Taiga and Southern Taiga subregions). For Far Eastern forests the subregions were generated based on separate species: 6 subregions were suggested for Larch, 3 for Spruce and 2 for Cedar (Korjakin, 1990). The forest vegetational regionalization was used as a basis for the FIR division in Siberia (Falaleev et al., 1975).

Within the framework of the developed MS, we followed the following rules of thumb: 1. Primary units of territorial partition (regionalization) should be the same for all basic resources and ecological estimates for different species. 2. The regionalization has to present possibilities to provide different generalizations of both natural and administrative nature. 3. Existing initial data (aggregations) should have a scale which would be compatible with primary units used in the regionalization.

It can be shown that the only relevant division into ecological regions (ecoregions) is a division that completely corresponds to the above requirements. For Russia, 141 ecoregions have been identified: 63 in Siberia and in the Russian Far East, and 78 in European Russia. The following principles have been used for the identification:

1. The basic ecological cycles should be of the same magnitude. A consequence of this is a requirement of the approximate equality of basic indicators for productivity of the terrestrial biota.
2. Ecoregions should be homogeneous with respect to climatic and soil conditions. Mountain areas and plains as well as permafrost and non-permafrost areas should be separated. Consequently, ecoregions should be homogeneous with respect to forest growing potential, basic features of forest cover, and regimes of natural disturbances. It means that basic areas of stands of a specific species should not have much variation in the site indexes.
3. Character and level of anthropogenic and natural disturbances should be similar within an ecoregion. This follows from the requirements that disturbance regimes have to be similar.
4. Ecoregion boundaries should not cross the administrative boundaries of objects of the Russian Federation (oblasts, kraj, and autonomic republics).

From the requirements listed above it can be concluded that an ecoregion can serve as a primary unit for the FIR, but for large scale growth evaluations ecoregions have to be aggregated. Such aggregations can be different for different species and different goals of investigations. For the FIR of Pine stands the following basic requirements were used: a) the minimum difference between the average site index is one class; b) homogeneity of basic groups of forest types, which means species composition, type of age structure, regularities of growth and disturbances regimes; c) areas of Pine stands and availability of initial tables. Finally, we developed 12 forest inventory regions for Pine stands: 6 in European part (index E is given below before the number of ecoregions) and 6 in the Asian part (index A):

- E-I. Western ecoregions of northern and middle taiga (Murmanskaja oblast and Karelia republic).
- E-II. Eastern ecoregions of forest tundra and northern taiga (Arkhangelsk and Vologda oblast, and Komi republic).
- E-III. Ecoregions of middle taiga (Archangelsk, Perm and Vologda oblast, and Komi republic).
- E-IV. Ecoregions of southern taiga, mixed forests, deciduous forests, and forest steppe.
- E-V. Mountain ecoregions of middle and southern taiga of Ural.
- E-VI. Ecoregions of steppe and semidesert zones of the European part.
- A-VII. Ecoregions of sparse taiga and northern taiga of West Siberia.
- A-VIII. Ecoregions of middle and southern taiga of West Siberia.
- A-IX. Ecoregions of sparse taiga and northern taiga of East Siberia and Far East.
- A-X. Ecoregions of middle taiga, southern taiga, subtaiga, and forest steppe of East Siberia and Yakutia.
- A-XI. Mountain taiga ecoregions of Burjatia, Irkutsk, Chita, and Amur oblasts.
- A-XII. Ecoregions of forest steppe and steppe zones of West Siberia.

The distribution of the ecoregions from the suggested FIR regions is presented in Figure 1. For the European part our regions are similar to those recommended by Sagreev (1978).

5. Technically, the modeling process was realized in the following way. For a given type of models and groups of ecoregions, basic data were selected. Usually, these were table(s) of model(s) which were validated earlier in Russia. If different tables of the same type were available for a region, a special procedure for comparison of the tables was used, and decisions on which table to use were made on an expert

basis. If the tables (models) had no significant statistical differences, the coefficients of the models were calculated either for all initial data or for the most complete and reliable source. All supplementary information and results of measurements available were also used.

Much research on inventory reference-normatives was carried out from 1970-1990 under the guidance of the former USSR State Forest Committee. Results of this work, after approval by special expert commissions, have been published in a number of regional reference books for the forest inventory (e.g., Moshkalev, 1984; Shvidenko et al., 1987; Voinov, 1986; Korjakin, 1990). Unfortunately, such regional reference books have not been published for the Siberian forests. Nevertheless, the selection of the basic sources was facilitated by the availability of these publications. Data for missing indicators (some initial sources did not report the total productivity) were taken from other relevant publications, archives, and results of measurement.

Due to the fact that a significant part of the initial data used for the model development were presented in the form of organized data, e.g., in the form of yield tables, the required accuracy of approximation was rather high, some 7% for any approximated estimate. The coefficients c_1 , c_2 and c_3 , defined in this way, were used for the development of the models. The models were presented in two-dimensional form (site index and age). To arrange the dependence of coefficients of site indexes, a quadratic regression (Shvidenko et al., 1996a) was used.

$$c_1 = c_{13} N^2 + c_{12} N + c_{11}$$

$$c_2 = c_{23} N^2 + c_{22} N + c_{21}$$

$$c_3 = c_{33} N^2 + c_{32} N + c_{31}$$

where N is the number of the site index (1 corresponds to site indexes Ia, 2 to site index I, ..., 6 to site index Va, etc.). If initial sources were developed over forest types, a fractional number of site index as corresponding to a given forest type was used for the calculations of the coefficients.

4. Models

Based on the approaches mentioned above, 22 models are suggested to describe the dynamics of the Pine forests in Russia (the codes presented below are: the first 3 digits is the code of species in the Russian State Forest Account, e.g., 101 Pine; the 4th digit is the type of table: 1 normal general, 2 normal regional; 3 variable stocking; 4 modal; the 5th digit is the type of age structure: 1 evenaged, 2 relatively unevenaged, 3 unevenaged, 4 gradually unevenaged; and the 6th digit is the type of ecological modification: 1 common; 2 automorphic conditions; 3 hydromorphic conditions). A short description of the main basic sources used in the calculations is presented below.

4.1. Models for Fully-Stocked (normal) Stands

101212. Models for goal programs of cultivated plantations of Pine stands. The models are developed for Id, ..., IV site indexes, and covers an age-span from 10 to 120 years. The region for accurate application is E-IV (see Figure 1). The models could be used for long-term predictions in other regions, excluding regions of sparse and northern taiga as well as steppe and semi desert zones (Basic source: Strochinsky et al., 1992, pp. 20-27). Authors of the initial tables are A.Strochinsky, A.Shvidenko, and P.Lakida.

101212. Models of Pine plantations. The models are designated for description of the dynamics of artificial (planted) Pine forests in the regions E-IV for Ib, Ia, ..., V, Va site indexes, and cover an age-span from 10 to 120 years. The models can be used for Pine plantations in ecoregions of southern taiga, mixed and deciduous forests, and forest steppe. (Sagreev et al., 1992, pp. 335-337). Author of the initial tables is V.V.Uspensky.

101111. General models. The models can be applied for all evenaged natural Pine stands if regional models for normal stands are absent. The models are recommended for implementation in regional normal stands in ecoregions of southern taiga, mixed forests, deciduous forests and forest steppe zones of the European part of Russia. The models are developed for Ib, Ia, ..., Va, Vb site indexes, and cover an age-span from 10 to 200 years (Sagreev et al., 1992, pp. 299-304). Author of the initial tables is V.V.Sagreev.

101212. Models for western ecoregions of northern and middle taiga zones (Karelia and Murmansk oblast, the FIR region E-I). The models are developed for Ia, I, ..., V, Va site indexes, and cover an age-span from 20 to 180 years. (Kozlov, 1985, pp. 64-94). Author of the initial tables is I.F.Kozlov.

101212. Models for forest-tundra and northern taiga ecoregions of the European part of Russia (the FIR region E-II). Developed for II, III, ..., Va, Vb site indexes, and ages from 20 to 300 years including destructive stages (Voinov, 1986, pp. 122-123). Author of the initial tables is V.I.Levin. Total productivity was calculated by the formula $TV = R_1 GS$, where $R_1 = (R - 0.007SI) (0.9517 + 0.000526 A)$, $R = TVg/GSg$, where TVg and GSg are, total productivity and growing stock respectively of Pine stands given in the general models.

101212. Models for middle-taiga ecoregions of European Russia. Region - E-III. Developed for II, III, ..., Va, Vb site indexes, and ages from 20 to 300 years with destructive phases (Voinov, 1986, pp. 119-122). Author of the initial tables is V.I. Levin. The initial tables have been generated over forest types. The correspondence between forest types and site indexes given by the author is the following: II site index-Pine stands (P.s.) with *Oxalis* (*kislichnik*); III-P.s. with bilberries (*chernichnik*); IV-P.s. with bilberries+long mosses (*chernichnik dolgomoshnij*), P.s. with red bilberry (*brusnichnik*), and P.s. with mosses and lichens (*mokhovo-lishainikovy*); V- P.s. with lichens (*lishainikoviy*), P.s. with sphagnum and sphagnum+sedge (*osokovo-sphagnoviy*); Va-P.s. *vakhto-sphagnoviy* and P.s. on bogs. Total productivity is calculated based on regularities in the general models.

101212. Models for mountain ecoregions of middle and southern taiga of the Ural region (E-V). Developed for I, II, III and IV site indexes, and ages from 10 to 160 years. (Verkhunov P.M., 1991, Table 5.6, pp. 213-214). Authors of initial tables are M.I.Galperin and I.F.Korostyljov. Initial tables are generated over forest types.

101212. Models for middle taiga, southern taiga, subtaiga, and forest steppe ecoregions of Central and East Siberia (A-X). Developed by the aggregation of 15 different yield tables for Ia, I, ..., V site indexes, and ages from 20 to 180 years. (Motovilov G.P., 1966; Falaleev E.N. and Polakov V.S., 1969; Falaleev E.N. et al., 1975; Kozlovskiy and Pavlov, 1967). Authors of the initial tables are S.S.Shanin, E.N. Falaleev, E.P.Smolonogov, and E.L.Bessabotnov.

101212. Models for subtaiga, forest steppe and mountain taiga ecoregions of the southern part of West Siberia (A-VIII). Developed as aggregation of 8 yield tables for I, II, ..., Va site indexes, and ages from 20 to 170 years. The authors are the same as above.

101213. Models for northern taiga ecoregions of the West Siberian Plain (A-VII) (hydromorphic conditions). Developed as aggregation of 6 yield tables initially developed over forest types for IV, V, Va and Vb site indexes, and ages from 20 to 250 years (Motovilov, 1966; Falaleev et al., 1975; and Kozlovskiy and Pavlov, 1967).

101212. Models for mountain ecoregions of Zabaikalja (A-XI) (Irkutskaja, Chitinskaja and Amurskaja oblast and Burjatia Republic). Developed for III, IV and V site indexes, and ages from 20 to 250 years (Falaleev et al., 1975; Motovilov, 1966; and Zai et al., 1981).

101212. Models for Pine stands in *melkosopochnik* of Kazakhstan. Recommended for steppe ecoregions of the Urals and West Siberia (A-XII) (except for belt stands). Developed for I, II, ..., V, Va site indexes, and ages from 20 to 140 years (Makarenko, 1980). The initial tables were developed over growth classes. Authors of the initial tables are A.A.Makarenko and A.I.Koltunova.

101212. Models for belt Pine stands (*lentochnie bory*) in steppe ecoregions of Siberia (A-XII). Developed for I, II, III, IV site indexes, and ages from 20 to 140 years (Makarenko, 1980). The initial tables were developed over growth classes. Authors of the initial tables are A.A.Makarenko and A.I.Koltunova.

4.2. Models for Modal Stands

101412. Models for western ecoregions of southern taiga and mixed forests of the European part, and recommended for Leningrad, Pskov and Novgorod oblasts. Developed for Ia, I, ..., V site indexes, and ages from 20 to 130 years. The models are developed as the aggregation of 7 different yield tables for modal stands of western regions of the former Soviet Union (including Baltic republic, Buyelorus, and the Russian North West), and from data of forest inventory and results of field measurements.

101412. Models for two groups of modal stands in Karelia and Murmanskaja oblast with a relative stocking 0.65 and 0.8. Developed for I, ..., V, Va site indexes, and ages from 20 to 180 years. (Kozlov, 1985). Author of the initial tables is I.F.Kozlov.

101413. Models for the central ecoregions of the European part (southern taiga, mixed forests, deciduous forests, forest steppe). Developed for I, ..., V site indexes and covering an age-span from 20 to 140 years in the form of 6 aggregated yield tables for

modal stands of central and southern regions of Russia. Additional data have been used from Northern Ukraina and Buyelorus from forest inventory and from results of field measurements.

101412. Models for forest tundra and northern taiga ecoregions of the European North (excluding Karelia and Murmansk oblast), developed for IV, V, Va and Vb site indexes, and covering an age-span from 20 to 140 years (Voinov, 1986, Table 5.1.5, pp. 128-129). Author of the initial tables developed over forest types is B.A.Semenov. The total productivity was calculated based on data from field measurements.

101412. Models for mixed Pine stands with white birch and larch of northern taiga ecoregions of the West Siberian plain, developed for III, IV, ..., Vb site indexes and covering an age-span of 20 to 250 years (Falaleev et al., 1975, Table 58, pp 65-90). Author of the initial tables developed over forest types is A.E.Tetenkin.

101413. Models for Pine stands growing in hydromorphic conditions of northern, middle and southern taiga of Siberia. The models are developed as an aggregation of 3 different yield tables (developed over forest types) for IV, V, Va and Vb site indexes, and covering an age-span from 20 to 200 years (Smolonogov, 1970 and Falaleev et al., 1975).

101412. Models for Pine stands growing in automorphic conditions of northern, middle and southern taiga of Siberia. The models were developed as an aggregation of 4 different yield tables (developed over forest types) for III, IV, V and Va site indexes, and covers an age-span from 20 to 180 years (Smolonogov, 1970 and Falaleev et al., 1975).

Individual parameters of the models are presented in Tables 4 and 5. The tables calculated by the models are presented in Appendixes 1 and 2.

Table 4. Growth Functions Parameters for Normal Pine Stands

	c11	c12	c13	c21	c22	c23	c31	c32	c33	c41	c42	c43
101212. Goal Program of Cultivated Pine Stands												
H	42.35886	-4.32895	-0.01183	0.022333	-4.1E-05	1.96E-05	1.370246	-0.00142	0.000922	–	–	–
D	94.43298	-0.9514	-1.17496	0.005467	-0.00047	8.04E-05	0.922933	0.00626	0.002704	–	–	–
BA	43.9569	-4.02067	0.27985	0.048097	0.000368	-2.7E-05	1.577307	0.067266	0.010518	–	–	–
GS	773.891	-123.235	7.641807	0.029757	2.81E-05	-7.6E-05	2.25105	0.044783	-0.0002	–	–	–
TV	1705.058	-259.118	15.2538	0.017533	3.08E-05	-2.3E-05	1.826484	0.041956	0.003485	–	–	–
101212. Cultivated Pine Stands (plantations)												
H	39.99908	-3.62026	-0.02264	0.026365	-0.00146	6.19E-05	1.360921	-0.07182	0.01679	–	–	–
D	173.1088	-23.6628	1.440227	0.003226	-0.00024	4.76E-05	1.006004	-0.07906	0.018992	–	–	–
BA	54.33946	-4.45456	0.092888	0.041583	0.002579	-0.00041	0.964825	-0.01825	0.036802	–	–	–
GS	869.0483	-93.884	-0.23558	0.028546	-0.00174	0.000148	1.803761	-0.1682	0.04956	–	–	–
TV	1699.685	-197.52	-0.74786	0.022015	-0.00158	0.000312	1.906985	-0.25408	0.074387	–	–	–
101111. General												
H	42.679896	-3.672878	-0.085074	0.02153	-0.00134	0.00013	1.244	-0.038	0.015	–	–	–
D	69.08517	-6.16043	-0.0791	0.011865	-0.00047	0.000065	1.18853	0.01435	0.00482	–	–	–
BA	59.41988	-6.27612	0.2162	0.040272	-0.003526	0.000162	1.13309	-0.02862	0.00199	–	–	–
GS	1019.0606	-162.7926	6.0478	0.027433	-0.002283	0.000154	2.0258	-0.0623	0.0131	–	–	–
TV	1839.98	-249.891	5.649	0.020699	-0.001531	0.00012	2.0269	-0.1132	0.0239	–	–	–
101212. Karelia republic and Murmanskaja oblast												
H	35.04844	-1.03981	-0.28113	0.036281	-0.00567	0.00045	2.017794	-0.20713	0.024856	–	–	–
D	75.22187	-12.1802	0.809394	0.001416	0.004912	-0.00059	0.196737	0.449259	-0.04596	–	–	–
BA	56.15855	-1.48975	-0.586	0.052102	-0.0114	0.001582	1.728512	-0.2178	0.04515	–	–	–
GS	835.7459	-46.109	-8.5934	0.027612	-0.00311	0.000297	1.257599	0.311245	-0.02591	–	–	–
TV	2352.416	-356.044	9.262281	0.007189	0.003583	-0.00033	0.380969	0.702173	-0.05502	–	–	–

101212. Subtundra and Northern Taiga Ecoregions of European Russia

H	38.99938	-2.93593	-0.10641	0.02009	0.000327	-3.9E-05	1.640456	-0.20014	0.032034	–	–	–
D	56.57721	-5.00933	0.0244	0.009519	0.001028	-6.2E-05	1.862747	-0.30524	0.049335	–	–	–
BA	46.93517	0.946046	-0.59253	0.021083	-0.00187	0.000429	2.843668	-1.36453	0.192864	0.008578	0.002477	-0.00031
GS	916.712	-113.198	1.180382	0.024049	-0.00285	0.000426	3.88336	-1.33539	0.188505	0.00545	0.001088	-8.1E-05
TV	1897.534	-242.344	3.742169	0.00468	0.003599	-0.00024	0.266583	0.312108	0.014013	–	–	–

101212. Middle Taiga Ecoregions of European Russia

H	54.79048	-8.72277	0.41506	-0.00592	0.00887	-0.00074	0.313392	0.123085	0.021145	–	–	–
D	73.85311	-10.9955	0.511386	0.022118	-0.005	0.000629	4.289694	-1.62162	0.217586	–	–	–
BA	75.65839	-13.0406	0.855598	-0.03635	0.025629	-0.00246	-1.81375	1.004721	-0.07708	0.030887	-0.00753	0.000809
GS	1361.741	-302.582	19.20065	-0.01822	0.016632	-0.0016	-2.219	1.523067	-0.11497	0.012763	-0.00228	0.000316
TV	2081.364	-355.606	15.83951	0.019474	-0.00144	0.000174	4.265016	-1.35965	0.175796	–	–	–

101212. Middle Taiga, South Taiga, Subtaiga and Forest Steppe Ecoregions of Central and East Siberia

H	46.49251	-6.92659	0.418991	0.01834	0.001727	-0.00016	2.169778	-0.61956	0.120212	–	–	–
D	63.21413	-4.11427	-0.28691	0.023479	-0.00629	0.000782	2.744299	-0.75962	0.103511	–	–	–
BA	42.43583	2.920939	-0.92596	0.127666	-0.058	0.008893	3.969275	-1.73638	0.290375	–	–	–
GS	858.4123	-94.03	-0.97704	0.027157	-0.00193	0.000128	1.205861	0.530664	-0.08542	–	–	–
TV	1642.708	-84.8652	-13.8867	0.017478	0.000154	-9.8E-05	1.347204	0.605417	-0.08923	–	–	–

101212. Fully-stocked Pine stands of mountain ecoregions in the Ural south and middle taiga

H	43.91288	-6.1578	0.27075	0.01024	0.00855	-0.0008	1.3274	-0.1291	0.1049			
D	69.21543	-10.0168	0.84212	0.01251	0.00079	-0.0001	1.1687	0.11085	0.0231			
BA	59.66124	-4.95514	0.29685	0.00688	0.01717	-0.0021	0.7020	0.01280	0.0802			
GS	1077.706	-189.163	12.3030	0.00763	0.01214	-0.0018	0.3867	1.02246	-0.112			
TV	1843.516	-249.78	8.32685	0.01008	0.00682	-0.0009	1.1415	0.49055	-0.031			

101213. Northern Taiga Ecoregions of West Siberian plain

H	54.40087	-7.66332	0.23594	0.028147	-0.00358	0.000481	9.76196	-2.98427	0.284636	-	-	-
D	99.82447	-16.5051	0.732628	0.034011	-0.00797	0.000749	8.780857	-2.51255	0.218954	-	-	-
BA	52.0576	-7.32441	0.300012	-0.15986	0.058956	-0.00438	-9.59853	3.089592	-0.20172	-	-	-
GS	777.6919	-138.336	6.056971	-0.0113	0.011049	-0.00078	-5.33318	2.162296	-0.119	-	-	-
TV	2134.694	-412.856	20.9146	-0.02575	0.010574	-0.00061	-4.1846	1.406706	-0.06238	-	-	-

101212. Mountain stands in Zabaikal'e

H	45.80431	-6.3701	0.274073	-0.01678	0.016954	-0.00165	-1.52502	1.197701	-0.09039	-	-	-
D	61.11183	-5.4824	0.083115	0.0284	-0.00748	0.000853	7.047965	-2.59413	0.294642	-	-	-
BA	30.24448	1.988047	-0.51232	0.32764	-0.1243	0.012782	9.285718	-3.75043	0.422386	0.043957	-0.01124	0.001137
GS	753.2793	-114.391	4.819045	0.032982	-0.00544	0.000679	0.642263	0.17	0.036282	-0.01627	0.010444	-0.00103
TV	1683.279	-331.611	21.63212	-0.02592	0.018625	-0.00173	-7.74941	3.922132	-0.34121	-	-	-

101212. Belt Pine Stands (*lentochnie bory*)

H	38.53734	-4.02054	0.013605	0.036784	0.000682	-0.00014	2.277917	-0.01758	-0.00181	-	-	-
D	41.55251	-3.47448	0.140014	0.029275	0.000426	-0.00039	0.763086	0.98113	-0.11941	-	-	-
BA	67.06972	-11.3858	1.056953	-0.05411	0.050121	-0.00493	-0.32138	0.52912	0.030053	-	-	-
GS	985.4088	-211.468	14.93424	0.024625	0.005173	-0.00027	2.985753	-0.34411	0.066213	-	-	-
TV	1142.865	-176.673	9.297052	0.040511	-0.0024	0.000136	3.436764	-0.40393	0.053061	-	-	-

101212. Melkosopochnik of Kazakhstan

H	43.84999	-4.28018	0.007902	0.021305	0.000631	-4.6E-05	1.70066	0.046668	-0.00326	-	-	-
D	50.89087	-5.88837	0.09266	0.018458	-0.00021	4.27E-05	1.491018	-0.0012	0.001496	-	-	-
BA	63.79573	-6.43028	0.230005	0.029336	0.003042	-0.00013	1.050824	0.191026	-0.00653	-	-	-
GS	1157.438	-206.723	10.193	0.025579	-0.00024	2.43E-05	2.588265	0.025912	-0.008	-	-	-
TV	1602.801	-307.105	16.48709	0.022318	-0.00053	7.88E-05	2.589652	-0.04082	-0.00016	-	-	-

Digits in the code note: first 3 digits - the type of the specie (101 - pine);
 4-th digit - the type of a table: 1 - normal general, 2 - normal regional, 3 - general (different stocking), 4 - modal;
 5-th digit - the type of age structure: 1 - unevenaged, 2 - moderately evenaged, 3 - evenaged, 4 - gradually evenaged;
 6th digit - the type of a serie: 1 - general, 2 - automorphic, 3 - hydromorphic.

Table 5. Growth Functions Parameters for Modal Pine Stands

	c11	c12	c13	c21	c22	c23	c31	c32	c33	c41	c42	c43
101412. Western ecoregions of Southern Taiga and Mixed Forests of European Russia												
H	43.80519	-5.92466	0.325175	0.015928	0.006213	-0.0009	0.839706	0.478014	-0.04095	-	-	-
D	86.77021	-15.3049	1.085602	0.003725	0.004898	-0.00051	0.733629	0.314318	-0.0223	-	-	-
BA	34.98147	-3.9107	0.135496	0.028293	0.012509	-0.00207	0.510518	0.452957	-0.04032	-0.00542	0.015341	-0.00212
GS	574.249	-137.458	12.2907	0.018748	0.012012	-0.00195	0.973364	0.975032	-0.11582	-	-	-
TV	926.928	-247.603	23.66711	0.020881	0.009165	-0.00153	1.539122	0.740128	-0.08317	-	-	-
101412. Karelia (stocking = 0.8)												
H	29.00869	2.095061	-0.66636	0.054146	-0.0147	0.00153	3.053235	-0.72637	0.085438	-	-	-
D	63.52648	-5.33995	-0.06992	0.020783	-0.00498	0.000587	2.336889	-0.60492	0.077369	-	-	-
BA	51.60491	-3.82347	-0.17921	0.027819	0.00055	4.82E-05	1.151489	0.048505	0.00532	-	-	-
GS	732.0629	-67.6641	-3.55003	0.02175	-0.00028	-8.2E-06	0.396607	0.684125	-0.06514	-	-	-
TV	2002.803	-330.125	11.7029	0.009427	0.0041	-0.00048	-0.20738	1.15957	-0.11628	-	-	-
101412. Karelia (stocking = 0.65)												
H	34.63592	-0.28449	-0.39909	0.036722	-0.00706	0.00066	1.860391	-0.16755	0.019371	-	-	-
D	43.54228	5.694858	-1.3959	0.028355	-0.00875	0.001059	2.416617	-0.5899	0.07865	-	-	-
BA	30.99842	6.090539	-1.39377	0.062077	-0.02284	0.002894	2.381302	-0.75641	0.10703	-	-	-
GS	714.1454	-65.8837	-4.44776	0.010114	0.003079	-0.00027	-1.44479	1.500031	-0.14628	-	-	-
	1637.802	-189.827	-4.13473	0.014074	0.00024	-1.1E-05	0.220116	0.83965	-0.07611	-	-	-
101413. Central Regions of European Part												
H	40.804	-2.27586	-0.23214	0.01536	0.001337	-0.00026	0.8596	0.1384	-0.015	-	-	-
D	38.388	5.266143	-1.22214	0.02646	-0.00535	0.000407	1.4678	-0.15336	0.012357	-	-	-
BA	37.714	-6.02671	0.480714	0.08826	-0.0226	0.001964	2.2776	-0.59605	0.057293	-	-	-

GS	522.92	-95.6414	6.421429	0.04608	-0.00521	-2.9E-05	2.5114	-0.08629	-0.01671	-	-	-
	1036.837	-179.131	9.830071	0.04211	-0.00438	-9.5E-06	2.554723	-0.00375	-0.0231	-	-	-

101412. Forest Tundra and Northern Taiga Ecoregions of the European North

H	57.31894	-8.99863	0.369316	0.015479	0.002744	-9.7E-05	-2.75088	1.006492	-0.02353	-	-	-
D	35.17328	1.34114	-0.55821	0.007599	0.003478	8.6E-05	-2.56551	1.033791	-0.00017	-	-	-
BA	38.75393	-3.73029	0.024255	-0.00857	0.010421	0.000254	-13.9538	3.199914	0.028093	-	-	-
GS	429.2122	-44.2841	-0.6461	0.03867	0.001333	0	4.9333	0.16667	0	-	-	-
TV	1179.685	-141.815	0.725	0.005025	0.009025	-0.00087	2.0352	0.2637	-0.0335	-	-	-

101412. Mixed Pine Forests of Northern Taiga Ecoregions of West Siberian Plain

H	41.17425	-3.72292	-0.05387	0.034114	-0.00433	0.000459	2.973792	-0.69851	0.097566	-	-	-
D	56.55899	-3.45819	-0.22507	0.039596	-0.00921	0.000777	4.456761	-1.07746	0.09827	-	-	-
BA	48.67152	-5.83514	0.160316	0.245143	-0.06816	0.00533	14.79995	-4.87845	0.432915	-	-	-
GS	741.2282	-124.781	4.862374	0.11246	-0.02508	0.001804	9.469977	-2.04134	0.172042	-	-	-
TV	1545.496	-281.692	12.19486	0.072294	-0.01357	0.000954	4.125498	-0.29184	0.030549	-	-	-

101413. Northern, Middle and Southern Taiga Ecoregions of West Siberia (hydromorphic conditions)

H	7.307827	6.586937	-0.82207	0.117179	-0.03011	0.002349	4.502176	-1.19995	0.123767	-	-	-
D	132.3424	-27.3801	1.619815	-0.01156	0.006195	-0.00037	4.104588	-1.02305	0.096809	-	-	-
BA	151.4881	-31.2411	1.696353	-0.26028	0.096975	-0.00776	-34.2094	11.23228	-0.84185	-	-	-
GS	1753.355	-391.613	22.47056	0.162928	-0.04293	0.0033	17.99798	-5.22531	0.446141	-	-	-
TV	2723.692	-590.785	32.70304	0.145298	-0.04079	0.003197	14.39888	-4.23295	0.364212	-	-	-

101412. Northern, Middle and Southern Taiga Ecoregions of Siberia (automorphic conditions)

H	43.15299	-4.0748	-0.04533	0.006079	0.004906	-0.00034	-3.7801	1.867499	-0.15527	-	-	-
D	288.6924	-93.539	8.380427	-0.12025	0.049663	-0.00458	-10.4127	4.293506	-0.38091	-	-	-
BA	-62.5535	34.04125	-3.12397	0.091202	-0.0254	0.002253	5.987266	-1.95211	0.198431	-	-	-
GS	-197.857	232.0568	-26.0865	0.040693	-0.00871	0.000919	3.800462	-0.93887	0.130543	-	-	-
TV	-145.189	309.0927	-36.7036	0.031978	-0.00675	0.00074	3.202289	-0.68159	0.101371	-	-	-

5. Estimates on Increment and Mortality of Pine Stands in Russia

Two important indicators describing the current state and productivity of forests, gross growth (dTV) and net growth (dGS), were calculated based on the developed models for Russia. Data of Forest State Account-1993 (FSFMR, 1995) served as initial data (dominant species, age, site index, stocking, growing stock by ecoregions). The calculations were done based on percentages of gross and net growth derived from the system. Results of the calculations are presented in Appendix 3. Total gross and net growth of Pine forests in Russia were estimated to 388.4 to 200.1 million m³/year respectively. It means that the actual mortality is 188.3 million m³/year. The average value for net growth of Pine in Russia is 1.60 m³/ha and year, but the European Pine forests have a current productivity of about two times higher than in Asia (2.25 m³/ha and year versus 1.18 m³/ha and year). The main reasons for this difference are different climatic and soil conditions, more severe disturbance regimes in Asia, higher average age in the Asian part, and differences in the age structures of stands.

6. Conclusion

The models developed for Pine stands within the framework of a special modeling system can be used in many applications for ecological evaluations; for estimation of Net Primary Productivity (NPP) and Net Ecosystem Productivity (NEP) of the woody part of an ecosystem; for establishment of forest management practices; to substantiate the intensity of thinning; for forest inventory, etc. The models (within the framework of a complete MS) will be presented to the Federal Service of Forest Management of the Russian Federation for official consideration and future use in forest management of the country.

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APPENDIX 1

NORMAL TABLES OF PINE STANDS

Dynamics of Normal Cultivated Pine Stands

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						<i>Ib Site Index</i>					
20	11.9	10.6	3523	31.3	194	12.95	9.68	237	18.01	11.87	5.06
30	17.6	15.7	2015	39.2	321	12.19	10.69	425	19.07	14.16	6.88
40	22.3	20.7	1320	44.4	434	10.49	10.86	612	18.20	15.31	7.72
50	26.2	25.5	936	47.8	530	8.61	10.60	786	16.45	15.72	7.83
60	29.2	30.1	701	50.0	607	6.88	10.12	940	14.37	15.67	7.49
70	31.7	34.7	546	51.5	668	5.40	9.55	1073	12.28	15.33	6.88
80	33.5	39.0	439	52.5	716	4.18	8.95	1186	10.33	14.83	6.15
90	35.0	43.3	361	53.1	753	3.22	8.36	1281	8.60	14.23	5.38
100	36.2	47.4	304	53.5	781	2.46	7.81	1359	7.10	13.59	4.64
110	37.0	51.3	260	53.8	802	1.87	7.29	1424	5.82	12.94	3.95
120	37.7	55.2	226	54.0	819	1.42	6.82	1476	4.75	12.30	3.34
<i>Ia Site Index</i>											
20	10.7	10.3	3503	29.4	177	11.27	8.86	232	16.20	11.62	4.93
30	15.8	15.0	2089	36.7	287	10.47	9.56	397	16.50	13.25	6.03
40	20.0	19.4	1407	41.4	384	9.01	9.61	558	15.47	13.95	6.46
50	23.4	23.6	1018	44.5	467	7.44	9.33	705	13.87	14.10	6.43
60	26.1	27.6	774	46.4	534	6.00	8.90	835	12.10	13.91	6.10
70	28.3	31.5	611	47.7	587	4.77	8.39	947	10.37	13.53	5.61
80	30.0	35.3	496	48.5	630	3.75	7.87	1043	8.78	13.04	5.03
90	31.4	38.9	412	49.0	663	2.92	7.37	1123	7.36	12.48	4.44
100	32.5	42.4	350	49.4	689	2.27	6.89	1191	6.13	11.91	3.86
110	33.3	45.8	301	49.6	709	1.75	6.44	1247	5.08	11.33	3.33
120	34.0	49.0	263	49.7	724	1.35	6.03	1293	4.19	10.77	2.84
<i>I Site Index</i>											
20	9.3	9.3	3846	26.2	149	9.48	7.43	199	13.74	9.97	4.27
30	13.7	13.4	2369	33.2	241	8.90	8.05	339	13.98	11.31	5.08
40	17.4	17.2	1626	37.7	325	7.75	8.12	476	13.14	11.89	5.38
50	20.4	20.9	1190	40.7	396	6.49	7.92	601	11.83	12.01	5.33
60	22.9	24.4	913	42.5	455	5.31	7.58	712	10.37	11.86	5.06
70	24.9	27.7	724	43.7	503	4.28	7.18	808	8.94	11.54	4.66
80	26.5	31.0	591	44.5	541	3.41	6.76	891	7.61	11.13	4.20
90	27.8	34.1	493	45.0	571	2.69	6.35	961	6.42	10.68	3.73
100	28.8	37.1	419	45.3	595	2.12	5.95	1020	5.38	10.20	3.26
110	29.6	40.0	362	45.5	614	1.66	5.58	1069	4.49	9.72	2.83
120	30.2	42.8	317	45.6	629	1.30	5.24	1110	3.73	9.25	2.43
<i>II Site Index</i>											
20	7.8	7.8	4667	22.1	113	7.61	5.64	148	10.89	7.39	3.28
30	11.5	11.2	2940	29.0	189	7.41	6.29	261	11.50	8.70	4.09
40	14.7	14.5	2036	33.6	259	6.63	6.48	374	11.07	9.36	4.43
50	17.4	17.6	1496	36.6	321	5.68	6.41	481	10.13	9.61	4.45
60	19.6	20.7	1147	38.5	373	4.73	6.21	576	8.99	9.60	4.26
70	21.4	23.6	910	39.7	416	3.87	5.94	660	7.82	9.43	3.94
80	22.9	26.4	741	40.5	451	3.13	5.63	733	6.70	9.16	3.57

Dynamics of Normal Cultivated Pine Stands

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						90	24.1		29.1	617	
100	25.1	31.7	524	41.3	501	2.00	5.01	847	4.79	8.47	2.78
110	25.8	34.2	451	41.5	519	1.59	4.72	891	4.01	8.10	2.42
120	26.4	36.6	395	41.6	533	1.26	4.44	927	3.34	7.73	2.08

III Site Index

20	6.1	6.0	6164	17.7	76	5.72	3.82	94	7.92	4.71	2.20
30	9.3	8.9	3932	24.5	135	5.93	4.51	180	9.01	6.00	3.08
40	12.0	11.7	2725	29.2	193	5.54	4.82	271	9.07	6.78	3.53
50	14.4	14.4	1993	32.3	245	4.89	4.90	359	8.54	7.19	3.65
60	16.3	17.0	1518	34.4	290	4.17	4.84	441	7.72	7.35	3.55
70	18.0	19.5	1195	35.7	329	3.49	4.70	514	6.80	7.34	3.31
80	19.3	21.9	965	36.5	360	2.87	4.51	577	5.87	7.21	3.00
90	20.4	24.3	798	37.1	386	2.33	4.29	631	5.00	7.01	2.67
100	21.3	26.6	672	37.4	407	1.88	4.07	677	4.22	6.77	2.34
110	22.0	28.9	575	37.6	424	1.51	3.86	716	3.53	6.51	2.02
120	22.6	31.0	500	37.8	438	1.21	3.65	748	2.94	6.24	1.73

IV Site Index

20	4.6	4.4	8573	13.2	46	3.92	2.28	52	5.18	2.60	1.26
30	7.1	6.8	5500	19.8	88	4.44	2.93	112	6.58	3.73	2.14
40	9.4	9.1	3788	24.6	133	4.39	3.31	181	7.05	4.51	2.65
50	11.4	11.4	2741	27.9	175	4.04	3.50	251	6.89	5.01	2.85
60	13.1	13.7	2061	30.2	213	3.55	3.55	317	6.38	5.29	2.82
70	14.5	15.9	1600	31.7	246	3.04	3.51	378	5.69	5.39	2.65
80	15.7	18.0	1276	32.6	274	2.55	3.42	431	4.94	5.39	2.40
90	16.7	20.2	1041	33.2	297	2.10	3.30	477	4.22	5.30	2.12
100	17.6	22.2	866	33.7	316	1.72	3.16	515	3.55	5.15	1.83
110	18.3	24.3	733	33.9	332	1.40	3.01	548	2.96	4.98	1.57
120	18.8	26.2	630	34.1	344	1.13	2.87	575	2.45	4.79	1.32

V Site Index

20	3.1	3.1	11963	9.1	24	2.38	1.18	25	2.97	1.24	0.59
30	5.1	5.0	7693	15.1	51	3.02	1.70	62	4.33	2.06	1.31
40	6.9	6.9	5250	19.9	82	3.21	2.06	109	5.00	2.73	1.79
50	8.6	8.9	3745	23.4	114	3.10	2.28	160	5.10	3.20	2.01
60	10.0	10.9	2770	25.9	144	2.82	2.40	210	4.83	3.50	2.01
70	11.2	12.9	2113	27.6	170	2.48	2.43	256	4.36	3.66	1.88
80	12.3	14.9	1657	28.7	193	2.12	2.42	297	3.80	3.71	1.68
90	13.2	16.8	1330	29.5	213	1.78	2.36	332	3.23	3.69	1.45
100	13.9	18.7	1089	30.0	229	1.47	2.29	362	2.70	3.62	1.23
110	14.5	20.6	909	30.3	242	1.21	2.20	386	2.22	3.51	1.02
120	15.0	22.5	771	30.5	253	0.98	2.11	406	1.82	3.39	0.84

Dynamics of Normal Cultivated Pine Stands

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						<i>Va Site Index</i>					
20	2.0	2.1	15717	5.6	10	1.21	0.51	10	1.36	0.48	0.16
30	3.4	3.6	10158	10.6	25	1.76	0.84	28	2.34	0.94	0.57
40	4.7	5.3	6879	15.1	44	2.04	1.11	55	2.94	1.37	0.89
50	6.0	7.0	4840	18.7	65	2.09	1.30	86	3.13	1.71	1.04
60	7.1	8.8	3522	21.4	86	1.98	1.43	117	3.02	1.94	1.04
70	8.1	10.6	2640	23.4	105	1.79	1.49	145	2.73	2.08	0.95
80	9.0	12.4	2032	24.7	121	1.56	1.52	171	2.37	2.14	0.81
90	9.7	14.3	1602	25.7	136	1.33	1.51	193	1.99	2.14	0.66
100	10.4	16.1	1290	26.3	148	1.11	1.48	211	1.64	2.11	0.52
110	10.9	17.9	1059	26.8	158	0.92	1.44	226	1.32	2.05	0.40
120	11.3	19.7	885	27.1	166	0.75	1.39	237	1.06	1.98	0.31

Dynamics of Goal Program of Cultivated Pine Stands

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						<i>Id Site Index</i>					
20	12.6	13.6	1766	25.6	182	14.47	9.12	265	19.49	13.27	5.02
30	19.1	19.1	1222	35.2	331	14.86	11.04	470	20.95	15.65	6.08
40	24.8	24.2	904	41.7	474	13.42	11.84	679	20.63	16.96	7.21
50	29.7	28.9	700	45.9	598	11.33	11.95	879	19.38	17.58	8.05
60	33.7	33.2	561	48.6	700	9.20	11.67	1065	17.69	17.75	8.49
70	37.0	37.2	463	50.3	782	7.28	11.17	1232	15.84	17.61	8.56
80	39.7	40.9	391	51.3	847	5.66	10.58	1381	13.98	17.27	8.32
90	41.9	44.3	338	52.0	896	4.35	9.96	1512	12.22	16.80	7.87
100	43.7	47.5	296	52.4	935	3.31	9.35	1626	10.59	16.26	7.28
110	45.2	50.4	264	52.7	963	2.51	8.76	1725	9.13	15.68	6.62
120	46.3	53.2	238	52.8	985	1.89	8.21	1810	7.84	15.08	5.94
<i>Ic Site Index</i>											
20	11.5	12.7	1810	23.0	153	12.40	7.67	223	16.67	11.16	4.27
30	17.5	18.0	1253	31.9	282	12.85	9.39	399	18.07	13.29	5.22
40	22.7	22.8	924	37.8	405	11.65	10.12	579	17.89	14.48	6.24
50	27.1	27.3	713	41.7	513	9.85	10.25	754	16.87	15.07	7.02
60	30.8	31.4	569	44.1	602	7.99	10.03	915	15.43	15.26	7.44
70	33.9	35.3	467	45.7	673	6.32	9.62	1062	13.83	15.17	7.51
80	36.3	38.9	393	46.7	729	4.91	9.11	1192	12.22	14.90	7.31
90	38.4	42.3	337	47.3	772	3.76	8.58	1306	10.68	14.51	6.92
100	40.0	45.4	294	47.6	805	2.86	8.05	1406	9.26	14.06	6.40
110	41.3	48.4	261	47.9	830	2.16	7.55	1492	7.99	13.56	5.82
120	42.4	51.1	234	48.0	849	1.63	7.07	1566	6.85	13.05	5.22
<i>Ib Site Index</i>											
20	10.5	11.6	1930	20.6	127	10.48	6.36	184	14.05	9.21	3.57
30	15.9	16.5	1340	28.7	236	10.98	7.88	333	15.41	11.10	4.43
40	20.6	21.0	987	34.3	342	10.02	8.55	488	15.37	12.20	5.36
50	24.6	25.2	758	37.9	435	8.50	8.70	638	14.57	12.76	6.07
60	27.9	29.1	602	40.2	512	6.91	8.53	778	13.37	12.97	6.46
70	30.7	32.8	492	41.6	574	5.47	8.19	905	12.01	12.93	6.55
80	32.9	36.2	412	42.5	622	4.25	7.78	1018	10.63	12.73	6.39
90	34.8	39.5	352	43.0	659	3.26	7.33	1118	9.31	12.42	6.05
100	36.3	42.5	306	43.4	688	2.48	6.88	1205	8.08	12.05	5.60
110	37.5	45.4	270	43.6	709	1.87	6.45	1280	6.97	11.63	5.10
120	38.4	48.1	241	43.7	726	1.41	6.05	1344	5.98	11.20	4.57
<i>Ia Site Index</i>											
20	9.4	10.5	2127	18.3	104	8.76	5.21	150	11.68	7.48	2.93
30	14.2	14.9	1483	25.9	196	9.29	6.53	274	13.01	9.14	3.71
40	18.5	19.0	1091	31.1	286	8.54	7.15	406	13.09	10.14	4.55
50	22.1	22.9	836	34.5	365	7.29	7.30	534	12.49	10.68	5.20
60	25.1	26.6	662	36.6	431	5.95	7.19	654	11.52	10.90	5.57
70	27.5	30.0	538	38.0	485	4.72	6.92	764	10.39	10.91	5.67

Dynamics of Goal Program of Cultivated Pine Stands

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						80	29.6		33.2	448	
90	31.2	36.3	381	39.4	559	2.82	6.21	948	8.09	10.54	5.27
100	32.5	39.1	330	39.7	583	2.15	5.83	1024	7.04	10.24	4.89
110	33.6	41.9	290	39.9	602	1.63	5.47	1089	6.08	9.90	4.45
120	34.5	44.4	258	40.0	616	1.22	5.14	1146	5.22	9.55	4.00

I Site Index

20	8.3	9.2	2412	16.1	84	7.23	4.21	119	9.59	5.97	2.36
30	12.6	13.2	1693	23.3	161	7.79	5.36	223	10.87	7.43	3.07
40	16.3	17.0	1246	28.3	236	7.24	5.91	333	11.07	8.33	3.83
50	19.5	20.5	952	31.5	304	6.22	6.08	442	10.64	8.84	4.42
60	22.2	23.9	751	33.6	361	5.11	6.01	545	9.88	9.08	4.77
70	24.4	27.0	608	34.9	406	4.07	5.81	639	8.95	9.13	4.88
80	26.2	30.0	505	35.7	443	3.18	5.53	724	7.98	9.05	4.79
90	27.6	32.9	427	36.2	471	2.45	5.23	799	7.02	8.87	4.57
100	28.8	35.5	368	36.5	492	1.87	4.92	864	6.12	8.64	4.25
110	29.8	38.1	322	36.7	508	1.42	4.62	921	5.30	8.38	3.88
120	30.5	40.5	286	36.8	521	1.07	4.34	971	4.56	8.09	3.49

II Site Index

20	7.2	8.0	2821	14.2	68	5.93	3.38	94	7.80	4.70	1.87
30	11.0	11.6	1996	21.1	131	6.50	4.36	179	9.01	5.97	2.52
40	14.2	15.0	1470	25.9	194	6.11	4.86	271	9.30	6.78	3.19
50	17.0	18.2	1121	29.0	252	5.30	5.03	363	9.04	7.27	3.73
60	19.3	21.2	881	31.1	300	4.39	5.00	451	8.45	7.51	4.06
70	21.2	24.1	712	32.3	339	3.52	4.85	532	7.70	7.60	4.18
80	22.8	26.8	588	33.1	371	2.77	4.64	605	6.90	7.56	4.13
90	24.0	29.4	497	33.6	395	2.15	4.39	670	6.10	7.44	3.95
100	25.1	31.8	427	33.9	414	1.65	4.14	727	5.33	7.27	3.69
110	25.9	34.2	372	34.1	429	1.26	3.90	777	4.63	7.06	3.37
120	26.6	36.4	329	34.2	440	0.95	3.66	820	4.00	6.83	3.04

III Site Index

20	6.1	6.8	3447	12.6	54	4.84	2.69	73	6.29	3.67	1.45
30	9.3	9.9	2464	19.2	106	5.41	3.53	143	7.45	4.76	2.04
40	12.1	12.9	1819	23.9	159	5.16	3.98	220	7.81	5.49	2.65
50	14.5	15.8	1385	27.0	208	4.54	4.16	297	7.67	5.95	3.14
60	16.4	18.4	1086	29.0	250	3.79	4.16	372	7.24	6.20	3.45
70	18.0	21.0	874	30.3	284	3.07	4.06	442	6.65	6.31	3.58
80	19.4	23.4	721	31.1	311	2.43	3.89	505	5.99	6.31	3.56
90	20.4	25.8	606	31.6	333	1.90	3.70	562	5.32	6.24	3.42
100	21.3	28.0	519	31.9	350	1.47	3.50	611	4.68	6.11	3.21
110	22.0	30.1	452	32.1	363	1.13	3.30	655	4.08	5.96	2.95
120	22.6	32.1	399	32.2	373	0.86	3.10	693	3.53	5.78	2.67

Dynamics of Goal Program of Cultivated Pine Stands

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						<i>IV Site Index</i>					
20	5.0	5.6	4542	11.2	43	3.97	2.15	57	5.08	2.85	1.11
30	7.7	8.2	3286	17.6	86	4.54	2.88	114	6.17	3.80	1.63
40	10.0	10.8	2434	22.2	131	4.40	3.29	178	6.59	4.46	2.19
50	11.9	13.2	1853	25.4	173	3.92	3.47	244	6.56	4.89	2.64
60	13.5	15.5	1450	27.5	210	3.32	3.49	309	6.26	5.14	2.94
70	14.8	17.7	1165	28.8	240	2.72	3.42	369	5.79	5.27	3.08
80	15.9	19.8	957	29.6	264	2.18	3.30	424	5.26	5.30	3.08
90	16.8	21.8	803	30.1	284	1.72	3.15	474	4.70	5.27	2.98
100	17.5	23.7	687	30.4	299	1.34	2.99	518	4.15	5.18	2.81
110	18.1	25.5	596	30.6	311	1.03	2.82	557	3.63	5.06	2.60
120	18.6	27.3	525	30.7	320	0.80	2.66	591	3.16	4.92	2.36

Dynamics of Normal (Fully Stocked) Pine Stands (General Tables)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
<i>1b Site Index</i>											
10	5.5	5.1	8277	17.0	57	9.95	5.65	61	11.19	6.13	1.24
20	11.6	10.9	3263	30.4	178	13.51	8.89	205	16.77	10.24	3.25
30	16.9	16.5	1863	39.7	316	13.74	10.53	385	18.77	12.83	5.02
40	21.6	21.7	1245	46.2	448	12.46	11.19	573	18.68	14.33	6.22
50	25.4	26.6	911	50.5	563	10.64	11.27	755	17.46	15.09	6.82
60	28.6	31.0	709	53.4	660	8.77	11.00	921	15.71	15.35	6.94
70	31.3	35.0	576	55.4	739	7.05	10.56	1068	13.77	15.26	6.72
80	33.4	38.6	485	56.7	802	5.59	10.03	1196	11.86	14.95	6.27
90	35.2	41.9	418	57.6	852	4.38	9.46	1306	10.08	14.51	5.70
100	36.6	44.8	369	58.2	891	3.40	8.91	1399	8.49	13.99	5.09
110	37.8	47.4	332	58.6	921	2.63	8.37	1476	7.10	13.42	4.47
120	38.7	49.8	302	58.9	944	2.03	7.86	1541	5.90	12.84	3.87
130	39.5	51.9	279	59.1	962	1.55	7.40	1595	4.88	12.27	3.33
140	40.1	53.8	260	59.2	975	1.19	6.97	1639	4.03	11.71	2.84
150	40.6	55.5	245	59.3	986	0.91	6.57	1676	3.31	11.17	2.40
160	41.0	57.0	233	59.3	994	0.69	6.21	1706	2.72	10.66	2.02
170	41.3	58.3	222	59.3	1000	0.53	5.88	1731	2.23	10.18	1.70
180	41.6	59.5	214	59.4	1004	0.40	5.58	1751	1.82	9.73	1.42
190	41.8	60.6	206	59.4	1008	0.31	5.30	1767	1.49	9.30	1.18
200	42.0	61.5	200	59.4	1011	0.23	5.05	1781	1.21	8.90	0.98
<i>1a Site Index</i>											
10	4.9	4.3	10061	14.5	36	7.75	3.60	55	9.59	5.46	1.84
20	10.2	9.3	3859	26.0	114	10.55	5.70	175	13.90	8.75	3.35
30	14.9	14.1	2178	34.2	207	10.90	6.91	324	15.44	10.78	4.54
40	19.0	18.8	1447	40.0	302	10.08	7.54	479	15.39	11.96	5.31
50	22.5	23.1	1055	44.1	390	8.80	7.80	628	14.48	12.57	5.68
60	25.4	27.0	818	47.0	469	7.42	7.81	767	13.15	12.78	5.73
70	27.8	30.6	663	48.9	537	6.12	7.67	891	11.67	12.73	5.55
80	29.8	33.9	556	50.3	595	4.96	7.44	1000	10.18	12.50	5.22
90	31.4	36.9	479	51.2	644	3.98	7.16	1095	8.77	12.16	4.79
100	32.8	39.6	421	51.9	685	3.17	6.85	1176	7.49	11.76	4.32
110	33.9	42.0	377	52.3	718	2.51	6.53	1245	6.35	11.32	3.84
120	34.8	44.2	343	52.7	746	1.97	6.21	1303	5.35	10.86	3.38
130	35.6	46.2	316	52.9	768	1.55	5.91	1353	4.50	10.40	2.95
140	36.2	47.9	294	53.0	786	1.21	5.62	1394	3.76	9.96	2.55
150	36.7	49.5	276	53.1	801	0.95	5.34	1428	3.14	9.52	2.19
160	37.1	50.9	261	53.2	813	0.74	5.08	1457	2.62	9.11	1.88
170	37.4	52.2	249	53.2	822	0.58	4.84	1481	2.17	8.71	1.60
180	37.7	53.3	239	53.3	830	0.45	4.61	1501	1.80	8.34	1.36
190	37.9	54.3	230	53.3	837	0.35	4.40	1517	1.50	7.98	1.15
200	38.1	55.3	222	53.3	852	0.27	4.26	1531	1.24	7.65	0.97

Dynamics of Normal (Fully Stocked) Pine Stands (General Tables)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
<i>I Site Index</i>											
10	4.1	3.5	12753	12.4	34	5.86	3.38	45	7.78	4.50	1.92
20	8.7	7.7	4708	22.1	106	8.07	5.28	142	11.18	7.11	3.11
30	12.8	12.0	2611	29.3	189	8.49	6.31	262	12.45	8.72	3.96
40	16.4	16.0	1718	34.5	272	8.02	6.81	387	12.51	9.68	4.49
50	19.5	19.8	1245	38.3	349	7.15	6.97	510	11.88	10.19	4.73
60	22.1	23.3	962	41.0	415	6.16	6.92	624	10.91	10.39	4.75
70	24.3	26.5	777	42.9	472	5.18	6.74	727	9.79	10.39	4.61
80	26.1	29.5	649	44.3	519	4.29	6.49	819	8.65	10.24	4.35
90	27.6	32.2	557	45.3	558	3.52	6.20	900	7.54	10.00	4.03
100	28.9	34.6	489	46.0	590	2.86	5.90	971	6.52	9.71	3.67
110	30.0	36.8	437	46.5	616	2.31	5.60	1031	5.60	9.37	3.29
120	30.8	38.8	396	46.8	636	1.85	5.30	1083	4.79	9.03	2.93
130	31.6	40.6	363	47.1	653	1.48	5.02	1127	4.07	8.67	2.58
140	32.2	42.2	337	47.3	666	1.19	4.76	1165	3.45	8.32	2.26
150	32.7	43.7	316	47.4	677	0.94	4.51	1196	2.92	7.98	1.97
160	33.1	45.0	298	47.5	685	0.75	4.28	1223	2.46	7.65	1.71
170	33.4	46.2	284	47.6	692	0.60	4.07	1246	2.07	7.33	1.47
180	33.7	47.3	271	47.6	697	0.47	3.87	1265	1.74	7.03	1.27
190	33.9	48.2	261	47.6	702	0.38	3.69	1281	1.46	6.74	1.08
200	34.1	49.1	252	47.7	705	0.30	3.52	1294	1.22	6.47	0.93
<i>II Site Index</i>											
10	3.3	2.8	16937	10.4	24	4.27	2.44	34	5.92	3.40	1.65
20	7.1	6.3	5955	18.8	77	6.03	3.87	109	8.66	5.43	2.63
30	10.6	9.9	3228	25.0	141	6.48	4.69	202	9.79	6.73	3.31
40	13.7	13.4	2096	29.6	205	6.25	5.12	301	9.97	7.53	3.72
50	16.4	16.7	1506	33.1	265	5.69	5.29	399	9.60	7.99	3.91
60	18.8	19.8	1156	35.6	318	5.00	5.30	492	8.93	8.20	3.93
70	20.7	22.7	929	37.4	365	4.29	5.21	578	8.11	8.25	3.83
80	22.4	25.3	774	38.8	404	3.62	5.05	654	7.25	8.18	3.63
90	23.8	27.7	662	39.8	437	3.02	4.86	723	6.40	8.03	3.38
100	25.0	29.9	579	40.5	465	2.50	4.65	783	5.60	7.83	3.10
110	26.0	31.8	516	41.1	487	2.05	4.43	835	4.87	7.59	2.81
120	26.8	33.6	466	41.5	506	1.68	4.22	880	4.20	7.33	2.52
130	27.5	35.3	427	41.7	521	1.37	4.01	919	3.61	7.07	2.25
140	28.1	36.8	396	42.0	533	1.11	3.81	953	3.10	6.80	1.99
150	28.5	38.1	370	42.1	543	0.90	3.62	981	2.64	6.54	1.75
160	28.9	39.3	348	42.2	552	0.73	3.45	1006	2.25	6.29	1.53
170	29.3	40.4	331	42.3	558	0.59	3.28	1027	1.92	6.04	1.33
180	29.5	41.3	316	42.4	563	0.47	3.13	1044	1.63	5.80	1.15
190	29.8	42.2	303	42.4	568	0.38	2.99	1059	1.38	5.57	1.00
200	30.0	43.0	292	42.4	571	0.31	2.86	1072	1.17	5.36	0.86

Dynamics of Normal (Fully Stocked) Pine Stands (General Tables)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
III Site Index											
10	2.5	2.2	23756	8.8	17	2.99	1.67	23	4.19	2.33	1.20
20	5.5	5.1	7873	15.8	54	4.36	2.72	77	6.40	3.87	2.03
30	8.4	8.1	4147	21.2	101	4.82	3.36	147	7.43	4.91	2.61
40	11.1	11.0	2648	25.3	149	4.75	3.73	224	7.73	5.59	2.98
50	13.4	13.9	1882	28.4	195	4.41	3.90	300	7.57	6.01	3.16
60	15.5	16.5	1433	30.7	237	3.95	3.95	374	7.15	6.24	3.21
70	17.2	19.0	1146	32.5	274	3.44	3.91	443	6.59	6.33	3.14
80	18.7	21.3	950	33.8	306	2.96	3.82	506	5.96	6.32	3.00
90	20.0	23.4	810	34.8	333	2.51	3.70	562	5.32	6.25	2.82
100	21.1	25.3	706	35.5	356	2.11	3.56	612	4.71	6.12	2.60
110	22.0	27.1	627	36.1	375	1.76	3.41	656	4.13	5.97	2.38
120	22.7	28.7	566	36.5	391	1.46	3.26	695	3.60	5.79	2.15
130	23.4	30.1	517	36.8	405	1.20	3.11	729	3.13	5.61	1.93
140	23.9	31.4	478	37.1	416	0.99	2.97	758	2.70	5.41	1.71
150	24.4	32.6	446	37.2	425	0.81	2.83	783	2.33	5.22	1.52
160	24.7	33.7	420	37.4	432	0.67	2.70	805	2.00	5.03	1.34
170	25.0	34.6	398	37.5	438	0.55	2.58	823	1.72	4.84	1.17
180	25.3	35.5	379	37.6	443	0.45	2.46	839	1.47	4.66	1.03
190	25.5	36.3	364	37.6	447	0.36	2.35	853	1.26	4.49	0.89
200	25.7	37.0	350	37.6	450	0.30	2.25	864	1.07	4.32	0.78
IV Site Index											
10	1.7	1.6	35663	7.4	11	1.99	1.08	14	2.72	1.43	0.73
20	4.0	3.9	11030	13.4	37	3.04	1.83	51	4.45	2.55	1.41
30	6.4	6.4	5617	18.0	69	3.46	2.32	101	5.38	3.36	1.92
40	8.6	8.8	3514	21.6	104	3.49	2.61	157	5.76	3.92	2.26
50	10.6	11.2	2464	24.3	139	3.31	2.77	215	5.76	4.29	2.46
60	12.3	13.5	1859	26.5	170	3.01	2.84	271	5.54	4.52	2.53
70	13.8	15.6	1477	28.1	199	2.67	2.84	325	5.18	4.64	2.51
80	15.1	17.5	1218	29.3	224	2.33	2.79	375	4.75	4.68	2.42
90	16.2	19.3	1035	30.3	245	2.00	2.72	420	4.29	4.66	2.29
100	17.2	21.0	900	31.0	264	1.70	2.64	460	3.83	4.60	2.13
110	18.0	22.5	797	31.6	279	1.44	2.54	496	3.39	4.51	1.96
120	18.7	23.8	718	32.0	292	1.20	2.44	528	2.99	4.40	1.78
130	19.2	25.1	655	32.4	303	1.01	2.33	556	2.61	4.28	1.61
140	19.7	26.2	605	32.6	313	0.84	2.23	581	2.28	4.15	1.44
150	20.1	27.2	563	32.8	320	0.70	2.14	602	1.97	4.01	1.28
160	20.5	28.2	529	33.0	327	0.58	2.04	620	1.71	3.88	1.13
170	20.7	29.0	501	33.1	332	0.48	1.95	636	1.48	3.74	1.00
180	21.0	29.7	478	33.2	336	0.39	1.87	650	1.27	3.61	0.88
190	21.2	30.4	457	33.2	340	0.32	1.79	662	1.09	3.48	0.77
200	21.3	31.0	440	33.3	343	0.27	1.71	672	0.94	3.36	0.67

Dynamics of Normal (Fully Stocked) Pine Stands (General Tables)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
V Site Index											
10	1.1	1.2	58724	6.2	6	1.24	0.64	8	1.59	0.78	0.35
20	2.8	2.9	16788	11.3	23	2.01	1.16	30	2.86	1.52	0.85
30	4.6	4.9	8221	15.2	45	2.37	1.51	63	3.64	2.11	1.27
40	6.3	6.8	5024	18.4	70	2.45	1.74	102	4.04	2.55	1.59
50	7.9	8.7	3470	20.8	94	2.37	1.88	143	4.15	2.86	1.78
60	9.3	10.6	2591	22.7	117	2.19	1.94	184	4.07	3.07	1.88
70	10.5	12.3	2042	24.2	137	1.97	1.96	224	3.87	3.20	1.89
80	11.6	13.9	1675	25.4	156	1.74	1.95	261	3.59	3.27	1.85
90	12.5	15.4	1417	26.3	172	1.51	1.91	296	3.28	3.29	1.77
100	13.3	16.7	1229	27.0	186	1.30	1.86	327	2.96	3.27	1.66
110	14.0	18.0	1087	27.6	198	1.11	1.80	355	2.64	3.23	1.54
120	14.6	19.1	977	28.0	208	0.94	1.74	380	2.34	3.17	1.40
130	15.1	20.1	890	28.4	217	0.79	1.67	402	2.06	3.09	1.27
140	15.5	21.1	821	28.6	224	0.66	1.60	421	1.81	3.01	1.14
150	15.8	21.9	764	28.8	230	0.55	1.54	438	1.58	2.92	1.02
160	16.1	22.7	718	29.0	235	0.46	1.47	453	1.37	2.83	0.91
170	16.3	23.4	679	29.1	240	0.38	1.41	466	1.19	2.74	0.80
180	16.6	24.0	647	29.2	243	0.32	1.35	477	1.03	2.65	0.71
190	16.7	24.5	620	29.3	246	0.27	1.30	486	0.89	2.56	0.62
200	16.9	25.0	596	29.3	248	0.22	1.24	494	0.76	2.47	0.54
Va Site Index											
10	0.6	0.8	111336	5.2	4	0.71	0.35	4	0.80	0.36	0.09
20	1.7	2.0	29147	9.5	13	1.23	0.67	16	1.63	0.80	0.40
30	3.0	3.5	13660	12.9	27	1.51	0.91	35	2.22	1.18	0.71
40	4.2	5.0	8131	15.7	43	1.60	1.08	60	2.56	1.49	0.96
50	5.4	6.4	5520	17.8	59	1.58	1.18	86	2.72	1.72	1.14
60	6.5	7.8	4073	19.6	74	1.48	1.24	113	2.72	1.89	1.24
70	7.4	9.1	3185	20.9	89	1.35	1.27	140	2.63	2.00	1.28
80	8.2	10.4	2598	22.0	101	1.20	1.27	166	2.48	2.07	1.27
90	8.9	11.5	2189	22.9	113	1.05	1.25	190	2.29	2.11	1.23
100	9.6	12.6	1892	23.5	122	0.91	1.22	211	2.08	2.11	1.17
110	10.1	13.5	1670	24.1	131	0.78	1.19	231	1.87	2.10	1.09
120	10.5	14.4	1499	24.5	138	0.67	1.15	249	1.67	2.07	1.00
130	10.9	15.2	1365	24.8	144	0.57	1.11	265	1.48	2.04	0.91
140	11.2	15.9	1258	25.1	150	0.48	1.07	278	1.30	1.99	0.82
150	11.5	16.6	1171	25.3	154	0.40	1.03	291	1.14	1.94	0.73
160	11.7	17.2	1100	25.5	158	0.34	0.99	301	0.99	1.88	0.65
170	11.9	17.7	1041	25.6	161	0.28	0.95	310	0.86	1.83	0.58
180	12.0	18.2	992	25.7	163	0.23	0.91	318	0.74	1.77	0.51
190	12.2	18.6	950	25.8	165	0.20	0.87	325	0.64	1.71	0.45
200	12.3	19.0	915	25.8	167	0.16	0.84	331	0.56	1.66	0.39

Dynamics of Normal (Fully Stocked) Pine Stands

of Karelia and Murmansk oblast

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						Ia Site Index					
20	8.2	16.8	1016	22.6	183	10.93	9.17	361	16.67	18.03	5.74
30	13.5	21.1	924	32.4	289	10.01	9.62	520	15.17	17.33	5.16
40	18.1	24.7	824	39.4	382	8.62	9.55	664	13.76	16.61	5.14
50	21.8	27.7	732	44.3	461	7.18	9.22	795	12.45	15.91	5.27
60	24.8	30.5	653	47.6	526	5.87	8.77	914	11.26	15.23	5.39
70	27.0	32.9	587	49.8	579	4.74	8.27	1021	10.18	14.58	5.44
80	28.8	35.0	531	51.3	622	3.79	7.77	1118	9.19	13.97	5.40
90	30.0	37.0	485	52.2	655	3.02	7.28	1205	8.30	13.39	5.28
100	31.0	38.8	446	52.9	682	2.39	6.82	1284	7.49	12.84	5.10
110	31.7	40.5	414	53.3	704	1.88	6.40	1355	6.75	12.32	4.87
120	32.3	42.0	387	53.6	720	1.48	6.00	1419	6.09	11.83	4.61
130	32.6	43.4	363	53.7	734	1.16	5.64	1477	5.49	11.36	4.33
140	32.9	44.7	343	53.9	744	0.91	5.31	1529	4.95	10.92	4.04
150	33.1	45.9	326	53.9	752	0.72	5.01	1576	4.47	10.51	3.75
160	33.3	47.0	311	54.0	758	0.56	4.74	1619	4.03	10.12	3.47
170	33.4	48.1	298	54.0	763	0.44	4.49	1657	3.63	9.75	3.19
180	33.5	49.0	286	54.0	767	0.34	4.26	1691	3.27	9.40	2.93
I Site Index											
20	7.1	10.3	2246	18.8	117	8.25	5.87	167	11.47	8.37	3.22
30	11.6	14.4	1684	27.3	201	8.33	6.70	287	12.23	9.56	3.90
40	15.6	18.0	1334	33.9	282	7.70	7.04	409	12.21	10.24	4.51
50	19.0	21.2	1095	38.7	354	6.79	7.08	530	11.76	10.59	4.97
60	21.7	24.1	923	42.3	417	5.82	6.95	644	11.08	10.73	5.26
70	24.0	26.8	794	44.8	471	4.90	6.72	751	10.28	10.72	5.38
80	25.7	29.2	696	46.6	515	4.07	6.44	849	9.43	10.62	5.37
90	27.1	31.4	619	47.8	552	3.34	6.14	939	8.59	10.44	5.24
100	28.2	33.3	558	48.7	583	2.73	5.83	1021	7.77	10.21	5.04
110	29.0	35.2	509	49.4	607	2.22	5.52	1095	7.00	9.95	4.78
120	29.7	36.8	468	49.8	627	1.80	5.23	1161	6.27	9.68	4.48
130	30.2	38.3	435	50.1	644	1.45	4.95	1221	5.61	9.39	4.16
140	30.6	39.7	408	50.3	657	1.17	4.69	1274	5.00	9.10	3.83
150	30.9	40.9	384	50.5	667	0.94	4.45	1321	4.44	8.80	3.51
160	31.1	42.0	365	50.6	675	0.75	4.22	1363	3.95	8.52	3.19
170	31.3	43.1	348	50.7	682	0.60	4.01	1400	3.50	8.23	2.89
180	31.4	44.0	333	50.7	688	0.48	3.82	1433	3.10	7.96	2.61
II Site Index											
20	5.9	7.2	3752	15.4	76	5.98	3.80	92	7.89	4.62	1.91
30	9.7	10.8	2500	22.8	139	6.53	4.64	180	9.48	6.01	2.95
40	13.1	14.1	1844	28.7	204	6.39	5.11	279	10.15	6.97	3.76
50	16.1	17.1	1445	33.3	266	5.90	5.32	381	10.21	7.62	4.31
60	18.6	19.9	1179	36.8	322	5.25	5.36	482	9.88	8.03	4.63
70	20.7	22.5	992	39.3	371	4.57	5.30	578	9.31	8.26	4.75

Dynamics of Normal (Fully Stocked) Pine Stands

of Karelia and Murmansk oblast

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						80	22.4		24.8	855	
90	23.8	26.9	751	42.7	449	3.30	4.99	750	7.86	8.33	4.57
100	24.9	28.8	671	43.7	479	2.76	4.79	825	7.10	8.25	4.34
110	25.8	30.5	608	44.4	505	2.30	4.59	892	6.36	8.11	4.06
120	26.6	32.1	557	45.0	525	1.90	4.38	952	5.65	7.94	3.75
130	27.1	33.5	516	45.4	543	1.57	4.18	1005	5.00	7.73	3.44
140	27.6	34.7	482	45.7	557	1.29	3.98	1052	4.41	7.52	3.12
150	28.0	35.9	454	45.9	569	1.05	3.79	1094	3.87	7.29	2.81
160	28.3	36.9	431	46.0	578	0.86	3.61	1130	3.39	7.06	2.52
170	28.5	37.8	411	46.1	586	0.70	3.45	1162	2.96	6.83	2.25
180	28.7	38.6	394	46.2	592	0.57	3.29	1189	2.57	6.61	2.00

III Site Index

20	4.8	5.4	5356	12.4	50	4.27	2.51	56	5.43	2.78	1.16
30	7.8	8.4	3383	18.9	97	4.92	3.23	119	7.11	3.97	2.19
40	10.7	11.3	2410	24.3	147	5.01	3.67	195	8.00	4.88	2.99
50	13.2	14.0	1841	28.5	196	4.78	3.92	277	8.30	5.54	3.52
60	15.4	16.5	1475	31.7	242	4.37	4.03	360	8.18	6.00	3.82
70	17.3	18.8	1223	34.1	283	3.89	4.04	440	7.80	6.28	3.91
80	18.9	20.9	1043	35.9	319	3.39	3.99	515	7.25	6.44	3.86
90	20.3	22.8	908	37.2	351	2.92	3.90	585	6.63	6.50	3.71
100	21.4	24.6	806	38.2	378	2.49	3.78	648	5.97	6.48	3.48
110	22.3	26.1	726	38.9	401	2.10	3.64	704	5.32	6.40	3.22
120	23.0	27.5	663	39.4	420	1.77	3.50	754	4.71	6.28	2.94
130	23.6	28.8	612	39.8	436	1.48	3.36	798	4.13	6.14	2.66
140	24.2	29.9	570	40.1	450	1.23	3.21	837	3.61	5.98	2.38
150	24.6	30.9	536	40.3	461	1.02	3.07	871	3.14	5.80	2.12
160	24.9	31.8	508	40.4	470	0.84	2.94	900	2.72	5.62	1.87
170	25.2	32.7	484	40.5	478	0.70	2.81	925	2.35	5.44	1.65
180	25.4	33.4	464	40.6	484	0.58	2.69	947	2.02	5.26	1.45

IV Site Index

20	3.6	4.3	6843	10.0	34	2.98	1.68	34	3.64	1.72	0.66
30	6.1	6.8	4332	15.7	67	3.54	2.22	78	5.05	2.61	1.50
40	8.4	9.2	3063	20.5	103	3.69	2.58	133	5.88	3.33	2.19
50	10.5	11.5	2315	24.1	140	3.57	2.79	194	6.24	3.89	2.66
60	12.4	13.7	1832	26.9	174	3.31	2.90	257	6.24	4.28	2.92
70	14.1	15.7	1501	28.9	206	2.98	2.94	318	6.00	4.55	3.01
80	15.5	17.5	1265	30.4	234	2.63	2.92	376	5.61	4.70	2.97
90	16.7	19.2	1090	31.4	258	2.29	2.87	430	5.14	4.78	2.85
100	17.7	20.7	958	32.2	279	1.96	2.79	479	4.63	4.79	2.67
110	18.6	22.1	855	32.7	298	1.67	2.71	523	4.13	4.75	2.45
120	19.3	23.3	775	33.1	313	1.41	2.61	561	3.64	4.68	2.23
130	19.9	24.5	710	33.4	326	1.19	2.51	596	3.19	4.58	2.00
140	20.4	25.5	658	33.6	337	1.00	2.41	625	2.78	4.47	1.78
150	20.8	26.4	615	33.7	346	0.83	2.31	651	2.40	4.34	1.57

Dynamics of Normal (Fully Stocked) Pine Stands

of Karelia and Murmansk oblast

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
160	21.1	27.3	579	33.8	354	0.69	2.21	674	2.07	4.21	1.38
170	21.4	28.0	550	33.9	360	0.58	2.12	693	1.78	4.08	1.21
180	21.7	28.7	525	33.9	365	0.48	2.03	709	1.53	3.94	1.05

V Site Index

20	2.6	3.6	7746	7.9	21	1.89	1.06	21	2.27	1.03	0.38
30	4.5	5.6	5158	12.7	42	2.27	1.41	49	3.26	1.62	0.99
40	6.3	7.6	3701	16.7	66	2.37	1.64	85	3.88	2.11	1.51
50	8.0	9.5	2793	19.6	89	2.30	1.78	125	4.17	2.50	1.88
60	9.6	11.2	2191	21.7	111	2.13	1.85	167	4.22	2.79	2.09
70	10.9	12.9	1775	23.1	132	1.92	1.88	209	4.10	2.98	2.18
80	12.1	14.4	1476	24.1	150	1.69	1.87	249	3.86	3.11	2.17
90	13.2	15.8	1255	24.8	165	1.47	1.84	286	3.56	3.18	2.09
100	14.0	17.2	1089	25.2	179	1.26	1.79	320	3.22	3.20	1.96
110	14.8	18.4	961	25.5	191	1.07	1.73	350	2.88	3.19	1.81
120	15.4	19.5	861	25.7	201	0.91	1.67	378	2.55	3.15	1.65
130	15.9	20.5	781	25.9	209	0.76	1.61	402	2.24	3.09	1.48
140	16.4	21.5	716	25.9	216	0.64	1.54	423	1.96	3.02	1.32
150	16.8	22.3	663	26.0	222	0.53	1.48	441	1.70	2.94	1.17
160	17.1	23.1	620	26.0	227	0.44	1.42	457	1.47	2.85	1.03
170	17.4	23.9	583	26.1	231	0.37	1.36	470	1.27	2.77	0.90
180	17.6	24.5	553	26.1	234	0.30	1.30	482	1.09	2.68	0.78

Va Site Index

20	1.7	3.1	7292	5.6	9	0.75	0.43	11	1.20	0.54	0.45
30	3.1	4.7	5337	9.2	17	0.88	0.56	26	1.73	0.86	0.85
40	4.4	6.2	3970	11.9	26	0.91	0.65	45	2.08	1.12	1.18
50	5.7	7.6	3028	13.8	35	0.87	0.69	67	2.27	1.34	1.40
60	6.9	9.0	2373	15.0	43	0.79	0.72	90	2.32	1.50	1.52
70	8.0	10.3	1909	15.8	51	0.71	0.72	113	2.27	1.61	1.56
80	8.9	11.5	1573	16.3	57	0.62	0.72	135	2.16	1.69	1.54
90	9.7	12.6	1324	16.6	63	0.53	0.70	156	2.01	1.73	1.48
100	10.4	13.7	1137	16.7	68	0.45	0.68	175	1.84	1.75	1.39
110	10.9	14.7	992	16.8	72	0.38	0.65	193	1.66	1.75	1.28
120	11.4	15.7	879	16.9	75	0.32	0.63	208	1.48	1.74	1.17
130	11.9	16.5	789	17.0	78	0.26	0.60	222	1.32	1.71	1.05
140	12.2	17.4	716	17.0	81	0.22	0.58	235	1.16	1.68	0.94
150	12.5	18.2	656	17.0	83	0.18	0.55	246	1.02	1.64	0.83
160	12.8	18.9	606	17.0	84	0.15	0.53	255	0.89	1.59	0.74
170	13.0	19.6	564	17.0	86	0.12	0.50	263	0.77	1.55	0.65
180	13.1	20.2	529	17.0	87	0.10	0.48	270	0.67	1.50	0.57

Dynamics of Normal (Fully Stocked) Pine Stands

in Subtundra and Northern Taiga Ecoregions of European Russia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
II Site Index											
20	7.0	4.9	13606	25.6	98	6.32	4.90	174	10.12	8.72	3.80
30	10.5	7.9	6022	29.8	161	6.25	5.38	275	9.92	9.17	3.67
40	13.6	11.0	3486	32.9	222	5.78	5.54	372	9.35	9.29	3.57
50	16.3	13.9	2337	35.2	277	5.17	5.53	462	8.64	9.23	3.47
60	18.6	16.6	1717	37.0	325	4.52	5.42	544	7.87	9.07	3.36
70	20.5	19.1	1343	38.4	367	3.89	5.24	619	7.12	8.84	3.22
80	22.1	21.4	1100	39.6	403	3.32	5.04	687	6.39	8.58	3.07
90	23.4	23.5	932	40.5	434	2.81	4.82	747	5.71	8.30	2.90
100	24.4	25.4	811	41.2	459	2.37	4.59	801	5.09	8.01	2.72
110	25.3	27.2	721	41.8	481	1.98	4.37	849	4.52	7.72	2.53
120	26.0	28.7	652	42.3	499	1.66	4.16	892	4.00	7.43	2.35
130	26.6	30.1	588	42.0	499	-0.06	3.84	929	3.54	7.15	3.60
140	27.1	31.4	537	41.6	498	-0.17	3.56	963	3.13	6.88	3.29
150	27.5	32.5	496	41.2	496	-0.27	3.31	992	2.76	6.61	3.02
160	27.8	33.6	461	40.8	493	-0.36	3.08	1018	2.43	6.36	2.79
170	28.1	34.5	432	40.3	489	-0.44	2.88	1041	2.14	6.12	2.58
180	28.3	35.3	406	39.7	484	-0.52	2.69	1061	1.88	5.89	2.40
190	28.5	36.0	384	39.0	478	-0.60	2.52	1078	1.65	5.68	2.25
200	28.6	36.6	364	38.3	472	-0.67	2.36	1094	1.45	5.47	2.13
210	28.7	37.2	346	37.6	465	-0.75	2.21	1107	1.27	5.27	2.02
220	28.8	37.7	329	36.8	457	-0.82	2.08	1119	1.12	5.09	1.94
230	28.9	38.2	314	35.9	449	-0.89	1.95	1130	0.98	4.91	1.87
240	29.0	38.6	300	35.0	439	-0.95	1.83	1139	0.86	4.75	1.81
250	29.0	38.9	286	34.1	430	-1.02	1.72	1147	0.75	4.59	1.77
260	29.1	39.3	273	33.1	419	-1.07	1.61	1154	0.66	4.44	1.74
270	29.1	39.5	261	32.1	408	-1.13	1.51	1160	0.58	4.30	1.71
280	29.1	39.8	250	31.1	397	-1.18	1.42	1166	0.51	4.16	1.69
290	29.1	40.0	239	30.0	385	-1.22	1.33	1171	0.45	4.04	1.67
300	29.2	40.2	228	29.0	372	-1.26	1.24	1175	0.39	3.92	1.65

III Site Index

20	5.9	4.3	16828	24.7	83	5.27	4.14	97	7.18	4.83	1.91
30	9.0	7.1	7248	28.6	135	5.18	4.51	173	7.90	5.75	2.72
40	11.8	9.8	4129	31.3	185	4.77	4.63	252	7.97	6.31	3.20
50	14.2	12.5	2738	33.4	230	4.24	4.61	331	7.68	6.62	3.43
60	16.2	14.9	1998	35.0	270	3.70	4.50	405	7.19	6.75	3.49
70	17.8	17.2	1556	36.3	304	3.18	4.35	474	6.60	6.77	3.42
80	19.2	19.3	1270	37.2	334	2.70	4.17	537	5.97	6.71	3.27
90	20.4	21.2	1074	38.0	359	2.28	3.98	594	5.35	6.60	3.07
100	21.3	23.0	934	38.6	380	1.92	3.80	644	4.76	6.44	2.84
110	22.1	24.5	830	39.1	397	1.61	3.61	689	4.20	6.26	2.60
120	22.7	25.9	750	39.5	412	1.34	3.43	728	3.70	6.07	2.36
130	23.3	27.1	679	39.3	411	-0.13	3.16	763	3.24	5.87	3.37
140	23.7	28.3	622	39.0	409	-0.22	2.92	793	2.83	5.67	3.05

Dynamics of Normal (Fully Stocked) Pine Stands

in Subtundra and Northern Taiga Ecoregions of European Russia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
150	24.0	29.2	575	38.6	407	-0.31	2.71	820	2.46	5.46	2.77
160	24.3	30.1	536	38.2	403	-0.38	2.52	843	2.14	5.27	2.52
170	24.5	30.9	503	37.7	399	-0.46	2.35	863	1.85	5.07	2.31
180	24.7	31.6	474	37.2	394	-0.53	2.19	880	1.61	4.89	2.14
190	24.9	32.2	449	36.6	388	-0.60	2.04	895	1.39	4.71	1.99
200	25.0	32.8	426	36.0	382	-0.66	1.91	908	1.20	4.54	1.87
210	25.1	33.3	406	35.3	375	-0.73	1.79	919	1.04	4.38	1.77
220	25.2	33.7	387	34.5	368	-0.79	1.67	929	0.89	4.22	1.69
230	25.3	34.1	370	33.7	359	-0.85	1.56	937	0.77	4.07	1.62
240	25.3	34.4	354	32.9	351	-0.91	1.46	944	0.66	3.93	1.57
250	25.4	34.7	338	32.0	341	-0.96	1.36	950	0.57	3.80	1.53
260	25.4	35.0	324	31.1	331	-1.01	1.27	955	0.49	3.67	1.50
270	25.4	35.2	310	30.1	321	-1.05	1.19	960	0.42	3.56	1.48
280	25.5	35.4	296	29.2	310	-1.09	1.11	964	0.36	3.44	1.46
290	25.5	35.6	284	28.2	299	-1.13	1.03	967	0.31	3.34	1.44
300	25.5	35.7	271	27.2	288	-1.15	0.96	970	0.27	3.23	1.42

IV Site Index

20	4.6	3.2	19345	15.6	47	3.63	2.34	50	4.59	2.50	0.96
30	7.2	5.5	8496	20.2	85	3.94	2.83	102	5.72	3.41	1.78
40	9.5	7.9	4886	23.7	124	3.85	3.11	162	6.22	4.06	2.36
50	11.5	10.2	3256	26.4	161	3.56	3.23	225	6.28	4.50	2.72
60	13.3	12.4	2380	28.6	195	3.18	3.25	287	6.06	4.78	2.88
70	14.8	14.4	1854	30.3	225	2.77	3.21	346	5.68	4.94	2.90
80	16.0	16.3	1513	31.6	251	2.38	3.13	400	5.20	5.00	2.82
90	17.0	18.0	1278	32.7	273	2.02	3.03	450	4.69	5.00	2.67
100	17.9	19.6	1110	33.5	291	1.70	2.91	494	4.18	4.94	2.47
110	18.6	21.0	985	34.2	307	1.42	2.79	533	3.68	4.85	2.26
120	19.1	22.3	889	34.7	320	1.18	2.67	568	3.23	4.73	2.04
130	19.6	23.4	798	34.4	319	-0.17	2.45	598	2.81	4.60	2.97
140	20.0	24.5	725	34.0	317	-0.25	2.26	624	2.43	4.46	2.68
150	20.3	25.4	665	33.6	314	-0.33	2.09	647	2.10	4.31	2.43
160	20.5	26.2	615	33.1	310	-0.40	1.94	666	1.81	4.16	2.20
170	20.7	26.9	572	32.5	306	-0.47	1.80	683	1.55	4.02	2.02
180	20.9	27.5	535	31.8	301	-0.54	1.67	697	1.33	3.87	1.86
190	21.1	28.1	502	31.0	295	-0.60	1.55	710	1.13	3.73	1.73
200	21.2	28.5	471	30.2	289	-0.66	1.44	720	0.97	3.60	1.63
210	21.3	29.0	444	29.3	282	-0.72	1.34	729	0.82	3.47	1.55
220	21.3	29.4	418	28.3	274	-0.78	1.25	737	0.70	3.35	1.48
230	21.4	29.7	393	27.2	266	-0.83	1.16	743	0.60	3.23	1.43
240	21.4	30.0	370	26.2	258	-0.88	1.07	749	0.51	3.12	1.39
250	21.5	30.3	348	25.0	248	-0.93	0.99	753	0.43	3.01	1.36
260	21.5	30.5	327	23.9	239	-0.97	0.92	757	0.37	2.91	1.33
270	21.5	30.7	307	22.7	229	-1.00	0.85	761	0.31	2.82	1.31
280	21.6	30.9	288	21.5	219	-1.03	0.78	763	0.26	2.73	1.29
290	21.6	31.0	270	20.4	209	-1.04	0.72	766	0.22	2.64	1.27

Dynamics of Normal (Fully Stocked) Pine Stands

in Subtundra and Northern Taiga Ecoregions of European Russia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
300	21.6	31.2	252	19.2	198	-1.06	0.66	768	0.19	2.56	1.25

V Site Index

20	3.1	2.0	22489	7.1	18	1.94	0.92	23	2.57	1.17	0.63
30	5.1	3.7	10424	11.4	41	2.58	1.38	55	3.68	1.83	1.10
40	7.0	5.6	6144	15.2	69	2.83	1.72	95	4.34	2.38	1.51
50	8.7	7.5	4135	18.4	97	2.81	1.94	141	4.63	2.81	1.82
60	10.2	9.4	3030	21.1	124	2.63	2.07	187	4.64	3.12	2.01
70	11.4	11.2	2355	23.2	149	2.36	2.13	233	4.45	3.32	2.10
80	12.5	12.9	1912	24.9	171	2.06	2.14	276	4.15	3.45	2.10
90	13.4	14.4	1606	26.3	191	1.76	2.12	316	3.78	3.51	2.03
100	14.1	15.9	1385	27.4	207	1.48	2.07	351	3.39	3.51	1.91
110	14.8	17.2	1221	28.2	220	1.23	2.00	383	3.00	3.49	1.77
120	15.3	18.3	1095	28.9	231	1.02	1.93	412	2.63	3.43	1.61
130	15.7	19.4	998	29.4	241	0.83	1.85	436	2.29	3.35	1.45
140	16.0	20.3	920	29.8	248	0.68	1.77	457	1.98	3.27	1.29
150	16.3	21.2	840	29.6	246	-0.24	1.64	476	1.70	3.17	1.93
160	16.5	21.9	774	29.2	243	-0.29	1.52	491	1.45	3.07	1.74
170	16.7	22.6	719	28.7	240	-0.35	1.41	505	1.24	2.97	1.58
180	16.9	23.2	671	28.2	237	-0.40	1.31	516	1.05	2.87	1.45
190	17.0	23.7	628	27.6	232	-0.46	1.22	526	0.89	2.77	1.35
200	17.1	24.1	589	26.9	227	-0.51	1.14	534	0.76	2.67	1.27
210	17.2	24.5	553	26.1	222	-0.57	1.06	541	0.64	2.58	1.21
220	17.3	24.9	519	25.2	216	-0.63	0.98	547	0.54	2.49	1.17
230	17.3	25.2	486	24.2	209	-0.68	0.91	552	0.45	2.40	1.14
240	17.4	25.5	455	23.2	202	-0.74	0.84	556	0.38	2.32	1.12
250	17.4	25.7	424	22.0	195	-0.79	0.78	560	0.32	2.24	1.11
260	17.4	25.9	395	20.8	187	-0.83	0.72	563	0.27	2.16	1.10
270	17.4	26.1	366	19.6	178	-0.87	0.66	565	0.23	2.09	1.10
280	17.5	26.3	338	18.3	169	-0.90	0.60	567	0.19	2.03	1.09
290	17.5	26.4	311	17.0	160	-0.93	0.55	569	0.16	1.96	1.09
300	17.5	26.5	284	15.7	151	-0.94	0.50	570	0.14	1.90	1.08

Va Site Index

20	1.8	1.1	29505	2.6	5	0.78	0.27	9	1.19	0.46	0.41
30	3.2	2.2	14647	5.5	16	1.37	0.54	25	1.97	0.84	0.60
40	4.6	3.6	8826	8.7	32	1.76	0.80	48	2.56	1.20	0.80
50	5.9	5.0	5944	11.8	51	1.92	1.01	76	2.92	1.51	0.99
60	7.1	6.5	4310	14.4	70	1.90	1.17	106	3.06	1.76	1.16
70	8.1	8.0	3297	16.7	88	1.76	1.26	136	3.03	1.94	1.27
80	9.0	9.5	2629	18.5	105	1.55	1.31	166	2.89	2.07	1.34
90	9.7	10.8	2167	19.9	119	1.33	1.33	194	2.69	2.15	1.35
100	10.3	12.1	1835	21.0	132	1.11	1.32	219	2.44	2.19	1.32
110	10.8	13.2	1589	21.9	142	0.92	1.29	242	2.18	2.20	1.26
120	11.3	14.3	1403	22.5	150	0.75	1.25	263	1.92	2.19	1.18
130	11.6	15.3	1259	23.0	157	0.60	1.21	281	1.68	2.16	1.08

Dynamics of Normal (Fully Stocked) Pine Stands

in Subtundra and Northern Taiga Ecoregions of European Russia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
140	11.9	16.1	1146	23.4	162	0.48	1.16	297	1.45	2.12	0.97
150	12.1	16.9	1035	23.2	161	-0.17	1.07	310	1.25	2.07	1.42
160	12.3	17.6	946	23.0	159	-0.21	0.99	322	1.07	2.01	1.28
170	12.5	18.2	871	22.7	156	-0.25	0.92	332	0.91	1.95	1.16
180	12.6	18.7	809	22.3	154	-0.29	0.85	340	0.77	1.89	1.07
190	12.7	19.2	754	21.9	151	-0.34	0.79	347	0.65	1.83	0.99
200	12.8	19.7	706	21.4	147	-0.38	0.73	353	0.55	1.77	0.94
210	12.9	20.0	661	20.8	143	-0.43	0.68	358	0.47	1.71	0.89
220	13.0	20.4	620	20.2	138	-0.47	0.63	362	0.39	1.65	0.87
230	13.0	20.7	581	19.5	133	-0.52	0.58	366	0.33	1.59	0.85
240	13.1	20.9	544	18.7	128	-0.56	0.53	369	0.28	1.54	0.84
250	13.1	21.1	507	17.8	122	-0.60	0.49	372	0.23	1.49	0.83
260	13.1	21.3	471	16.8	116	-0.63	0.45	374	0.19	1.44	0.83
270	13.1	21.5	436	15.8	109	-0.66	0.41	375	0.16	1.39	0.83
280	13.2	21.7	402	14.8	103	-0.69	0.37	377	0.14	1.35	0.82
290	13.2	21.8	368	13.7	96	-0.70	0.33	378	0.11	1.30	0.81
300	13.2	21.9	335	12.6	89	-0.71	0.30	379	0.09	1.26	0.80

Vb Site Index

20	0.9	0.5	47518	0.8	1	0.21	0.05	3	0.38	0.13	0.17
30	1.7	1.1	24984	2.4	5	0.52	0.16	8	0.75	0.27	0.23
40	2.5	2.0	15026	4.6	11	0.80	0.28	17	1.09	0.44	0.29
50	3.4	3.0	9847	6.9	20	0.97	0.41	30	1.34	0.59	0.37
60	4.2	4.1	6875	9.0	30	1.00	0.50	44	1.48	0.73	0.48
70	4.9	5.2	5047	10.8	40	0.95	0.57	59	1.53	0.84	0.59
80	5.5	6.4	3862	12.3	49	0.84	0.61	74	1.51	0.93	0.67
90	6.0	7.5	3062	13.4	57	0.71	0.63	89	1.44	0.99	0.73
100	6.5	8.5	2502	14.3	63	0.58	0.63	103	1.34	1.03	0.75
110	6.9	9.5	2098	14.9	69	0.47	0.62	116	1.21	1.05	0.75
120	7.2	10.4	1801	15.4	73	0.37	0.61	127	1.09	1.06	0.72
130	7.4	11.3	1576	15.7	76	0.29	0.58	137	0.96	1.06	0.67
140	7.7	12.0	1404	15.9	79	0.22	0.56	146	0.84	1.05	0.61
150	7.8	12.7	1251	15.9	78	-0.07	0.52	154	0.73	1.03	0.80
160	8.0	13.3	1132	15.8	77	-0.09	0.48	161	0.62	1.01	0.72
170	8.1	13.9	1036	15.7	76	-0.11	0.45	167	0.53	0.98	0.65
180	8.2	14.4	959	15.6	75	-0.14	0.42	172	0.46	0.95	0.59
190	8.3	14.8	895	15.5	73	-0.16	0.39	176	0.39	0.93	0.55
200	8.4	15.2	840	15.3	72	-0.18	0.36	179	0.33	0.90	0.51
210	8.4	15.6	792	15.1	70	-0.21	0.33	183	0.28	0.87	0.49
220	8.5	15.9	750	14.9	67	-0.23	0.31	185	0.23	0.84	0.47
230	8.5	16.2	712	14.6	65	-0.26	0.28	187	0.20	0.81	0.46
240	8.6	16.4	677	14.3	62	-0.28	0.26	189	0.17	0.79	0.45
250	8.6	16.6	644	13.9	59	-0.31	0.24	191	0.14	0.76	0.45
260	8.6	16.8	612	13.6	56	-0.33	0.22	192	0.12	0.74	0.45
270	8.6	16.9	581	13.1	53	-0.35	0.19	193	0.10	0.71	0.44
280	8.6	17.1	551	12.6	49	-0.36	0.18	194	0.08	0.69	0.44

Dynamics of Normal (Fully Stocked) Pine Stands

in Middle Taiga Ecoregions of European Russia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						II Site Index					
20	9.5	5.8	9203	24.3	124.4	6.85	6.22	125	9.32	6.26	2.47
30	12.8	9.3	4170	28.6	190.8	6.38	6.36	223	10.14	7.45	3.76
40	15.5	12.8	2460	31.8	251.4	5.74	6.29	325	10.10	8.13	4.36
50	17.8	16.1	1675	34.2	305.4	5.05	6.11	424	9.58	8.48	4.53
60	19.8	19.2	1248	36.0	352.6	4.40	5.88	516	8.83	8.60	4.43
70	21.5	22.0	988	37.5	393.6	3.80	5.62	600	7.98	8.57	4.18
80	23.0	24.6	818	38.7	428.8	3.26	5.36	676	7.11	8.44	3.84
90	24.2	26.9	700	39.7	459.1	2.79	5.10	742	6.26	8.25	3.47
100	25.3	29.0	615	40.5	484.9	2.38	4.85	801	5.48	8.01	3.10
110	26.3	30.8	551	41.2	506.8	2.02	4.61	852	4.76	7.75	2.74
120	27.1	32.5	502	41.7	525.5	1.72	4.38	896	4.12	7.47	2.40
130	27.8	34.0	464	42.1	541.3	1.45	4.16	935	3.55	7.19	2.09
140	28.4	35.3	434	42.5	554.7	1.23	3.96	968	3.05	6.91	1.82
150	28.9	36.5	402	42.1	551.4	-0.37	3.68	996	2.61	6.64	2.98
160	29.4	37.5	376	41.6	547.3	-0.46	3.42	1020	2.23	6.37	2.69
170	29.8	38.5	353	41.0	542.3	-0.54	3.19	1041	1.90	6.12	2.44
180	30.1	39.3	333	40.4	536.5	-0.62	2.98	1058	1.62	5.88	2.24
190	30.4	40.0	315	39.6	529.9	-0.70	2.79	1073	1.38	5.65	2.08
200	30.7	40.7	298	38.8	522.4	-0.78	2.61	1086	1.17	5.43	1.96
210	30.9	41.2	283	37.8	514.2	-0.86	2.45	1097	1.00	5.22	1.86
220	31.1	41.7	269	36.8	505.2	-0.94	2.30	1106	0.85	5.03	1.79
230	31.2	42.2	256	35.8	495.4	-1.02	2.15	1114	0.72	4.84	1.74
240	31.4	42.6	243	34.6	484.8	-1.09	2.02	1120	0.61	4.67	1.70
250	31.5	42.9	231	33.5	473.6	-1.16	1.89	1126	0.52	4.50	1.68
260	31.6	43.2	220	32.2	461.6	-1.23	1.78	1131	0.44	4.35	1.67
270	31.7	43.5	209	31.0	449.0	-1.29	1.66	1135	0.37	4.20	1.66
280	31.8	43.7	198	29.7	435.9	-1.34	1.56	1138	0.31	4.07	1.66
290	31.9	43.9	188	28.4	422.2	-1.39	1.46	1141	0.27	3.93	1.66
300	31.9	44.1	178	27.2	408.0	-1.44	1.36	1144	0.23	3.81	1.66

III Site Index

20	6.7	5.3	7082	15.8	59.2	4.76	2.96	114	7.88	5.70	3.13
30	9.7	8.3	3831	20.9	109.6	5.18	3.65	195	8.25	6.51	3.07
40	12.3	11.2	2507	24.7	160.9	5.02	4.02	277	8.01	6.92	3.00
50	14.5	13.9	1823	27.7	208.9	4.56	4.18	355	7.48	7.09	2.92
60	16.4	16.4	1418	29.9	251.8	4.00	4.20	426	6.81	7.10	2.82
70	18.0	18.7	1156	31.6	288.8	3.41	4.13	491	6.10	7.01	2.69
80	19.4	20.7	976	32.9	320.1	2.86	4.00	548	5.40	6.85	2.54
90	20.5	22.6	847	33.9	346.3	2.37	3.85	599	4.74	6.65	2.37
100	21.5	24.3	750	34.7	367.8	1.95	3.68	643	4.14	6.43	2.19
110	22.3	25.8	676	35.3	385.5	1.59	3.50	682	3.59	6.20	2.00
120	23.0	27.1	618	35.7	399.8	1.29	3.33	715	3.10	5.96	1.81
130	23.6	28.3	572	36.1	411.5	1.04	3.17	744	2.67	5.72	1.62
140	24.0	29.4	534	36.3	420.8	0.84	3.01	769	2.29	5.49	1.45
150	24.4	30.4	497	36.1	418.7	-0.25	2.79	790	1.96	5.27	2.21

Dynamics of Normal (Fully Stocked) Pine Stands

in Middle Taiga Ecoregions of European Russia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
160	24.8	31.3	466	35.7	415.9	-0.31	2.60	808	1.68	5.05	1.99
170	25.1	32.0	439	35.3	412.5	-0.37	2.43	824	1.43	4.85	1.81
180	25.3	32.7	415	34.8	408.4	-0.44	2.27	837	1.22	4.65	1.66
190	25.5	33.3	393	34.2	403.7	-0.51	2.12	848	1.04	4.46	1.55
200	25.7	33.8	372	33.5	398.2	-0.58	1.99	858	0.89	4.29	1.47
210	25.8	34.3	353	32.7	392.1	-0.65	1.87	866	0.76	4.12	1.41
220	25.9	34.7	335	31.7	385.2	-0.73	1.75	873	0.64	3.97	1.37
230	26.0	35.1	317	30.7	377.6	-0.80	1.64	879	0.55	3.82	1.35
240	26.1	35.5	299	29.5	369.2	-0.87	1.54	884	0.46	3.68	1.34
250	26.2	35.8	282	28.3	360.1	-0.95	1.44	888	0.39	3.55	1.34
260	26.2	36.0	265	27.0	350.3	-1.02	1.35	892	0.34	3.43	1.35
270	26.3	36.2	248	25.6	339.7	-1.09	1.26	895	0.28	3.32	1.37
280	26.3	36.5	232	24.2	328.5	-1.15	1.17	898	0.24	3.21	1.39
290	26.4	36.6	216	22.8	316.7	-1.21	1.09	900	0.21	3.10	1.41
300	26.4	36.8	200	21.3	304.4	-1.26	1.01	902	0.17	3.01	1.43

IV Site Index

20	4.3	2.9	18014	11.5	31.3	3.04	1.56	67	5.23	3.33	2.19
30	6.8	5.0	8368	16.4	65.6	3.70	2.19	123	5.87	4.09	2.17
40	9.1	7.2	4920	20.2	103.5	3.80	2.59	182	5.97	4.56	2.18
50	11.1	9.4	3299	23.1	140.4	3.55	2.81	241	5.76	4.82	2.20
60	12.8	11.6	2406	25.3	174.0	3.15	2.90	297	5.37	4.95	2.22
70	14.3	13.6	1862	27.0	203.2	2.69	2.90	348	4.90	4.98	2.20
80	15.5	15.5	1506	28.2	227.9	2.25	2.85	395	4.39	4.93	2.14
90	16.6	17.2	1260	29.2	248.4	1.84	2.76	436	3.90	4.85	2.05
100	17.5	18.7	1083	29.9	265.0	1.49	2.65	473	3.42	4.73	1.93
110	18.2	20.2	952	30.4	278.4	1.20	2.53	505	2.99	4.59	1.79
120	18.8	21.4	852	30.8	289.1	0.95	2.41	533	2.60	4.44	1.64
130	19.3	22.6	774	31.0	297.7	0.76	2.29	557	2.24	4.28	1.49
140	19.7	23.6	713	31.2	304.4	0.60	2.17	578	1.93	4.13	1.34
150	20.0	24.5	656	31.1	302.4	-0.23	2.02	596	1.66	3.97	1.89
160	20.3	25.4	609	30.8	299.8	-0.28	1.87	611	1.42	3.82	1.70
170	20.5	26.1	570	30.5	296.8	-0.34	1.75	624	1.22	3.67	1.55
180	20.7	26.7	535	30.1	293.1	-0.40	1.63	635	1.04	3.53	1.43
190	20.9	27.3	504	29.5	288.8	-0.46	1.52	645	0.89	3.39	1.34
200	21.0	27.8	475	28.9	283.9	-0.52	1.42	653	0.75	3.27	1.28
210	21.1	28.3	449	28.2	278.4	-0.59	1.33	660	0.64	3.14	1.23
220	21.2	28.7	423	27.3	272.1	-0.66	1.24	666	0.55	3.03	1.21
230	21.2	29.0	398	26.4	265.1	-0.73	1.15	671	0.46	2.92	1.19
240	21.3	29.3	374	25.3	257.5	-0.80	1.07	675	0.39	2.81	1.19
250	21.3	29.6	350	24.2	249.2	-0.87	1.00	679	0.33	2.72	1.20
260	21.4	29.9	327	22.9	240.2	-0.93	0.92	682	0.28	2.62	1.21
270	21.4	30.1	304	21.6	230.6	-0.99	0.85	685	0.24	2.54	1.23
280	21.4	30.3	281	20.2	220.4	-1.04	0.79	687	0.20	2.45	1.24
290	21.5	30.4	259	18.9	209.8	-1.08	0.72	689	0.17	2.38	1.26
300	21.5	30.6	238	17.5	198.8	-1.12	0.66	690	0.15	2.30	1.27

Dynamics of Normal (Fully Stocked) Pine Stands

in Middle Taiga Ecoregions of European Russia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
V Site Index											
20	2.5	1.0	107398	8.6	16.4	1.77	0.82	25	2.59	1.27	0.82
30	4.3	2.3	32121	12.8	37.4	2.36	1.25	56	3.48	1.87	1.12
40	6.2	3.8	14261	16.3	62.3	2.58	1.56	94	3.97	2.34	1.39
50	7.9	5.6	7863	19.1	88.0	2.53	1.76	134	4.14	2.69	1.61
60	9.4	7.4	4973	21.3	112.4	2.32	1.87	176	4.09	2.93	1.77
70	10.8	9.2	3456	22.9	134.2	2.05	1.92	216	3.89	3.08	1.84
80	11.9	10.9	2574	24.2	153.2	1.75	1.92	253	3.60	3.16	1.85
90	12.9	12.6	2019	25.2	169.3	1.47	1.88	288	3.27	3.19	1.81
100	13.7	14.1	1650	25.9	182.6	1.21	1.83	319	2.93	3.19	1.72
110	14.3	15.6	1394	26.5	193.6	0.99	1.76	346	2.59	3.15	1.61
120	14.9	16.8	1208	26.9	202.5	0.80	1.69	370	2.28	3.09	1.48
130	15.3	18.0	1071	27.2	209.7	0.64	1.61	392	1.98	3.01	1.34
140	15.7	19.0	966	27.5	215.4	0.51	1.54	410	1.72	2.93	1.20
150	16.0	19.9	872	27.2	212.8	-0.29	1.42	426	1.48	2.84	1.77
160	16.3	20.8	796	26.9	209.6	-0.35	1.31	440	1.27	2.75	1.62
170	16.5	21.5	733	26.5	205.8	-0.41	1.21	452	1.09	2.66	1.50
180	16.7	22.1	679	26.0	201.4	-0.48	1.12	462	0.93	2.57	1.41
190	16.8	22.7	631	25.4	196.3	-0.54	1.03	470	0.79	2.48	1.34
200	16.9	23.1	588	24.7	190.5	-0.61	0.95	478	0.67	2.39	1.28
210	17.0	23.6	548	23.9	184.0	-0.68	0.88	484	0.57	2.30	1.25
220	17.1	23.9	510	22.9	176.9	-0.74	0.80	489	0.48	2.22	1.23
230	17.1	24.2	474	21.9	169.2	-0.80	0.74	494	0.41	2.15	1.21
240	17.2	24.5	439	20.7	160.8	-0.86	0.67	497	0.35	2.07	1.21
250	17.2	24.8	405	19.5	152.0	-0.90	0.61	501	0.29	2.00	1.20
260	17.3	25.0	372	18.2	142.8	-0.94	0.55	503	0.25	1.94	1.19
270	17.3	25.1	340	16.9	133.3	-0.96	0.49	506	0.21	1.87	1.17
280	17.3	25.3	310	15.6	123.6	-0.98	0.44	507	0.18	1.81	1.15
290	17.3	25.4	280	14.2	113.8	-0.98	0.39	509	0.15	1.76	1.13
300	17.3	25.5	252	12.9	104.1	-0.97	0.35	511	0.13	1.70	1.09

Va Site Index

20	1.2	0.3			8.1	0.93	0.41	7	0.91	0.33	-0.02
30	2.4	0.9	135288	9.3	19.6	1.34	0.65	19	1.63	0.64	0.29
40	3.8	2.0	40050	12.3	34.3	1.58	0.86	39	2.22	0.97	0.65
50	5.1	3.3	16968	14.8	50.6	1.66	1.01	63	2.62	1.26	0.96
60	6.4	4.9	8977	17.0	67.1	1.63	1.12	90	2.82	1.51	1.20
70	7.6	6.6	5514	18.7	82.9	1.53	1.18	119	2.86	1.70	1.33
80	8.6	8.3	3766	20.2	97.6	1.39	1.22	147	2.78	1.84	1.39
90	9.5	9.9	2782	21.4	110.7	1.24	1.23	174	2.62	1.94	1.38
100	10.2	11.4	2181	22.3	122.3	1.08	1.22	199	2.40	1.99	1.32
110	10.9	12.8	1790	23.1	132.3	0.93	1.20	222	2.17	2.02	1.24
120	11.4	14.1	1523	23.7	140.9	0.79	1.17	243	1.93	2.02	1.13
130	11.9	15.2	1335	24.2	148.3	0.67	1.14	261	1.70	2.01	1.02
140	12.3	16.2	1197	24.6	154.4	0.57	1.10	277	1.48	1.98	0.91
150	12.6	17.1	1058	24.2	150.0	-0.48	1.00	291	1.28	1.94	1.75

**Dynamics of Normal (Fully Stocked) Pine Stands
in Middle Taiga Ecoregions of European Russia**

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
160	12.9	17.8	948	23.6	144.9	-0.55	0.91	302	1.10	1.89	1.65
170	13.1	18.4	856	22.9	139.1	-0.62	0.82	313	0.94	1.84	1.56
180	13.3	19.0	778	22.0	132.5	-0.69	0.74	321	0.80	1.78	1.49
190	13.4	19.4	710	21.1	125.4	-0.75	0.66	329	0.68	1.73	1.43
200	13.5	19.8	647	20.0	117.7	-0.80	0.59	335	0.58	1.67	1.37
210	13.6	20.2	590	18.9	109.5	-0.84	0.52	340	0.49	1.62	1.32
220	13.7	20.5	536	17.6	101.0	-0.86	0.46	345	0.41	1.57	1.27
230	13.8	20.7	485	16.3	92.3	-0.87	0.40	349	0.35	1.52	1.22
240	13.8	20.9	438	15.0	83.6	-0.87	0.35	352	0.29	1.47	1.16
250	13.9	21.1	393	13.7	75.0	-0.85	0.30	354	0.24	1.42	1.10
260	13.9	21.2	351	12.4	66.6	-0.82	0.26	357	0.21	1.37	1.02
270	13.9	21.3	312	11.1	58.7	-0.78	0.22	359	0.17	1.33	0.95
280	14.0	21.4	275	9.9	51.1	-0.72	0.18	360	0.14	1.29	0.87
290	14.0	21.5	242	8.8	44.2	-0.67	0.15	361	0.12	1.25	0.79
300	14.0	21.6	211	7.7	37.8	-0.60	0.13	363	0.10	1.21	0.71

Vb Site Index

30	1.1	0.4			8.4	0.60	0.28	5	0.61	0.18	0.01
40	2.0	1.2	61665	6.8	15.2	0.76	0.38	14	1.05	0.34	0.29
50	2.9	2.3	19794	8.6	23.4	0.88	0.47	26	1.45	0.52	0.58
60	3.8	3.8	8885	10.2	32.6	0.95	0.54	42	1.75	0.71	0.80
70	4.8	5.5	4971	11.6	42.2	0.98	0.60	61	1.92	0.87	0.94
80	5.6	7.2	3237	13.0	52.1	0.98	0.65	80	1.97	1.00	0.99
90	6.4	8.8	2349	14.3	61.8	0.96	0.69	100	1.94	1.11	0.97
100	7.2	10.3	1846	15.4	71.3	0.93	0.71	119	1.83	1.19	0.91
110	7.8	11.7	1538	16.5	80.3	0.88	0.73	136	1.69	1.24	0.81
120	8.4	12.9	1340	17.4	88.8	0.82	0.74	152	1.52	1.27	0.70
130	8.8	13.9	1207	18.3	96.8	0.77	0.74	167	1.35	1.28	0.58
140	9.3	14.7	1116	19.1	104.2	0.71	0.74	179	1.18	1.28	0.47
150	9.6	15.5	955	17.9	110.9	-0.80	0.74	190	1.02	1.27	1.82
160	9.9	16.1	827	16.7	117.1	-0.84	0.73	200	0.88	1.25	1.71
170	10.2	16.5	720	15.5	122.8	-0.85	0.72	208	0.75	1.22	1.60
180	10.4	16.9	630	14.2	127.9	-0.85	0.71	215	0.63	1.19	1.48
190	10.6	17.3	552	12.9	132.5	-0.83	0.70	221	0.53	1.16	1.36
200	10.7	17.5	483	11.7	136.6	-0.79	0.68	226	0.45	1.13	1.24
210	10.9	17.7	422	10.4	140.3	-0.73	0.67	230	0.38	1.09	1.11
220	11.0	17.9	368	9.3	143.6	-0.67	0.65	233	0.32	1.06	0.99
230	11.1	18.1	319	8.2	146.6	-0.60	0.64	236	0.26	1.03	0.87
240	11.2	18.2	276	7.2	149.3	-0.53	0.62	239	0.22	0.99	0.75
250	11.2	18.3	238	6.2	151.6	-0.46	0.61	241	0.18	0.96	0.65
260	11.3	18.3	205	5.4	153.7	-0.40	0.59	242	0.15	0.93	0.55
270	11.3	18.4	175	4.7	155.6	-0.33	0.58	244	0.13	0.90	0.46
280	11.4	18.4	149	4.0	157.3	-0.28	0.56	245	0.10	0.87	0.38
290	11.4	18.5	127	3.4	158.7	-0.23	0.55	246	0.09	0.85	0.31
300	11.4	18.5	108	2.9	160.0	-0.18	0.53	246	0.07	0.82	0.26

Dynamics of Normal (Fully Stocked) Pine Stands

in South and Middle Taiga Mountain Ecoregions of Ural

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						I Site Index					
10	3.3	2.5	27494	13.3	36	6.33	3.62	45	8.15	4.51	1.82
20	7.8	6.3	7566	23.6	114	8.75	5.69	149	12.13	7.46	3.38
30	12.1	10.4	3630	31.1	205	9.16	6.82	279	13.59	9.31	4.43
40	16.0	14.6	2193	36.6	294	8.58	7.35	416	13.59	10.40	5.01
50	19.2	18.5	1505	40.5	375	7.58	7.50	549	12.78	10.97	5.20
60	21.9	22.2	1121	43.4	445	6.47	7.42	671	11.58	11.18	5.11
70	24.1	25.6	884	45.5	504	5.39	7.21	780	10.23	11.14	4.84
80	25.8	28.7	728	47.0	553	4.42	6.92	875	8.88	10.94	4.46
90	27.3	31.5	619	48.1	593	3.58	6.59	957	7.61	10.64	4.03
100	28.4	34.0	540	48.9	625	2.88	6.25	1028	6.46	10.28	3.58
110	29.3	36.2	481	49.5	651	2.30	5.92	1087	5.44	9.88	3.14
120	30.0	38.2	436	49.9	672	1.83	5.60	1137	4.56	9.47	2.73
130	30.6	39.9	401	50.2	688	1.45	5.29	1179	3.80	9.07	2.35
140	31.0	41.5	373	50.4	701	1.15	5.01	1213	3.16	8.67	2.02
150	31.4	42.8	351	50.5	711	0.90	4.74	1242	2.62	8.28	1.72
160	31.7	44.0	333	50.6	719	0.71	4.49	1266	2.17	7.91	1.46
II Site Index											
10	2.0	1.4	56759	9.1	19	3.98	1.87	27	5.54	2.66	1.56
20	5.8	4.2	14225	19.4	75	6.86	3.73	105	9.76	5.25	2.90
30	9.8	7.4	6336	27.6	150	7.88	4.99	214	11.76	7.14	3.89
40	13.5	10.9	3596	33.6	228	7.70	5.71	335	12.19	8.38	4.49
50	16.6	14.4	2341	38.0	302	6.91	6.03	455	11.65	9.10	4.74
60	19.2	17.7	1668	41.0	366	5.89	6.09	566	10.59	9.44	4.70
70	21.2	20.8	1267	43.0	419	4.87	5.99	666	9.33	9.51	4.46
80	22.8	23.7	1010	44.4	463	3.93	5.79	753	8.03	9.41	4.10
90	24.0	26.3	836	45.4	498	3.12	5.54	827	6.80	9.19	3.67
100	24.9	28.7	713	46.1	526	2.46	5.26	889	5.68	8.89	3.23
110	25.6	30.8	624	46.5	548	1.92	4.98	941	4.71	8.55	2.80
120	26.2	32.7	556	46.8	565	1.48	4.71	984	3.88	8.20	2.39
130	26.6	34.4	505	47.0	578	1.15	4.45	1019	3.18	7.84	2.03
140	26.9	35.9	465	47.2	588	0.88	4.20	1048	2.59	7.48	1.71
150	27.2	37.3	433	47.3	596	0.68	3.97	1071	2.10	7.14	1.43
160	27.3	38.5	407	47.3	602	0.52	3.76	1090	1.71	6.81	1.19
III Site Index											
10	0.9				10	2.41	1.03	15	3.39	1.46	0.98
20	3.5	2.6	25925	13.7	47	4.82	2.37	67	6.98	3.37	2.16
30	6.9	5.1	10871	22.2	102	6.01	3.41	149	9.12	4.97	3.11
40	10.2	7.9	5837	28.8	164	6.20	4.10	245	9.93	6.13	3.72
50	13.2	10.9	3616	33.8	224	5.80	4.49	345	9.80	6.89	4.00
60	15.7	13.9	2466	37.3	279	5.11	4.65	440	9.12	7.33	4.01
70	17.6	16.7	1803	39.7	326	4.33	4.66	526	8.16	7.52	3.83
80	19.1	19.4	1391	41.3	366	3.57	4.57	603	7.11	7.53	3.53
90	20.3	22.0	1120	42.4	398	2.90	4.42	668	6.07	7.43	3.17

Dynamics of Normal (Fully Stocked) Pine Stands

in South and Middle Taiga Mountain Ecoregions of Ural

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
100	21.1	24.3	932	43.1	424	2.32	4.24	724	5.11	7.24	2.79
110	21.8	26.4	798	43.6	445	1.83	4.04	771	4.25	7.01	2.42
120	22.3	28.3	700	43.9	461	1.44	3.84	810	3.51	6.75	2.07
130	22.6	30.0	626	44.2	474	1.13	3.65	842	2.88	6.47	1.75
140	22.9	31.5	568	44.3	484	0.88	3.46	868	2.35	6.20	1.47
150	23.1	32.9	524	44.4	492	0.68	3.28	889	1.91	5.93	1.23
160	23.2	34.1	488	44.5	498	0.53	3.11	906	1.55	5.66	1.02
IV Site Index											
10	0.3				5	1.30	0.54	7	1.76	0.70	0.46
20	1.7				26	2.84	1.32	37	4.24	1.86	1.40
30	4.2	3.3	17264	15.1	60	3.84	2.01	90	6.09	2.98	2.24
40	7.0	5.6	8963	22.0	101	4.29	2.53	156	7.10	3.90	2.81
50	9.7	8.1	5364	27.7	145	4.31	2.89	229	7.41	4.58	3.09
60	12.0	10.7	3537	32.0	187	4.08	3.11	303	7.22	5.04	3.14
70	13.9	13.4	2505	35.1	226	3.70	3.23	373	6.73	5.32	3.03
80	15.4	15.9	1877	37.3	261	3.26	3.26	437	6.08	5.46	2.82
90	16.6	18.4	1470	38.9	291	2.81	3.23	494	5.36	5.49	2.55
100	17.5	20.6	1195	40.0	317	2.39	3.17	544	4.65	5.44	2.26
110	18.1	22.8	1001	40.7	339	2.01	3.08	587	3.98	5.34	1.97
120	18.6	24.7	861	41.2	357	1.67	2.98	624	3.37	5.20	1.70
130	19.0	26.5	756	41.6	372	1.38	2.86	655	2.83	5.04	1.46
140	19.2	28.0	677	41.8	385	1.13	2.75	681	2.37	4.86	1.23
150	19.4	29.5	615	42.0	395	0.93	2.63	702	1.97	4.68	1.04
160	19.5	30.7	567	42.1	404	0.76	2.52	720	1.63	4.50	0.87

Dynamics of Normal (Fully Stocked) Pine Stands

**in Middle Taiga, Southern Taiga, Subtaiga and Forest Steppe Ecoregions
of Central and East Siberia**

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
<i>Ia Site Index</i>											
20	6.2	4.8	13492	24.7	167	10.56	8.33	160	12.41	7.98	1.85
30	10.5	9.5	4917	34.6	270	9.91	8.99	292	13.78	9.73	3.87
40	14.7	14.6	2381	39.7	363	8.64	9.07	431	13.85	10.77	5.20
50	18.5	19.7	1380	42.3	442	7.25	8.85	566	13.19	11.33	5.94
60	21.9	24.7	907	43.4	508	5.95	8.47	693	12.16	11.56	6.21
70	24.8	29.3	654	44.0	562	4.80	8.03	809	10.96	11.56	6.16
80	27.3	33.4	505	44.2	605	3.84	7.56	912	9.72	11.41	5.89
90	29.5	37.1	411	44.3	639	3.04	7.10	1004	8.53	11.15	5.49
100	31.3	40.3	348	44.4	666	2.40	6.66	1083	7.41	10.83	5.01
110	32.8	43.1	305	44.4	687	1.89	6.25	1152	6.40	10.47	4.52
120	34.0	45.5	273	44.4	704	1.48	5.87	1212	5.50	10.10	4.02
130	35.1	47.6	250	44.4	717	1.15	5.52	1263	4.70	9.71	3.55
140	36.0	49.3	232	44.4	728	0.90	5.20	1306	4.01	9.33	3.11
150	36.7	50.8	219	44.4	736	0.70	4.90	1343	3.41	8.95	2.71
160	37.3	52.1	208	44.4	742	0.55	4.64	1374	2.89	8.59	2.34
170	37.7	53.2	200	44.4	747	0.43	4.39	1401	2.45	8.24	2.02
180	38.1	54.1	193	44.4	750	0.33	4.17	1424	2.07	7.91	1.74
<i>I Site Index</i>											
20	7.6	5.4	8729	19.7	103	7.73	5.14	96	8.80	4.78	1.07
30	11.8	9.4	4096	28.1	183	8.03	6.09	195	10.92	6.52	2.90
40	15.6	13.5	2380	34.0	261	7.51	6.52	310	11.81	7.75	4.30
50	18.8	17.5	1567	37.8	332	6.64	6.63	429	11.84	8.58	5.20
60	21.5	21.4	1123	40.3	393	5.68	6.55	545	11.35	9.08	5.66
70	23.8	25.0	856	41.9	445	4.75	6.36	655	10.54	9.35	5.78
80	25.7	28.2	685	42.9	489	3.92	6.11	755	9.57	9.44	5.66
90	27.3	31.2	568	43.5	524	3.19	5.82	846	8.56	9.40	5.36
100	28.6	33.9	486	43.9	553	2.58	5.53	926	7.56	9.26	4.98
110	29.7	36.3	426	44.2	576	2.08	5.24	997	6.61	9.07	4.54
120	30.5	38.5	382	44.3	595	1.66	4.96	1059	5.74	8.82	4.08
130	31.3	40.4	347	44.4	610	1.32	4.69	1112	4.96	8.56	3.63
140	31.8	42.0	320	44.5	621	1.05	4.44	1158	4.26	8.27	3.20
150	32.3	43.5	299	44.5	631	0.84	4.21	1198	3.64	7.99	2.81
160	32.7	44.8	282	44.5	638	0.66	3.99	1232	3.11	7.70	2.45
170	33.0	46.0	268	44.5	644	0.52	3.79	1260	2.65	7.41	2.12
180	33.2	47.0	257	44.6	649	0.42	3.60	1285	2.25	7.14	1.83
<i>II Site Index</i>											
20	7.0	5.4	7065	16.1	72	5.82	3.62	67	6.68	3.37	0.86
30	10.7	8.8	3800	23.0	134	6.35	4.47	146	8.78	4.86	2.43
40	14.0	12.2	2438	28.4	197	6.16	4.93	240	9.86	5.99	3.70
50	16.8	15.4	1730	32.3	256	5.62	5.12	340	10.18	6.81	4.56
60	19.2	18.5	1311	35.3	309	4.93	5.15	441	9.97	7.36	5.04
70	21.1	21.4	1042	37.4	355	4.22	5.07	539	9.43	7.69	5.21

Dynamics of Normal (Fully Stocked) Pine Stands

**in Middle Taiga, Southern Taiga, Subtaiga and Forest Steppe Ecoregions
of Central and East Siberia**

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
80	22.7	24.0	859	38.9	394	3.55	4.92	629	8.70	7.87	5.14
90	24.0	26.5	729	40.1	426	2.95	4.73	712	7.88	7.91	4.92
100	25.1	28.7	633	40.9	453	2.43	4.53	787	7.03	7.87	4.60
110	25.9	30.7	560	41.4	475	1.99	4.32	853	6.21	7.75	4.22
120	26.6	32.5	504	41.8	493	1.62	4.11	911	5.44	7.59	3.82
130	27.2	34.2	460	42.1	508	1.31	3.90	962	4.73	7.40	3.42
140	27.6	35.6	424	42.3	519	1.06	3.71	1006	4.10	7.19	3.04
150	28.0	37.0	396	42.5	529	0.85	3.53	1044	3.53	6.96	2.68
160	28.3	38.2	372	42.6	537	0.69	3.35	1077	3.03	6.73	2.34
170	28.5	39.3	352	42.7	543	0.55	3.19	1105	2.59	6.50	2.04
180	28.7	40.2	336	42.7	548	0.44	3.04	1129	2.21	6.27	1.77

III Site Index

20	5.0	4.6	8406	13.7	59	4.65	2.96	56	5.48	2.78	0.83
30	8.1	7.4	4832	20.6	108	5.05	3.61	120	7.22	3.99	2.18
40	11.0	10.2	3196	26.0	158	4.90	3.96	197	8.15	4.93	3.24
50	13.6	12.9	2297	30.0	206	4.49	4.11	281	8.45	5.61	3.96
60	15.8	15.5	1749	32.8	248	3.97	4.13	365	8.33	6.08	4.36
70	17.6	17.9	1389	34.8	285	3.43	4.07	446	7.93	6.38	4.49
80	19.1	20.1	1141	36.2	317	2.92	3.96	523	7.36	6.54	4.44
90	20.3	22.2	964	37.2	343	2.45	3.82	593	6.70	6.59	4.26
100	21.4	24.1	833	37.8	366	2.04	3.66	657	6.02	6.57	3.99
110	22.2	25.8	733	38.3	384	1.68	3.49	714	5.36	6.49	3.67
120	22.8	27.4	656	38.6	400	1.38	3.33	764	4.72	6.37	3.34
130	23.4	28.8	596	38.8	412	1.13	3.17	808	4.13	6.22	3.00
140	23.8	30.1	547	39.0	423	0.93	3.02	847	3.60	6.05	2.67
150	24.1	31.3	508	39.1	431	0.75	2.87	880	3.12	5.87	2.37
160	24.4	32.4	475	39.2	438	0.61	2.74	910	2.69	5.68	2.08
170	24.6	33.4	448	39.2	443	0.50	2.61	935	2.32	5.50	1.82
180	24.8	34.2	426	39.2	448	0.40	2.49	956	1.99	5.31	1.59

IV Site Index

20	2.8	3.2	17220	13.6	56	3.92	2.82	53	4.83	2.65	0.90
30	5.2	5.4	9248	21.4	96	3.99	3.21	108	6.02	3.59	2.03
40	7.7	7.8	5618	26.6	135	3.74	3.38	171	6.58	4.28	2.84
50	10.1	10.1	3729	29.8	171	3.36	3.42	238	6.70	4.76	3.34
60	12.2	12.3	2653	31.6	202	2.93	3.37	304	6.52	5.07	3.59
70	14.0	14.4	1995	32.6	229	2.51	3.28	368	6.16	5.25	3.65
80	15.6	16.4	1570	33.2	253	2.13	3.16	427	5.70	5.34	3.58
90	16.8	18.2	1282	33.5	272	1.78	3.02	482	5.19	5.35	3.41
100	17.9	19.9	1080	33.7	288	1.49	2.88	531	4.67	5.31	3.18
110	18.8	21.5	932	33.8	302	1.23	2.74	575	4.16	5.23	2.93
120	19.5	22.9	822	33.8	313	1.02	2.61	614	3.68	5.12	2.66
130	20.0	24.2	738	33.9	322	0.84	2.48	649	3.24	4.99	2.40
140	20.5	25.3	672	33.9	330	0.69	2.36	679	2.83	4.85	2.14
150	20.9	26.4	619	33.9	336	0.56	2.24	706	2.47	4.70	1.90

Dynamics of Normal (Fully Stocked) Pine Stands

in Middle Taiga, Southern Taiga, Subtaiga and Forest Steppe Ecoregions
of Central and East Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
160	21.2	27.3	577	33.9	341	0.46	2.13	729	2.14	4.55	1.68
170	21.4	28.2	543	33.9	345	0.38	2.03	749	1.86	4.40	1.48
180	21.6	29.0	514	33.9	349	0.31	1.94	766	1.61	4.26	1.30

V Site Index

20	1.2	1.9	53170	14.8	61	3.24	3.04	57	4.36	2.87	1.11
30	2.9	3.6	21165	21.7	92	2.93	3.06	104	4.86	3.47	1.93
40	4.8	5.5	10255	24.7	119	2.55	2.98	153	4.96	3.83	2.41
50	6.9	7.5	5813	25.9	143	2.17	2.85	202	4.82	4.05	2.65
60	8.9	9.5	3716	26.4	163	1.83	2.71	249	4.55	4.16	2.72
70	10.7	11.4	2601	26.5	179	1.53	2.56	293	4.21	4.19	2.68
80	12.3	13.2	1951	26.6	193	1.28	2.42	333	3.84	4.17	2.56
90	13.7	14.8	1543	26.6	205	1.06	2.28	370	3.46	4.11	2.40
100	14.9	16.3	1271	26.6	215	0.87	2.15	403	3.09	4.03	2.22
110	15.8	17.7	1082	26.6	223	0.72	2.02	432	2.75	3.93	2.03
120	16.6	18.9	946	26.6	229	0.59	1.91	458	2.43	3.81	1.84
130	17.3	20.0	844	26.6	235	0.49	1.80	480	2.14	3.70	1.65
140	17.8	21.0	767	26.6	239	0.40	1.71	500	1.88	3.57	1.48
150	18.3	21.9	707	26.6	243	0.33	1.62	518	1.64	3.45	1.31
160	18.6	22.7	659	26.6	246	0.27	1.54	533	1.43	3.33	1.16
170	18.9	23.4	621	26.6	248	0.22	1.46	547	1.25	3.22	1.03
180	19.1	24.0	590	26.6	250	0.18	1.39	558	1.09	3.10	0.91

Dynamics of Normal (Fully Stocked) Pine Stands

in Subtaiga, Forest Steppe and Mountain Ecoregions of West Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						I Site Index					
20	7.5	6.3	6158	19.0	96	7.29	4.82	95	8.06	4.74	0.77
30	11.8	10.6	3016	26.6	172	7.70	5.74	184	9.54	6.13	1.84
40	15.7	14.9	1840	32.1	248	7.34	6.20	282	10.04	7.06	2.70
50	19.1	19.0	1271	36.0	318	6.63	6.36	383	9.92	7.65	3.29
60	21.9	22.7	953	38.6	380	5.79	6.34	480	9.43	7.99	3.63
70	24.2	26.1	757	40.4	434	4.95	6.20	570	8.72	8.15	3.77
80	26.1	29.1	628	41.7	479	4.17	5.99	654	7.92	8.17	3.76
90	27.7	31.7	538	42.5	517	3.47	5.75	729	7.10	8.10	3.63
100	28.9	34.0	474	43.1	549	2.86	5.49	796	6.29	7.96	3.42
110	29.9	36.0	426	43.4	575	2.35	5.23	855	5.53	7.77	3.18
120	30.7	37.7	390	43.7	596	1.92	4.97	907	4.83	7.55	2.91
130	31.4	39.2	363	43.9	614	1.56	4.72	952	4.20	7.32	2.63
140	31.9	40.5	341	44.0	628	1.27	4.48	991	3.63	7.08	2.36
150	32.3	41.6	324	44.0	639	1.03	4.26	1024	3.13	6.83	2.10
160	32.6	42.6	310	44.1	649	0.83	4.05	1053	2.69	6.58	1.86
170	32.9	43.4	299	44.1	656	0.67	3.86	1078	2.31	6.34	1.64
II Site Index											
20	6.6	5.8	5709	15.0	69	5.54	3.43	74	6.65	3.71	1.11
30	10.4	9.6	3000	21.8	128	6.13	4.26	149	8.13	4.96	2.00
40	13.7	13.4	1916	27.1	189	6.05	4.73	234	8.72	5.85	2.67
50	16.6	17.0	1366	31.1	248	5.61	4.95	321	8.71	6.43	3.10
60	19.0	20.4	1046	34.1	301	5.02	5.01	407	8.33	6.78	3.32
70	21.1	23.4	843	36.3	348	4.38	4.97	487	7.74	6.96	3.36
80	22.7	26.1	705	37.9	388	3.75	4.85	561	7.04	7.02	3.29
90	24.1	28.6	608	39.0	423	3.18	4.70	628	6.31	6.98	3.13
100	25.3	30.7	536	39.8	452	2.66	4.52	688	5.59	6.88	2.92
110	26.2	32.6	483	40.4	476	2.22	4.33	740	4.90	6.73	2.68
120	26.9	34.3	442	40.8	497	1.84	4.14	786	4.27	6.55	2.43
130	27.5	35.8	409	41.1	513	1.51	3.95	826	3.70	6.35	2.18
140	28.0	37.0	384	41.3	527	1.24	3.76	860	3.19	6.14	1.94
150	28.4	38.2	363	41.5	538	1.02	3.59	889	2.74	5.93	1.72
160	28.7	39.1	346	41.6	548	0.83	3.42	915	2.35	5.72	1.51
170	29.0	40.0	332	41.7	555	0.68	3.27	937	2.00	5.51	1.32
III Site Index											
20	5.3	5.0	6151	12.0	46	4.08	2.31	53	5.13	2.67	1.06
30	8.4	8.3	3340	18.2	91	4.77	3.04	113	6.57	3.75	1.80
40	11.2	11.7	2175	23.2	140	4.88	3.49	182	7.23	4.55	2.35
50	13.7	14.8	1569	27.1	188	4.64	3.75	255	7.33	5.11	2.69
60	15.9	17.8	1211	30.1	232	4.22	3.86	328	7.07	5.46	2.85
70	17.7	20.5	980	32.3	272	3.72	3.88	396	6.59	5.66	2.87
80	19.2	22.9	822	33.9	306	3.22	3.83	459	6.00	5.74	2.78
90	20.5	25.1	710	35.1	336	2.74	3.73	516	5.37	5.73	2.63

Dynamics of Normal (Fully Stocked) Pine Stands

in Subtaiga, Forest Steppe and Mountain Ecoregions of West Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
100	21.5	27.0	627	36.0	361	2.31	3.61	566	4.74	5.66	2.43
110	22.4	28.7	564	36.6	382	1.93	3.48	611	4.14	5.55	2.22
120	23.1	30.3	516	37.1	400	1.60	3.33	649	3.59	5.41	1.99
130	23.7	31.6	477	37.4	414	1.32	3.19	683	3.09	5.25	1.77
140	24.2	32.7	447	37.6	426	1.09	3.05	711	2.65	5.08	1.57
150	24.5	33.8	422	37.8	436	0.89	2.91	736	2.26	4.91	1.37
160	24.9	34.7	402	38.0	444	0.73	2.78	757	1.92	4.73	1.20
170	25.1	35.4	386	38.0	451	0.59	2.65	775	1.63	4.56	1.04

IV Site Index

20	3.7	4.0	8310	10.2	29	2.86	1.46	34	3.60	1.72	0.74
30	6.2	6.8	4458	16.0	62	3.57	2.06	77	4.88	2.58	1.31
40	8.5	9.6	2862	20.7	99	3.78	2.47	130	5.54	3.25	1.76
50	10.7	12.3	2038	24.3	136	3.65	2.73	187	5.71	3.73	2.06
60	12.5	14.9	1554	27.0	171	3.35	2.86	243	5.56	4.05	2.21
70	14.2	17.2	1246	28.9	203	2.96	2.90	297	5.20	4.24	2.24
80	15.5	19.3	1038	30.2	230	2.55	2.88	347	4.73	4.33	2.18
90	16.7	21.1	891	31.2	254	2.16	2.82	392	4.22	4.35	2.06
100	17.7	22.8	784	31.9	274	1.80	2.74	431	3.71	4.31	1.90
110	18.5	24.2	703	32.3	290	1.49	2.64	466	3.22	4.23	1.73
120	19.2	25.5	641	32.7	304	1.23	2.53	496	2.77	4.13	1.54
130	19.8	26.6	593	32.9	315	1.00	2.42	521	2.36	4.01	1.36
140	20.3	27.5	555	33.1	324	0.81	2.31	543	2.01	3.88	1.20
150	20.7	28.4	525	33.2	331	0.66	2.21	562	1.70	3.74	1.04
160	21.0	29.1	500	33.2	337	0.53	2.11	577	1.43	3.61	0.90
170	21.3	29.7	480	33.3	342	0.43	2.01	590	1.20	3.47	0.77

V Site Index

20	2.3	2.8	15151	9.1	16	1.80	0.82	18	2.12	0.92	0.32
30	4.1	4.9	7614	14.6	38	2.40	1.26	45	3.07	1.49	0.67
40	5.9	7.2	4642	18.7	63	2.61	1.58	79	3.61	1.96	1.00
50	7.7	9.3	3176	21.7	89	2.54	1.78	116	3.80	2.32	1.25
60	9.3	11.3	2350	23.6	114	2.32	1.89	154	3.73	2.56	1.41
70	10.7	13.1	1844	24.9	135	2.03	1.93	190	3.49	2.71	1.47
80	12.0	14.7	1512	25.8	154	1.72	1.92	223	3.17	2.79	1.45
90	13.0	16.2	1285	26.3	170	1.42	1.88	253	2.81	2.81	1.38
100	14.0	17.4	1124	26.7	183	1.16	1.83	279	2.45	2.79	1.28
110	14.8	18.5	1006	26.9	193	0.94	1.76	302	2.10	2.75	1.16
120	15.4	19.4	918	27.0	201	0.75	1.68	321	1.79	2.68	1.04
130	16.0	20.2	851	27.1	208	0.60	1.60	338	1.51	2.60	0.91
140	16.5	20.8	798	27.2	214	0.48	1.53	352	1.27	2.51	0.79
150	16.9	21.4	757	27.2	218	0.38	1.45	363	1.06	2.42	0.68
160	17.2	21.9	725	27.3	221	0.30	1.38	373	0.88	2.33	0.58
170	17.5	22.3	699	27.3	224	0.23	1.32	381	0.73	2.24	0.50

Dynamics of Normal (Fully Stocked) Pine Stands

in Subtaiga, Forest Steppe and Mountain Ecoregions of West Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
<i>Va Site Index</i>											
20	1.2	1.5	47112	7.9	6	0.75	0.31	6	0.73	0.29	0.00
30	2.4	2.8	20942	12.5	16	1.07	0.52	15	1.14	0.51	0.07
40	3.7	4.1	11704	15.5	27	1.19	0.67	28	1.39	0.70	0.20
50	5.1	5.4	7539	17.4	39	1.15	0.77	43	1.49	0.85	0.34
60	6.4	6.6	5364	18.5	50	1.02	0.83	57	1.47	0.96	0.44
70	7.5	7.7	4108	19.1	59	0.87	0.84	72	1.37	1.02	0.51
80	8.6	8.6	3327	19.5	67	0.71	0.84	85	1.24	1.06	0.53
90	9.6	9.4	2815	19.7	73	0.57	0.82	96	1.09	1.07	0.52
100	10.4	10.1	2464	19.8	78	0.45	0.78	107	0.94	1.07	0.49
110	11.1	10.7	2215	19.8	82	0.35	0.75	115	0.80	1.05	0.45
120	11.8	11.1	2034	19.9	86	0.27	0.71	123	0.67	1.02	0.40
130	12.3	11.5	1899	19.9	88	0.21	0.68	129	0.55	0.99	0.35
140	12.8	11.9	1797	19.9	90	0.16	0.64	134	0.46	0.95	0.30
150	13.1	12.1	1719	19.9	91	0.12	0.61	138	0.38	0.92	0.26
160	13.5	12.4	1659	19.9	92	0.09	0.58	141	0.31	0.88	0.22
170	13.8	12.5	1611	19.9	93	0.07	0.55	144	0.25	0.85	0.18

Dynamics of Normal (Fully Stocked) Pine Stands

in Northern Taiga Ecoregions of West Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
IV Site Index											
20	3.0	2.9	16504	10.9	22	2.13	1.10	79	4.53	3.96	2.40
30	5.4	5.2	6508	13.8	46	2.60	1.53	124	4.45	4.14	1.85
40	7.8	7.7	3475	16.0	73	2.68	1.82	168	4.23	4.19	1.55
50	10.1	10.1	2191	17.6	99	2.53	1.98	209	3.95	4.18	1.42
60	12.1	12.5	1533	18.8	123	2.26	2.05	247	3.65	4.11	1.39
70	13.8	14.8	1153	19.8	144	1.95	2.05	282	3.34	4.02	1.40
80	15.3	16.9	914	20.5	162	1.64	2.02	314	3.04	3.92	1.41
90	16.6	18.9	754	21.1	177	1.35	1.96	343	2.76	3.81	1.41
100	17.6	20.7	641	21.5	189	1.10	1.89	369	2.49	3.69	1.39
110	18.4	22.3	559	21.8	199	0.89	1.81	393	2.25	3.57	1.36
120	19.1	23.8	498	22.1	207	0.72	1.72	414	2.02	3.45	1.31
130	19.7	25.1	450	22.3	213	0.57	1.64	433	1.82	3.33	1.25
140	20.1	26.3	413	22.4	218	0.45	1.56	450	1.63	3.22	1.18
150	20.5	27.4	383	22.5	222	0.36	1.48	466	1.46	3.11	1.10
160	20.8	28.3	360	22.6	226	0.28	1.41	480	1.31	3.00	1.02
170	21.0	29.2	340	22.7	228	0.22	1.34	492	1.17	2.89	0.94
180	21.2	29.9	324	22.7	230	0.18	1.28	503	1.04	2.79	0.87
190	21.4	30.6	310	22.8	232	0.14	1.22	513	0.93	2.70	0.79
200	21.5	31.2	299	22.8	233	0.11	1.16	522	0.83	2.61	0.72
210	21.6	31.7	290	22.8	234	0.09	1.11	529	0.74	2.52	0.66
220	21.7	32.2	282	22.9	235	0.07	1.07	536	0.66	2.44	0.59
230	21.7	32.6	275	22.9	235	0.05	1.02	543	0.59	2.36	0.54
240	21.8	32.9	269	22.9	236	0.04	0.98	548	0.52	2.28	0.48
250	21.8	33.3	264	22.9	236	0.03	0.94	553	0.47	2.21	0.43

V Site Index

20	2.2	2.7	11216	6.2	9	1.10	0.43	29	2.49	1.45	1.39
30	4.2	4.6	5745	9.5	23	1.65	0.76	57	2.98	1.89	1.33
40	6.1	6.6	3555	12.1	41	1.90	1.02	88	3.17	2.19	1.27
50	8.0	8.5	2454	14.0	60	1.91	1.20	120	3.17	2.39	1.26
60	9.6	10.4	1820	15.5	78	1.76	1.31	151	3.05	2.51	1.29
70	11.0	12.1	1423	16.5	95	1.54	1.36	180	2.86	2.58	1.31
80	12.1	13.8	1159	17.2	109	1.30	1.36	208	2.62	2.60	1.32
90	13.1	15.2	974	17.7	121	1.07	1.34	233	2.38	2.59	1.31
100	13.8	16.6	840	18.1	131	0.86	1.31	255	2.13	2.55	1.27
110	14.5	17.8	740	18.3	138	0.69	1.26	275	1.89	2.50	1.21
120	15.0	18.8	664	18.5	145	0.54	1.20	293	1.67	2.44	1.13
130	15.4	19.8	605	18.6	149	0.42	1.15	309	1.47	2.38	1.05
140	15.7	20.7	558	18.7	153	0.33	1.09	323	1.29	2.31	0.96
150	16.0	21.4	520	18.8	156	0.26	1.04	335	1.12	2.23	0.86
160	16.2	22.1	490	18.8	158	0.20	0.99	345	0.97	2.16	0.78
170	16.3	22.7	465	18.8	160	0.15	0.94	354	0.84	2.08	0.69
180	16.4	23.2	444	18.9	161	0.12	0.90	362	0.73	2.01	0.61
190	16.5	23.7	427	18.9	162	0.09	0.85	369	0.63	1.94	0.54

Dynamics of Normal (Fully Stocked) Pine Stands

in Northern Taiga Ecoregions of West Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						200	16.6		24.1	413	
210	16.7	24.5	401	18.9	164	0.05	0.78	380	0.47	1.81	0.42
220	16.7	24.8	390	18.9	164	0.04	0.75	384	0.40	1.75	0.36
230	16.8	25.1	382	18.9	165	0.03	0.72	388	0.35	1.69	0.32
240	16.8	25.4	374	18.9	165	0.02	0.69	391	0.30	1.63	0.27
250	16.8	25.6	368	18.9	165	0.02	0.66	394	0.26	1.58	0.24

Va Site Index

20	1.0	1.5	23097	4.1	4	0.53	0.18	12	1.32	0.61	0.79
30	2.3	2.9	10733	6.9	11	0.93	0.36	28	1.84	0.94	0.91
40	3.7	4.3	6200	9.2	22	1.17	0.54	48	2.14	1.21	0.97
50	5.2	5.9	4063	11.0	34	1.24	0.68	70	2.25	1.41	1.01
60	6.5	7.4	2897	12.4	46	1.19	0.77	93	2.22	1.55	1.04
70	7.7	8.8	2197	13.3	57	1.06	0.82	114	2.11	1.64	1.05
80	8.6	10.1	1747	14.0	67	0.90	0.84	135	1.95	1.68	1.04
90	9.4	11.3	1442	14.5	75	0.75	0.84	153	1.76	1.70	1.01
100	10.1	12.4	1227	14.8	82	0.60	0.82	170	1.56	1.70	0.96
110	10.6	13.4	1071	15.0	87	0.48	0.80	185	1.37	1.68	0.89
120	11.0	14.2	954	15.2	92	0.38	0.76	197	1.19	1.64	0.81
130	11.3	15.0	865	15.3	95	0.29	0.73	208	1.03	1.60	0.73
140	11.5	15.7	795	15.3	98	0.23	0.70	218	0.88	1.56	0.65
150	11.7	16.3	741	15.4	100	0.17	0.66	226	0.75	1.51	0.57
160	11.8	16.8	697	15.4	101	0.13	0.63	233	0.64	1.46	0.50
170	11.9	17.2	662	15.4	102	0.10	0.60	239	0.54	1.40	0.44
180	12.0	17.6	633	15.5	103	0.08	0.57	244	0.45	1.35	0.38
190	12.1	18.0	609	15.5	104	0.06	0.55	248	0.38	1.30	0.32
200	12.2	18.3	590	15.5	104	0.05	0.52	251	0.32	1.26	0.28
210	12.2	18.5	573	15.5	105	0.03	0.50	254	0.27	1.21	0.24
220	12.2	18.8	560	15.5	105	0.03	0.48	257	0.23	1.17	0.20
230	12.2	19.0	549	15.5	105	0.02	0.46	259	0.19	1.13	0.17
240	12.3	19.1	539	15.5	106	0.02	0.44	261	0.16	1.09	0.14
250	12.3	19.3	531	15.5	106	0.01	0.42	262	0.13	1.05	0.12

Vb Site Index

20	0.3	0.6	84357	2.4	1	0.22	0.07	5	0.67	0.26	0.45
30	1.0	1.4	26984	4.3	5	0.43	0.15	14	1.05	0.47	0.63
40	1.9	2.5	12589	6.1	10	0.58	0.24	26	1.32	0.65	0.73
50	3.0	3.7	7229	7.6	16	0.65	0.32	40	1.45	0.80	0.79
60	4.0	4.9	4737	8.9	22	0.65	0.37	55	1.47	0.91	0.82
70	4.8	6.1	3399	9.8	29	0.60	0.41	69	1.42	0.99	0.82
80	5.6	7.2	2607	10.6	34	0.53	0.43	83	1.32	1.03	0.79
90	6.2	8.2	2103	11.1	39	0.45	0.44	95	1.19	1.06	0.75
100	6.7	9.1	1765	11.5	43	0.37	0.43	106	1.06	1.06	0.69
110	7.1	9.9	1527	11.8	47	0.30	0.42	116	0.92	1.06	0.63
120	7.3	10.6	1356	12.0	49	0.24	0.41	125	0.80	1.04	0.56
130	7.6	11.3	1228	12.2	51	0.19	0.40	132	0.68	1.02	0.49

Dynamics of Normal (Fully Stocked) Pine Stands

in Northern Taiga Ecoregions of West Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
140	7.7	11.8	1131	12.3	53	0.15	0.38	139	0.58	0.99	0.43
150	7.8	12.2	1057	12.4	54	0.11	0.36	144	0.49	0.96	0.37
160	7.9	12.6	998	12.5	55	0.09	0.35	148	0.41	0.93	0.32
170	8.0	12.9	952	12.5	56	0.07	0.33	152	0.34	0.90	0.27
180	8.1	13.2	915	12.6	57	0.05	0.32	155	0.29	0.86	0.23
190	8.1	13.5	885	12.6	57	0.04	0.30	158	0.24	0.83	0.20
200	8.1	13.7	861	12.6	58	0.03	0.29	160	0.20	0.80	0.17
210	8.1	13.8	841	12.6	58	0.02	0.28	162	0.16	0.77	0.14
220	8.2	14.0	825	12.6	58	0.02	0.26	163	0.14	0.74	0.12
230	8.2	14.1	812	12.6	58	0.01	0.25	165	0.11	0.72	0.10
240	8.2	14.2	801	12.6	58	0.01	0.24	166	0.09	0.69	0.08
250	8.2	14.3	792	12.7	58	0.01	0.23	166	0.08	0.67	0.07

Dynamics of Normal (Fully Stocked) Pine Stands

in Mountain Ecoregions of Zabaikal'e

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
III Site Index											
20	4.4	2.9	21896	14.7	52.6	3.98	2.63	49	4.86	2.43	0.89
30	7.6	5.6	7730	19.1	94.0	4.20	3.13	105	6.25	3.50	2.05
40	10.6	8.6	3807	22.3	135.2	4.00	3.38	171	6.79	4.27	2.78
50	13.2	11.8	2254	24.6	173.4	3.61	3.47	239	6.73	4.78	3.12
60	15.4	14.9	1500	26.2	207.2	3.15	3.45	304	6.31	5.07	3.16
70	17.3	17.9	1084	27.3	236.4	2.69	3.38	364	5.71	5.21	3.02
80	18.8	20.7	831	28.1	261.1	2.26	3.26	418	5.03	5.23	2.77
90	20.0	23.4	667	28.7	281.8	1.88	3.13	465	4.35	5.17	2.48
100	21.0	25.8	555	29.1	298.9	1.55	2.99	505	3.71	5.05	2.17
110	21.8	28.0	476	29.3	312.9	1.27	2.84	540	3.14	4.91	1.87
120	22.4	30.0	417	29.5	324.4	1.03	2.70	568	2.63	4.74	1.59
130	22.9	31.8	373	29.7	333.7	0.84	2.57	592	2.19	4.56	1.35
140	23.3	33.4	339	29.8	341.3	0.68	2.44	612	1.81	4.37	1.13
150	23.6	34.9	313	29.8	347.5	0.55	2.32	629	1.49	4.19	0.94
160	23.8	36.1	292	29.9	352.4	0.44	2.20	642	1.23	4.01	0.78
170	24.0	37.3	273	29.8	350.2	-0.24	2.06	653	1.01	3.84	1.25
180	24.2	38.3	258	29.6	347.6	-0.28	1.93	663	0.83	3.68	1.11
190	24.3	39.1	244	29.4	344.5	-0.33	1.81	670	0.67	3.53	1.01
200	24.4	39.9	232	29.1	341.0	-0.39	1.70	676	0.55	3.38	0.94
210	24.5	40.6	221	28.6	336.8	-0.44	1.60	681	0.45	3.24	0.89
220	24.5	41.2	210	28.0	332.1	-0.50	1.51	685	0.37	3.11	0.87
230	24.6	41.7	199	27.2	326.8	-0.56	1.42	689	0.30	2.99	0.86
240	24.6	42.2	188	26.2	320.9	-0.63	1.34	691	0.24	2.88	0.87
250	24.6	42.6	176	25.1	314.3	-0.69	1.26	693	0.20	2.77	0.89
IV Site Index											
20	3.0	4.8	5493	10.1	27.0	2.56	1.35	22	2.91	1.12	0.35
30	5.6	7.8	2879	13.9	55.8	3.11	1.86	60	4.60	2.02	1.48
40	8.2	10.8	1843	16.9	87.8	3.23	2.20	112	5.57	2.80	2.34
50	10.6	13.6	1318	19.2	119.5	3.08	2.39	170	5.87	3.39	2.79
60	12.7	16.3	1012	21.0	148.9	2.79	2.48	228	5.69	3.80	2.90
70	14.4	18.7	816	22.5	175.0	2.44	2.50	282	5.21	4.03	2.77
80	15.8	21.0	682	23.6	197.6	2.08	2.47	331	4.59	4.14	2.51
90	16.9	23.0	587	24.4	216.8	1.75	2.41	374	3.93	4.16	2.18
100	17.8	24.9	516	25.1	232.8	1.45	2.33	410	3.31	4.10	1.85
110	18.5	26.6	462	25.6	246.0	1.20	2.24	440	2.74	4.00	1.54
120	19.0	28.1	420	26.0	256.8	0.98	2.14	465	2.24	3.88	1.27
130	19.4	29.4	387	26.3	265.6	0.79	2.04	485	1.82	3.73	1.03
140	19.7	30.6	360	26.6	272.8	0.64	1.95	502	1.47	3.58	0.83
150	20.0	31.7	338	26.7	278.6	0.52	1.86	515	1.18	3.43	0.66
160	20.2	32.7	315	26.5	275.5	-0.33	1.72	526	0.94	3.28	1.27
170	20.3	33.6	295	26.1	271.9	-0.39	1.60	534	0.75	3.14	1.14
180	20.4	34.4	277	25.6	267.7	-0.46	1.49	541	0.60	3.00	1.06
190	20.5	35.0	260	25.1	262.7	-0.53	1.38	546	0.47	2.87	1.00

Dynamics of Normal (Fully Stocked) Pine Stands

in Mountain Ecoregions of Zabaikal'e

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
200	20.6	35.7	244	24.3	257.0	-0.61	1.29	550	0.37	2.75	0.98
210	20.6	36.2	228	23.5	250.6	-0.68	1.19	554	0.30	2.64	0.98
220	20.7	36.7	213	22.6	243.4	-0.76	1.11	556	0.23	2.53	0.99
230	20.7	37.1	198	21.5	235.5	-0.83	1.02	558	0.18	2.43	1.02
240	20.7	37.5	184	20.3	226.8	-0.90	0.94	560	0.15	2.33	1.05
250	20.7	37.8	170	19.1	217.4	-0.97	0.87	561	0.12	2.24	1.09

V Site Index

20	1.9	4.0	6145	7.7	14.8	1.70	0.74	15	2.07	0.75	0.37
30	3.9	6.6	3579	12.2	35.5	2.36	1.18	43	3.46	1.43	1.10
40	6.0	9.2	2371	15.7	60.8	2.64	1.52	83	4.37	2.07	1.73
50	7.9	11.7	1702	18.3	87.2	2.61	1.74	129	4.74	2.57	2.12
60	9.7	14.1	1293	20.1	112.5	2.42	1.87	176	4.70	2.93	2.28
70	11.2	16.3	1026	21.3	135.2	2.13	1.93	222	4.38	3.16	2.25
80	12.5	18.3	843	22.1	155.0	1.82	1.94	263	3.92	3.29	2.10
90	13.5	20.1	713	22.7	171.7	1.52	1.91	300	3.40	3.33	1.89
100	14.4	21.8	617	23.0	185.5	1.25	1.85	331	2.89	3.31	1.65
110	15.0	23.3	545	23.3	196.7	1.01	1.79	358	2.42	3.25	1.41
120	15.6	24.7	490	23.4	205.8	0.81	1.72	380	2.00	3.17	1.18
130	16.0	25.9	447	23.5	213.1	0.65	1.64	398	1.64	3.06	0.99
140	16.3	27.0	412	23.6	218.9	0.52	1.56	413	1.33	2.95	0.81
150	16.6	28.0	382	23.5	217.2	-0.20	1.45	425	1.07	2.83	1.27
160	16.8	28.9	357	23.3	214.9	-0.25	1.34	434	0.86	2.71	1.11
170	16.9	29.6	334	23.0	212.3	-0.29	1.25	442	0.69	2.60	0.99
180	17.0	30.3	313	22.6	209.1	-0.34	1.16	448	0.55	2.49	0.90
190	17.1	31.0	293	22.1	205.4	-0.40	1.08	453	0.44	2.39	0.84
200	17.2	31.5	273	21.3	201.1	-0.45	1.01	457	0.35	2.29	0.80
210	17.3	32.0	253	20.3	196.4	-0.51	0.94	460	0.28	2.19	0.79
220	17.3	32.4	232	19.1	191.0	-0.56	0.87	463	0.22	2.10	0.78
230	17.3	32.8	210	17.8	185.1	-0.62	0.80	465	0.18	2.02	0.79
240	17.4	33.1	188	16.3	178.7	-0.67	0.74	466	0.14	1.94	0.81
250	17.4	33.5	167	14.6	171.7	-0.72	0.69	468	0.11	1.87	0.83

Dynamics of Normal Pine Stands

of Melkosopchnik of Kazakhstan

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
I Site Index											
20	5.8	6.7	5580	19.7	70	7.02	3.50	76	7.63	3.81	0.61
30	9.9	10.8	3062	28.2	150	8.74	5.00	165	9.77	5.48	1.04
40	13.9	14.7	2035	34.8	240	9.07	6.00	267	10.54	6.68	1.47
50	17.5	18.3	1505	39.6	329	8.56	6.57	372	10.37	7.44	1.82
60	20.6	21.4	1193	43.1	410	7.62	6.83	473	9.65	7.88	2.03
70	23.3	24.2	993	45.6	481	6.53	6.87	564	8.65	8.06	2.12
80	25.5	26.6	856	47.4	541	5.46	6.76	645	7.56	8.07	2.10
90	27.4	28.6	759	48.7	590	4.48	6.56	715	6.48	7.95	2.00
100	28.9	30.3	687	49.6	631	3.63	6.31	775	5.48	7.75	1.85
110	30.1	31.8	633	50.3	663	2.91	6.03	825	4.59	7.50	1.68
120	31.1	33.0	592	50.8	689	2.31	5.74	867	3.81	7.23	1.49
130	32.0	34.1	560	51.1	710	1.83	5.46	902	3.14	6.94	1.31
140	32.6	35.0	534	51.3	726	1.44	5.19	930	2.58	6.65	1.13
150	33.2	35.7	514	51.5	739	1.13	4.93	954	2.11	6.36	0.97
II Site Index											
20	5.0	5.7	6577	17.0	56	5.62	2.82	62	6.11	3.09	0.48
30	8.7	9.3	3694	25.1	120	6.98	4.01	132	7.74	4.40	0.75
40	12.2	12.7	2479	31.3	192	7.24	4.81	213	8.29	5.32	1.05
50	15.5	15.7	1840	35.8	263	6.84	5.26	296	8.13	5.91	1.29
60	18.2	18.5	1459	39.0	328	6.09	5.47	374	7.55	6.24	1.46
70	20.6	20.8	1213	41.3	385	5.23	5.49	446	6.76	6.37	1.53
80	22.6	22.9	1044	42.9	432	4.37	5.41	509	5.90	6.36	1.53
90	24.2	24.6	924	44.1	472	3.59	5.25	564	5.06	6.27	1.47
100	25.6	26.1	836	44.8	505	2.91	5.05	611	4.28	6.11	1.37
110	26.6	27.4	769	45.4	531	2.34	4.83	650	3.58	5.91	1.25
120	27.5	28.5	718	45.8	552	1.86	4.60	683	2.98	5.69	1.12
130	28.2	29.4	678	46.0	568	1.48	4.37	710	2.46	5.46	0.98
140	28.8	30.2	647	46.2	581	1.16	4.15	732	2.02	5.23	0.86
150	29.3	30.8	622	46.3	592	0.92	3.95	750	1.66	5.00	0.74
III Site Index											
20	4.3	4.8	8071	14.8	45	4.47	2.26	50	4.83	2.49	0.37
30	7.5	7.9	4617	22.4	96	5.50	3.20	105	6.04	3.50	0.54
40	10.6	10.7	3120	28.1	152	5.68	3.81	168	6.42	4.20	0.74
50	13.4	13.3	2321	32.3	208	5.35	4.16	232	6.26	4.63	0.91
60	15.8	15.6	1840	35.3	259	4.76	4.31	292	5.79	4.87	1.03
70	17.9	17.6	1528	37.4	303	4.08	4.32	347	5.16	4.96	1.08
80	19.6	19.4	1314	38.8	340	3.41	4.25	395	4.50	4.94	1.09
90	21.0	20.9	1161	39.7	371	2.80	4.12	437	3.85	4.85	1.05
100	22.2	22.1	1049	40.4	396	2.27	3.96	472	3.25	4.72	0.98
110	23.1	23.2	964	40.8	417	1.82	3.79	502	2.72	4.56	0.89
120	23.9	24.1	900	41.1	433	1.45	3.61	527	2.26	4.39	0.80
130	24.5	24.9	849	41.3	446	1.15	3.43	547	1.86	4.21	0.71

Dynamics of Normal Pine Stands

of Melkosopchnik of Kazakhstan

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
140	24.9	25.5	810	41.5	456	0.91	3.26	564	1.53	4.03	0.62
150	25.3	26.1	778	41.6	464	0.72	3.10	578	1.25	3.85	0.53

IV Site Index

20	4.3	4.8	8071	14.8	45	4.47	2.26	50	4.83	2.49	0.37
30	7.5	7.9	4617	22.4	96	5.50	3.20	105	6.04	3.50	0.54
40	10.6	10.7	3120	28.1	152	5.68	3.81	168	6.42	4.20	0.74
50	13.4	13.3	2321	32.3	208	5.35	4.16	232	6.26	4.63	0.91
60	15.8	15.6	1840	35.3	259	4.76	4.31	292	5.79	4.87	1.03
70	17.9	17.6	1528	37.4	303	4.08	4.32	347	5.16	4.96	1.08
80	19.6	19.4	1314	38.8	340	3.41	4.25	395	4.50	4.94	1.09
90	21.0	20.9	1161	39.7	371	2.80	4.12	437	3.85	4.85	1.05
100	22.2	22.1	1049	40.4	396	2.27	3.96	472	3.25	4.72	0.98
110	23.1	23.2	964	40.8	417	1.82	3.79	502	2.72	4.56	0.89
120	23.9	24.1	900	41.1	433	1.45	3.61	527	2.26	4.39	0.80
130	24.5	24.9	849	41.3	446	1.15	3.43	547	1.86	4.21	0.71
140	24.9	25.5	810	41.5	456	0.91	3.26	564	1.53	4.03	0.62
150	25.3	26.1	778	41.6	464	0.72	3.10	578	1.25	3.85	0.53

V Site Index

20	3.0	3.2	14487	11.4	29	2.72	1.44	32	2.94	1.58	0.22
30	5.2	5.2	8498	17.8	59	3.25	1.97	65	3.55	2.15	0.30
40	7.3	7.1	5793	22.8	92	3.29	2.30	101	3.69	2.53	0.39
50	9.3	8.8	4318	26.3	124	3.06	2.48	137	3.52	2.75	0.47
60	10.9	10.3	3421	28.7	153	2.69	2.55	171	3.21	2.85	0.51
70	12.4	11.7	2836	30.3	178	2.29	2.54	201	2.82	2.87	0.53
80	13.5	12.8	2435	31.4	199	1.91	2.49	227	2.43	2.84	0.52
90	14.5	13.8	2149	32.1	216	1.56	2.40	250	2.06	2.78	0.50
100	15.3	14.6	1940	32.6	230	1.26	2.30	269	1.72	2.69	0.46
110	15.9	15.3	1783	32.9	242	1.01	2.20	285	1.43	2.59	0.42
120	16.4	15.9	1663	33.1	251	0.80	2.09	297	1.18	2.48	0.37
130	16.9	16.4	1570	33.2	258	0.64	1.98	308	0.96	2.37	0.33
140	17.2	16.8	1498	33.3	263	0.50	1.88	317	0.79	2.26	0.28
150	17.4	17.2	1440	33.4	268	0.40	1.79	324	0.64	2.16	0.24

Và Site Index

20	2.3	2.4	22483	10.0	23	2.11	1.15	25	2.31	1.27	0.20
30	4.0	3.9	13292	16.0	46	2.45	1.54	51	2.73	1.70	0.28
40	5.7	5.4	9082	20.5	71	2.45	1.77	79	2.79	1.97	0.34
50	7.2	6.7	6773	23.7	94	2.25	1.89	106	2.63	2.12	0.38
60	8.5	7.8	5366	25.9	116	1.97	1.93	131	2.37	2.18	0.40
70	9.6	8.8	4448	27.3	134	1.66	1.91	153	2.07	2.19	0.40
80	10.5	9.7	3818	28.3	149	1.38	1.86	172	1.76	2.15	0.38
90	11.2	10.5	3371	28.9	161	1.12	1.79	189	1.48	2.10	0.36
100	11.8	11.1	3043	29.3	172	0.91	1.72	202	1.23	2.02	0.32
110	12.3	11.6	2799	29.6	180	0.72	1.63	213	1.01	1.94	0.29

Dynamics of Normal Pine Stands

of Melkosopochnik of Kazakhstan

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
120	12.7	12.0	2612	29.8	186	0.57	1.55	222	0.83	1.85	0.25
130	13.0	12.4	2469	29.9	191	0.45	1.47	230	0.67	1.77	0.22
140	13.3	12.7	2356	29.9	195	0.36	1.39	236	0.55	1.69	0.19
150	13.5	13.0	2268	30.0	198	0.28	1.32	241	0.44	1.61	0.16

Vb Site Index

20	1.6	1.6	42292	8.9	19	1.65	0.94	22	1.91	1.08	0.25
30	2.8	2.7	25134	14.3	37	1.87	1.22	42	2.20	1.41	0.33
40	4.0	3.7	17202	18.5	55	1.83	1.38	65	2.21	1.62	0.38
50	5.1	4.6	12833	21.4	73	1.66	1.46	86	2.06	1.72	0.40
60	6.0	5.4	10170	23.4	88	1.44	1.47	105	1.83	1.76	0.39
70	6.8	6.1	8432	24.7	102	1.21	1.45	122	1.57	1.75	0.37
80	7.4	6.7	7243	25.6	113	0.99	1.41	137	1.33	1.71	0.33
90	7.9	7.2	6399	26.1	122	0.81	1.35	149	1.11	1.66	0.30
100	8.4	7.6	5783	26.5	129	0.65	1.29	159	0.91	1.59	0.26
110	8.7	8.0	5324	26.7	135	0.52	1.22	167	0.74	1.52	0.23
120	9.0	8.3	4975	26.8	139	0.41	1.16	174	0.60	1.45	0.19
130	9.2	8.5	4707	26.9	143	0.32	1.10	180	0.49	1.38	0.16
140	9.4	8.7	4497	27.0	146	0.25	1.04	184	0.39	1.31	0.14
150	9.6	8.9	4333	27.0	148	0.20	0.99	187	0.31	1.25	0.11

Dynamics of Normal (Fully Stocked) Pine Belt Stands (Lentochnye Bory)

in Steppe and Forest Steppe of South Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
I Site Index											
20	7.3	5.4	9798	22.6	101	9.06	5.06	126	12.19	6.30	3.13
30	12.7	10.2	3570	29.0	197	9.69	6.56	257	13.47	8.58	3.78
40	17.4	14.8	1948	33.7	290	8.74	7.24	387	12.21	9.67	3.47
50	21.1	19.0	1312	37.2	370	7.23	7.40	498	10.01	9.97	2.78
60	23.9	22.5	1002	39.9	434	5.68	7.24	587	7.75	9.78	2.06
70	25.9	25.4	830	41.9	484	4.33	6.92	654	5.78	9.35	1.46
80	27.3	27.6	725	43.5	522	3.23	6.52	704	4.22	8.80	0.99
90	28.3	29.4	657	44.6	549	2.37	6.10	740	3.03	8.22	0.66
100	29.0	30.8	612	45.6	570	1.73	5.70	766	2.16	7.66	0.43
110	29.5	31.8	581	46.2	585	1.25	5.31	784	1.52	7.13	0.27
120	29.8	32.7	559	46.8	595	0.90	4.96	797	1.07	6.64	0.17
130	30.0	33.3	543	47.2	603	0.65	4.64	806	0.75	6.20	0.10
140	30.2	33.7	531	47.5	608	0.46	4.35	812	0.53	5.80	0.06
II Site Index											
20	6.5	3.3	25982	21.7	96	8.19	4.80	106	9.97	5.32	1.78
30	11.2	6.9	7874	29.5	180	8.23	5.99	213	10.94	7.11	2.71
40	15.3	10.9	3700	34.5	256	7.01	6.41	319	9.98	7.97	2.97
50	18.5	14.7	2207	37.7	319	5.49	6.38	410	8.28	8.21	2.80
60	20.8	18.2	1526	39.6	367	4.10	6.11	484	6.51	8.07	2.41
70	22.6	21.1	1166	40.7	402	2.97	5.74	541	4.94	7.73	1.97
80	23.8	23.5	955	41.4	427	2.12	5.34	584	3.67	7.30	1.55
90	24.6	25.4	822	41.8	445	1.49	4.94	616	2.69	6.84	1.20
100	25.2	27.0	735	42.1	457	1.04	4.57	639	1.95	6.39	0.91
110	25.7	28.2	675	42.2	466	0.72	4.24	655	1.40	5.96	0.68
120	26.0	29.2	633	42.3	472	0.50	3.93	667	1.00	5.56	0.50
130	26.2	29.9	602	42.3	476	0.34	3.66	676	0.71	5.20	0.37
140	26.3	30.5	580	42.4	479	0.24	3.42	682	0.51	4.87	0.27
III Site Index											
20	5.6	2.2	51295	19.4	80	6.91	4.01	84	7.94	4.22	1.03
30	9.6	5.0	14342	27.9	150	6.79	5.01	170	8.84	5.67	2.05
40	13.0	8.2	6163	32.8	213	5.61	5.32	256	8.21	6.40	2.60
50	15.7	11.6	3390	35.5	262	4.24	5.24	332	6.93	6.64	2.69
60	17.7	14.7	2189	36.9	298	3.05	4.97	394	5.54	6.57	2.49
70	19.2	17.4	1580	37.7	324	2.13	4.63	443	4.28	6.33	2.15
80	20.3	19.8	1236	38.0	342	1.46	4.27	481	3.24	6.01	1.77
90	21.0	21.8	1026	38.2	354	0.99	3.93	509	2.41	5.65	1.41
100	21.5	23.4	890	38.3	362	0.67	3.62	530	1.77	5.30	1.10
110	21.9	24.8	797	38.4	367	0.45	3.34	545	1.30	4.95	0.85
120	22.1	25.8	733	38.4	371	0.30	3.09	556	0.94	4.63	0.64
130	22.3	26.7	687	38.4	374	0.20	2.87	564	0.68	4.34	0.48
140	22.4	27.4	653	38.4	375	0.13	2.68	570	0.49	4.07	0.36

Dynamics of Normal (Fully Stocked) Pine Belt Stands (Lentochnye Bory)

in Steppe and Forest Steppe of South Siberia

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
<i>IV Site Index</i>											
20	4.6	1.7	73704	16.3	62	5.69	3.11	63	6.15	3.14	0.46
30	7.9	3.8	22175	25.5	120	5.67	4.01	130	7.11	4.35	1.44
40	10.7	6.4	9555	30.9	172	4.64	4.31	201	6.80	5.02	2.16
50	13.0	9.1	5139	33.8	213	3.44	4.25	264	5.88	5.29	2.44
60	14.6	11.8	3218	35.2	242	2.42	4.03	318	4.81	5.30	2.39
70	15.8	14.3	2250	35.9	262	1.65	3.74	361	3.78	5.15	2.14
80	16.7	16.4	1707	36.2	275	1.10	3.44	394	2.91	4.92	1.81
90	17.3	18.4	1376	36.4	284	0.73	3.16	419	2.20	4.66	1.47
100	17.8	20.0	1163	36.5	290	0.48	2.90	438	1.64	4.38	1.17
110	18.1	21.4	1019	36.5	294	0.31	2.68	453	1.22	4.12	0.91
120	18.3	22.5	918	36.5	297	0.20	2.47	463	0.90	3.86	0.70
130	18.4	23.5	845	36.6	298	0.13	2.30	471	0.66	3.62	0.53
140	18.5	24.3	791	36.6	299	0.08	2.14	477	0.48	3.40	0.40

APPENDIX 2

MODAL TABLES OF PINE STANDS

Dynamics of Modal Pine Stands

for Western ecoregions of southern taiga and mixed forests of European Part

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
Ia Site Index											
20	9.9	10.3	2098	17.6	99	6.70	4.95	113	9.19	5.64	2.49
30	14.6	15.1	1238	22.1	165	6.34	5.49	208	9.65	6.95	3.32
40	18.7	19.4	843	25.0	224	5.46	5.60	302	8.88	7.54	3.42
50	22.2	23.5	622	27.0	274	4.48	5.47	384	7.62	7.69	3.13
60	25.1	27.3	486	28.4	314	3.58	5.23	454	6.27	7.56	2.69
70	27.5	30.8	394	29.3	346	2.80	4.94	510	5.02	7.29	2.22
80	29.5	34.0	330	29.9	370	2.17	4.63	555	3.95	6.94	1.79
90	31.1	37.0	283	30.3	389	1.66	4.33	590	3.07	6.55	1.41
100	32.5	39.7	246	30.4	404	1.27	4.04	617	2.37	6.17	1.10
110	33.6	42.2	217	30.5	415	0.96	3.77	638	1.81	5.80	0.85
120	34.4	44.6	195	30.5	423	0.73	3.53	654	1.38	5.45	0.65
130	35.1	46.8	178	30.5	430	0.55	3.31	666	1.05	5.12	0.50
I Site Index											
20	7.2	8.0	2832	14.4	64	5.46	3.21	75	7.10	3.75	1.64
30	11.6	12.6	1531	19.0	121	5.59	4.02	152	7.94	5.06	2.35
40	15.6	16.9	980	22.1	173	4.89	4.34	229	7.39	5.73	2.50
50	19.0	21.1	692	24.1	218	3.95	4.35	298	6.26	5.95	2.31
60	21.9	24.9	522	25.4	253	3.04	4.21	354	5.01	5.90	1.97
70	24.2	28.4	414	26.2	279	2.27	3.98	398	3.87	5.69	1.60
80	26.1	31.6	341	26.8	299	1.67	3.73	432	2.93	5.40	1.26
90	27.6	34.5	287	26.9	313	1.21	3.48	457	2.18	5.08	0.97
100	28.8	37.2	245	26.7	323	0.87	3.23	476	1.61	4.76	0.74
110	29.8	39.6	214	26.4	330	0.62	3.00	490	1.17	4.46	0.55
120	30.5	41.8	190	26.0	336	0.44	2.80	500	0.85	4.17	0.41
130	31.1	43.7	170	25.5	339	0.31	2.61	507	0.62	3.90	0.31
II Site Index											
20	5.3	6.2	3846	11.6	43	4.16	2.16	49	5.13	2.46	0.97
30	9.2	10.3	1946	16.1	88	4.54	2.93	106	6.08	3.55	1.54
40	12.9	14.3	1192	19.1	131	4.07	3.28	167	5.80	4.17	1.74
50	16.1	18.1	817	21.1	168	3.29	3.36	221	4.95	4.41	1.66
60	18.7	21.7	604	22.3	197	2.52	3.28	265	3.96	4.42	1.45
70	20.9	25.0	472	23.1	219	1.86	3.13	300	3.05	4.29	1.19
80	22.7	27.9	385	23.6	235	1.34	2.93	327	2.28	4.08	0.94
90	24.1	30.6	325	23.9	246	0.95	2.73	346	1.68	3.85	0.73
100	25.2	33.0	276	23.7	254	0.67	2.54	361	1.22	3.61	0.55
110	26.0	35.1	239	23.2	260	0.47	2.36	371	0.88	3.37	0.41
120	26.7	37.0	210	22.6	264	0.33	2.20	379	0.63	3.16	0.30
130	27.2	38.7	185	21.8	266	0.23	2.05	384	0.45	2.95	0.22
III Site Index											
20	3.9	4.8	5027	9.0	29	2.98	1.44	32	3.53	1.58	0.55
30	7.1	8.3	2440	13.0	62	3.48	2.06	73	4.48	2.42	1.00

Dynamics of Modal Pine Stands

for Western ecoregions of southern taiga and mixed forests of European Part

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
40	10.3	11.8	1457	15.9	96	3.28	2.40	118	4.49	2.95	1.21
50	13.2	15.2	982	17.9	126	2.76	2.53	161	3.99	3.21	1.23
60	15.6	18.4	718	19.2	151	2.18	2.52	197	3.30	3.29	1.12
70	17.7	21.4	557	20.0	170	1.65	2.43	227	2.60	3.24	0.95
80	19.3	24.0	452	20.5	184	1.22	2.31	250	2.00	3.12	0.78
90	20.6	26.4	381	20.9	195	0.89	2.17	267	1.50	2.97	0.62
100	21.7	28.6	330	21.1	203	0.64	2.03	280	1.12	2.80	0.48
110	22.5	30.4	286	20.8	208	0.46	1.89	290	0.82	2.63	0.37
120	23.1	32.1	253	20.4	212	0.32	1.77	297	0.60	2.47	0.28
130	23.6	33.5	224	19.8	215	0.23	1.65	302	0.44	2.32	0.21

IV Site Index

20	2.8	3.7	6025	6.4	19	2.00	0.93	20	2.35	1.00	0.36
30	5.3	6.6	2879	9.8	42	2.52	1.39	49	3.24	1.62	0.71
40	7.9	9.6	1710	12.4	67	2.57	1.69	83	3.51	2.07	0.93
50	10.4	12.6	1150	14.4	92	2.34	1.84	117	3.35	2.35	1.01
60	12.5	15.4	841	15.7	114	2.00	1.90	149	2.97	2.48	0.97
70	14.4	18.1	652	16.7	132	1.63	1.89	176	2.51	2.52	0.88
80	16.0	20.5	529	17.4	147	1.30	1.83	199	2.05	2.49	0.75
90	17.2	22.6	445	17.8	158	1.01	1.76	218	1.64	2.42	0.63
100	18.3	24.5	385	18.2	167	0.78	1.67	232	1.29	2.32	0.51
110	19.1	26.2	340	18.4	174	0.59	1.58	244	1.00	2.21	0.41
120	19.8	27.7	301	18.2	179	0.45	1.49	252	0.77	2.10	0.33
130	20.3	29.0	270	17.9	183	0.33	1.41	259	0.59	1.99	0.26

V Site Index

20	1.8	2.8	6038	3.8	11	1.15	0.53	12	1.41	0.59	0.26
30	3.6	5.2	2915	6.2	24	1.56	0.81	30	2.12	0.99	0.56
40	5.6	7.8	1761	8.3	41	1.76	1.03	53	2.55	1.33	0.78
50	7.5	10.3	1205	10.1	59	1.80	1.18	80	2.70	1.59	0.90
60	9.4	12.8	894	11.6	77	1.73	1.28	107	2.67	1.78	0.94
70	11.0	15.2	702	12.7	93	1.59	1.34	133	2.51	1.89	0.92
80	12.5	17.4	575	13.6	109	1.42	1.36	156	2.27	1.96	0.86
90	13.8	19.3	487	14.3	122	1.24	1.35	178	2.01	1.98	0.77
100	14.8	21.1	423	14.8	133	1.07	1.33	197	1.75	1.97	0.68
110	15.7	22.7	375	15.2	143	0.91	1.30	213	1.50	1.94	0.59
120	16.5	24.1	339	15.5	152	0.77	1.26	227	1.27	1.89	0.50
130	17.1	25.4	305	15.4	159	0.64	1.22	238	1.06	1.83	0.42

Dynamics of Medium Stocked Pine Stands in Karelia

(stocking 0.8)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						I Site Index					
20	6.8	6.4	4708	15.3	118	7.10	5.88	160	11.23	8.01	4.13
30	11.5	10.5	2498	21.8	187	6.72	6.24	277	11.90	9.23	5.18
40	15.7	14.6	1608	26.9	251	6.00	6.27	395	11.70	9.89	5.70
50	19.1	18.5	1153	30.9	307	5.19	6.14	509	11.05	10.19	5.85
60	21.9	22.1	886	33.9	355	4.41	5.91	616	10.17	10.26	5.76
70	24.1	25.4	715	36.2	395	3.70	5.65	713	9.21	10.18	5.51
80	25.7	28.4	599	38.0	429	3.08	5.36	800	8.24	10.00	5.16
90	27.0	31.1	516	39.3	457	2.54	5.08	877	7.30	9.75	4.76
100	27.9	33.6	454	40.3	480	2.09	4.80	946	6.43	9.46	4.33
110	28.6	35.8	407	41.0	499	1.72	4.54	1006	5.63	9.15	3.91
120	29.1	37.8	371	41.6	515	1.40	4.29	1059	4.91	8.82	3.50
130	29.5	39.5	343	42.0	528	1.15	4.06	1105	4.27	8.50	3.12
140	29.7	41.1	320	42.3	538	0.93	3.84	1144	3.70	8.17	2.76
150	30.0	42.4	301	42.5	546	0.76	3.64	1179	3.20	7.86	2.44
160	30.1	43.7	285	42.7	553	0.62	3.46	1209	2.76	7.55	2.14
170	30.2	44.7	273	42.9	559	0.50	3.29	1234	2.38	7.26	1.88
180	30.3	45.7	262	43.0	563	0.41	3.13	1256	2.05	6.98	1.64
II Site Index											
20	5.9	6.6	3865	13.2	67	5.03	3.35	73	6.80	3.66	1.77
30	9.7	10.1	2369	19.0	119	5.34	3.98	151	8.51	5.02	3.18
40	13.1	13.5	1663	23.7	172	5.13	4.30	240	9.25	6.00	4.12
50	16.1	16.6	1261	27.4	221	4.68	4.42	333	9.31	6.67	4.63
60	18.7	19.5	1006	30.2	265	4.13	4.42	425	8.94	7.08	4.81
70	20.8	22.2	834	32.3	304	3.57	4.34	511	8.33	7.31	4.75
80	22.5	24.6	710	33.9	337	3.04	4.21	591	7.58	7.39	4.54
90	23.9	26.9	619	35.1	365	2.56	4.05	663	6.78	7.36	4.22
100	25.0	28.9	549	35.9	388	2.14	3.88	727	6.00	7.27	3.86
110	25.9	30.7	495	36.6	408	1.78	3.71	783	5.25	7.12	3.48
120	26.6	32.3	452	37.1	424	1.47	3.53	832	4.56	6.93	3.10
130	27.1	33.8	417	37.5	437	1.21	3.36	874	3.94	6.73	2.73
140	27.6	35.2	389	37.7	448	0.99	3.20	911	3.39	6.51	2.40
150	28.0	36.4	365	37.9	457	0.81	3.05	942	2.90	6.28	2.09
160	28.2	37.5	346	38.1	465	0.67	2.90	969	2.48	6.06	1.81
170	28.5	38.4	329	38.2	471	0.54	2.77	992	2.11	5.84	1.57
180	28.6	39.3	315	38.3	476	0.44	2.64	1012	1.79	5.62	1.35
III Site Index											
20	4.9	5.9	4060	11.0	42	3.51	2.08	41	4.33	2.03	0.82
30	7.9	8.9	2627	16.2	80	4.02	2.66	93	5.99	3.10	1.97
40	10.7	11.7	1902	20.4	120	4.06	3.01	158	6.92	3.95	2.86
50	13.2	14.3	1470	23.7	160	3.83	3.20	229	7.25	4.58	3.41
60	15.4	16.8	1187	26.2	197	3.48	3.28	302	7.15	5.03	3.67
70	17.3	19.0	991	28.0	229	3.07	3.28	371	6.78	5.30	3.71

Dynamics of Medium Stocked Pine Stands in Karelia

(stocking 0.8)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
80	18.9	21.0	847	29.4	258	2.66	3.22	437	6.24	5.46	3.58
90	20.2	22.9	740	30.5	283	2.27	3.14	496	5.63	5.51	3.36
100	21.3	24.6	657	31.3	303	1.92	3.03	549	5.00	5.49	3.08
110	22.3	26.2	592	31.8	321	1.61	2.92	596	4.39	5.42	2.78
120	23.1	27.6	540	32.3	336	1.34	2.80	637	3.81	5.31	2.47
130	23.7	28.9	498	32.6	348	1.11	2.68	672	3.29	5.17	2.18
140	24.2	30.0	463	32.8	358	0.92	2.56	703	2.82	5.02	1.90
150	24.7	31.1	435	33.0	367	0.76	2.44	729	2.41	4.86	1.65
160	25.0	32.0	411	33.1	374	0.62	2.33	751	2.05	4.70	1.42
170	25.3	32.9	390	33.2	379	0.51	2.23	770	1.73	4.53	1.22
180	25.6	33.7	373	33.3	384	0.42	2.13	786	1.46	4.37	1.04

IV Site Index

20	3.8	4.5	5690	8.9	27	2.42	1.36	26	2.85	1.28	0.42
30	6.2	6.9	3534	13.3	54	2.88	1.80	61	4.10	2.02	1.23
40	8.5	9.3	2484	16.9	84	2.98	2.09	106	4.87	2.65	1.89
50	10.6	11.6	1876	19.8	113	2.86	2.26	157	5.21	3.13	2.34
60	12.4	13.7	1487	21.9	141	2.64	2.34	209	5.22	3.48	2.58
70	14.1	15.7	1222	23.5	165	2.35	2.36	260	5.01	3.72	2.66
80	15.5	17.5	1032	24.7	188	2.06	2.34	309	4.67	3.86	2.61
90	16.7	19.1	892	25.6	207	1.77	2.30	353	4.25	3.93	2.47
100	17.7	20.6	785	26.2	223	1.51	2.23	394	3.80	3.94	2.29
110	18.5	22.0	702	26.7	237	1.28	2.15	430	3.36	3.90	2.08
120	19.2	23.3	637	27.1	249	1.07	2.07	461	2.94	3.84	1.87
130	19.8	24.4	584	27.3	259	0.89	1.99	488	2.55	3.76	1.66
140	20.3	25.4	541	27.5	267	0.74	1.91	512	2.20	3.66	1.45
150	20.8	26.4	506	27.6	274	0.62	1.82	532	1.88	3.55	1.27
160	21.1	27.2	476	27.7	279	0.51	1.74	550	1.61	3.44	1.10
170	21.4	28.0	452	27.8	284	0.42	1.67	565	1.37	3.32	0.95
180	21.6	28.7	431	27.9	288	0.35	1.60	577	1.16	3.21	0.81

V Site Index

20	2.6	2.9	10112	6.7	18	1.56	0.89	17	1.88	0.87	0.32
30	4.6	4.9	5501	10.4	35	1.85	1.17	40	2.66	1.35	0.81
40	6.5	6.9	3545	13.3	54	1.91	1.35	70	3.14	1.74	1.23
50	8.2	8.9	2518	15.6	73	1.84	1.46	102	3.37	2.05	1.53
60	9.7	10.8	1908	17.4	91	1.69	1.51	136	3.39	2.27	1.70
70	11.1	12.5	1514	18.7	107	1.52	1.52	170	3.29	2.43	1.77
80	12.2	14.2	1246	19.7	121	1.33	1.51	202	3.09	2.52	1.76
90	13.2	15.7	1055	20.4	133	1.15	1.48	231	2.85	2.57	1.70
100	14.0	17.0	914	20.9	144	0.98	1.44	259	2.58	2.59	1.60
110	14.6	18.3	808	21.2	153	0.83	1.39	283	2.31	2.57	1.47
120	15.2	19.4	726	21.5	161	0.70	1.34	305	2.05	2.54	1.34
130	15.6	20.4	661	21.7	167	0.59	1.29	324	1.80	2.49	1.21
140	16.0	21.4	609	21.8	173	0.49	1.23	341	1.57	2.43	1.08
150	16.3	22.2	567	22.0	177	0.41	1.18	355	1.36	2.37	0.96

Dynamics of Medium Stocked Pine Stands in Karelia

(stocking 0.8)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
160	16.5	22.9	533	22.0	181	0.34	1.13	368	1.18	2.30	0.84
170	16.7	23.6	505	22.1	184	0.28	1.08	379	1.02	2.23	0.74
180	16.9	24.2	481	22.1	186	0.23	1.04	389	0.87	2.16	0.64

Va Site Index

20	1.6	1.7	20263	4.7	9	0.72	0.44	12	1.19	0.62	0.47
30	3.0	3.2	8927	7.3	17	0.81	0.55	26	1.55	0.88	0.74
40	4.3	4.9	5045	9.6	25	0.82	0.62	43	1.75	1.07	0.94
50	5.6	6.6	3280	11.3	33	0.77	0.65	61	1.84	1.22	1.07
60	6.7	8.3	2336	12.6	40	0.70	0.67	79	1.84	1.32	1.14
70	7.6	9.9	1774	13.6	47	0.63	0.67	98	1.78	1.39	1.16
80	8.3	11.3	1415	14.3	53	0.55	0.66	115	1.69	1.44	1.14
90	8.9	12.7	1172	14.8	58	0.47	0.64	131	1.57	1.46	1.10
100	9.4	13.9	1000	15.1	62	0.40	0.62	146	1.44	1.46	1.04
110	9.7	15.0	875	15.4	66	0.34	0.60	160	1.31	1.46	0.97
120	10.0	15.9	781	15.6	69	0.29	0.57	173	1.18	1.44	0.90
130	10.2	16.8	709	15.7	72	0.24	0.55	184	1.06	1.41	0.82
140	10.4	17.6	653	15.8	74	0.20	0.53	194	0.94	1.38	0.74
150	10.6	18.2	608	15.9	76	0.17	0.50	203	0.84	1.35	0.67
160	10.7	18.8	573	15.9	77	0.14	0.48	211	0.74	1.32	0.60
170	10.7	19.3	544	16.0	78	0.12	0.46	218	0.65	1.28	0.54
180	10.8	19.8	520	16.0	79	0.10	0.44	224	0.57	1.24	0.48

Dynamics of Low Stocked Pine Stands in Karelia

(stocking 0.65)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
I Site Index											
20	7.4	6.1	4256	12.5	154	6.40	7.71	138	9.46	6.88	3.07
30	11.8	10.3	2171	18.1	213	5.44	7.11	236	10.00	7.86	4.57
40	15.7	14.5	1373	22.5	263	4.64	6.59	336	9.87	8.39	5.23
50	19.1	18.4	977	26.0	306	3.97	6.13	432	9.38	8.64	5.41
60	21.8	22.1	751	28.8	343	3.40	5.72	523	8.71	8.71	5.32
70	24.1	25.4	608	30.9	375	2.91	5.35	606	7.96	8.66	5.05
80	25.8	28.4	512	32.5	402	2.49	5.02	682	7.20	8.52	4.70
90	27.3	31.1	443	33.7	425	2.14	4.72	750	6.45	8.33	4.31
100	28.4	33.5	394	34.7	444	1.83	4.44	811	5.74	8.11	3.91
110	29.3	35.6	356	35.4	461	1.57	4.20	865	5.09	7.86	3.52
120	30.0	37.4	327	35.9	476	1.35	3.97	913	4.49	7.61	3.14
130	30.5	39.0	304	36.3	489	1.16	3.76	955	3.95	7.35	2.79
140	31.0	40.4	286	36.6	499	0.99	3.57	992	3.47	7.09	2.47
150	31.3	41.6	271	36.9	509	0.85	3.39	1025	3.03	6.83	2.18
160	31.6	42.7	259	37.1	516	0.73	3.23	1053	2.65	6.58	1.92
170	31.8	43.6	249	37.2	523	0.63	3.08	1078	2.31	6.34	1.68
180	31.9	44.4	241	37.3	529	0.54	2.94	1099	2.02	6.11	1.48
II Site Index											
20	6.0	5.7	4270	10.9	55	3.99	2.73	62	5.48	3.10	1.50
30	9.7	9.2	2321	15.4	96	4.28	3.21	124	6.75	4.13	2.47
40	13.0	12.6	1530	19.1	139	4.23	3.48	195	7.35	4.87	3.13
50	15.9	15.9	1122	22.2	180	3.98	3.61	269	7.50	5.39	3.52
60	18.4	18.9	879	24.7	218	3.65	3.64	344	7.33	5.73	3.69
70	20.5	21.8	721	26.8	253	3.28	3.62	416	6.98	5.94	3.70
80	22.3	24.4	612	28.6	284	2.90	3.55	483	6.51	6.04	3.61
90	23.8	26.8	533	30.0	311	2.55	3.46	546	5.98	6.06	3.43
100	25.0	28.9	474	31.2	335	2.22	3.35	603	5.44	6.03	3.22
110	26.0	30.9	429	32.2	356	1.92	3.23	654	4.89	5.95	2.97
120	26.8	32.7	393	33.0	374	1.66	3.11	701	4.38	5.84	2.72
130	27.4	34.3	364	33.7	389	1.42	2.99	742	3.89	5.71	2.47
140	27.9	35.8	341	34.2	402	1.22	2.87	779	3.44	5.56	2.23
150	28.4	37.1	321	34.6	413	1.04	2.76	811	3.04	5.41	2.00
160	28.7	38.2	305	35.0	423	0.89	2.64	839	2.67	5.25	1.78
170	29.0	39.3	291	35.3	431	0.75	2.54	864	2.34	5.08	1.59
180	29.2	40.2	280	35.6	438	0.64	2.43	886	2.05	4.92	1.41
III Site Index											
20	4.8	4.8	4808	8.8	27	2.51	1.37	33	3.33	1.64	0.82
30	7.8	7.7	2669	12.4	56	3.09	1.86	73	4.53	2.42	1.44
40	10.6	10.5	1782	15.6	88	3.31	2.20	122	5.27	3.05	1.96
50	13.1	13.3	1316	18.2	121	3.29	2.42	177	5.63	3.54	2.34
60	15.2	15.9	1036	20.5	153	3.12	2.55	234	5.70	3.89	2.57
70	17.1	18.3	853	22.5	183	2.87	2.62	290	5.56	4.14	2.69

Dynamics of Low Stocked Pine Stands in Karelia

(stocking 0.65)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						80	18.8		20.6	725	
90	20.1	22.7	631	25.5	235	2.29	2.61	396	4.94	4.40	2.66
100	21.3	24.6	561	26.7	256	2.00	2.56	443	4.55	4.43	2.55
110	22.3	26.4	506	27.7	275	1.73	2.50	487	4.14	4.42	2.40
120	23.1	28.0	463	28.5	291	1.49	2.43	526	3.73	4.38	2.24
130	23.8	29.5	428	29.2	305	1.27	2.35	561	3.34	4.32	2.06
140	24.3	30.8	399	29.8	317	1.09	2.26	593	2.97	4.23	1.88
150	24.8	32.1	375	30.3	327	0.92	2.18	621	2.63	4.14	1.71
160	25.2	33.2	355	30.8	335	0.78	2.09	645	2.32	4.03	1.54
170	25.5	34.2	338	31.1	342	0.66	2.01	667	2.04	3.92	1.38
180	25.8	35.2	324	31.4	348	0.55	1.94	686	1.78	3.81	1.23

IV Site Index

20	3.8	3.7	6205	6.5	17	1.68	0.85	20	2.11	0.98	0.43
30	6.2	6.1	3365	9.8	37	2.18	1.22	45	3.02	1.52	0.84
40	8.5	8.5	2204	12.6	60	2.40	1.49	79	3.62	1.97	1.23
50	10.6	10.9	1602	15.0	84	2.42	1.68	117	3.96	2.34	1.54
60	12.4	13.2	1244	17.0	108	2.32	1.79	157	4.07	2.62	1.75
70	14.0	15.3	1011	18.7	130	2.14	1.86	198	4.02	2.83	1.88
80	15.4	17.3	850	20.1	150	1.93	1.88	237	3.86	2.97	1.93
90	16.6	19.2	734	21.2	169	1.71	1.87	275	3.63	3.05	1.92
100	17.7	20.9	647	22.2	184	1.49	1.84	310	3.36	3.10	1.87
110	18.5	22.5	580	23.0	198	1.29	1.80	342	3.07	3.11	1.78
120	19.3	23.9	527	23.7	210	1.10	1.75	371	2.78	3.09	1.67
130	19.9	25.2	485	24.2	220	0.94	1.70	398	2.49	3.06	1.55
140	20.5	26.4	450	24.6	229	0.79	1.64	421	2.22	3.01	1.42
150	20.9	27.5	422	25.0	236	0.67	1.58	442	1.97	2.95	1.30
160	21.3	28.4	398	25.3	243	0.56	1.52	461	1.74	2.88	1.17
170	21.6	29.3	378	25.5	248	0.47	1.46	477	1.53	2.81	1.05
180	21.9	30.1	361	25.7	252	0.40	1.40	491	1.34	2.73	0.94

V Site Index

20	2.9	2.5	9133	4.4	11	1.07	0.57	12	1.28	0.59	0.21
30	4.8	4.4	4577	7.0	24	1.34	0.79	28	1.83	0.92	0.49
40	6.7	6.5	2826	9.2	38	1.44	0.94	48	2.19	1.19	0.76
50	8.3	8.5	1962	11.1	52	1.42	1.04	71	2.39	1.42	0.96
60	9.8	10.4	1469	12.6	66	1.34	1.10	95	2.45	1.58	1.11
70	11.1	12.3	1160	13.7	79	1.23	1.12	120	2.42	1.71	1.19
80	12.3	14.0	954	14.6	90	1.10	1.13	143	2.32	1.79	1.22
90	13.3	15.5	809	15.3	101	0.97	1.12	166	2.18	1.84	1.21
100	14.1	16.9	704	15.8	110	0.84	1.10	187	2.01	1.87	1.18
110	14.8	18.2	625	16.2	117	0.72	1.07	206	1.84	1.87	1.12
120	15.4	19.3	564	16.5	124	0.61	1.03	223	1.66	1.86	1.04
130	15.9	20.3	517	16.7	130	0.52	1.00	239	1.49	1.84	0.97
140	16.3	21.2	479	16.9	135	0.44	0.96	253	1.32	1.81	0.88
150	16.7	22.0	449	17.0	139	0.37	0.92	266	1.17	1.77	0.80

Dynamics of Low Stocked Pine Stands in Karelia

(stocking 0.65)

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
160	17.0	22.6	424	17.1	142	0.31	0.89	277	1.03	1.73	0.72
170	17.3	23.2	404	17.2	145	0.26	0.85	286	0.90	1.68	0.65
180	17.5	23.8	387	17.2	147	0.22	0.82	295	0.79	1.64	0.58

Va Site Index

20	2.1	1.3	11989	1.5	4	0.30	0.19	4	0.45	0.22	0.15
30	3.5	2.5	5190	2.6	7	0.33	0.24	10	0.61	0.33	0.28
40	4.8	3.9	2890	3.4	10	0.33	0.26	17	0.71	0.41	0.38
50	6.1	5.3	1862	4.1	14	0.31	0.27	24	0.76	0.48	0.44
60	7.2	6.6	1322	4.5	17	0.28	0.28	32	0.76	0.53	0.48
70	8.1	7.8	1007	4.8	19	0.25	0.28	39	0.74	0.56	0.49
80	9.0	8.8	809	5.0	22	0.22	0.27	46	0.70	0.58	0.48
90	9.6	9.8	678	5.1	24	0.19	0.26	53	0.65	0.59	0.46
100	10.2	10.6	587	5.2	26	0.16	0.26	59	0.60	0.59	0.43
110	10.7	11.3	521	5.2	27	0.14	0.25	65	0.54	0.59	0.40
120	11.1	11.9	473	5.3	28	0.12	0.24	70	0.49	0.58	0.37
130	11.5	12.4	437	5.3	29	0.10	0.23	75	0.43	0.57	0.33
140	11.8	12.9	410	5.3	30	0.08	0.22	79	0.38	0.56	0.30
150	12.0	13.2	388	5.3	31	0.07	0.21	82	0.34	0.55	0.27
160	12.2	13.5	371	5.3	32	0.06	0.20	86	0.30	0.53	0.24
170	12.3	13.8	358	5.3	32	0.05	0.19	88	0.26	0.52	0.21
180	12.5	14.0	348	5.3	33	0.04	0.18	91	0.23	0.50	0.19

Dynamics of Modal Pine Stands

in Forest Tundra and Northern Taiga Ecoregions of the European North

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
IV Site Index											
20	4.9	2.9	8803	5.9	13	1.66	0.65	59	5.53	2.96	3.87
30	7.9	6.1	3530	10.3	34	2.41	1.12	120	6.38	3.99	3.97
40	10.6	9.6	1927	13.9	59	2.63	1.48	183	6.22	4.58	3.58
50	12.9	12.9	1254	16.3	85	2.48	1.70	242	5.54	4.85	3.06
60	14.8	15.8	914	18.0	108	2.14	1.81	294	4.69	4.89	2.55
70	16.3	18.3	721	19.0	128	1.75	1.83	336	3.83	4.80	2.08
80	17.4	20.4	603	19.7	143	1.38	1.79	371	3.07	4.63	1.68
90	18.4	22.0	526	20.1	156	1.07	1.73	398	2.41	4.42	1.34
100	19.1	23.4	474	20.3	165	0.81	1.65	419	1.88	4.19	1.07
110	19.7	24.4	438	20.5	172	0.60	1.56	436	1.45	3.96	0.84
120	20.1	25.2	412	20.6	177	0.45	1.48	448	1.11	3.74	0.66
130	20.4	25.8	393	20.6	181	0.33	1.39	458	0.85	3.52	0.52
140	20.7	26.3	379	20.7	184	0.24	1.31	466	0.64	3.33	0.40

V Site Index

20	2.2	1.5	12687	2.2	10	1.20	0.48	45	4.07	2.25	2.87
30	4.3	3.9	5227	6.2	24	1.71	0.82	89	4.60	2.97	2.89
40	6.5	6.9	2725	10.2	43	1.86	1.07	135	4.44	3.37	2.58
50	8.5	10.0	1675	13.1	61	1.76	1.22	177	3.95	3.54	2.19
60	10.2	12.8	1163	14.9	77	1.54	1.29	213	3.34	3.56	1.80
70	11.6	15.2	885	16.0	92	1.28	1.31	244	2.74	3.48	1.46
80	12.8	17.1	723	16.6	103	1.02	1.29	268	2.20	3.36	1.18
90	13.7	18.6	622	16.9	112	0.80	1.25	288	1.74	3.20	0.94
100	14.4	19.7	557	17.1	119	0.61	1.19	303	1.36	3.03	0.75
110	14.9	20.6	513	17.1	124	0.46	1.13	315	1.05	2.87	0.59
120	15.3	21.3	483	17.2	128	0.35	1.07	325	0.81	2.71	0.46
130	15.6	21.8	463	17.2	132	0.26	1.01	332	0.62	2.55	0.36
140	15.9	22.1	448	17.2	134	0.19	0.96	337	0.48	2.41	0.28

Va Site Index

20	1.0	0.8	26923	1.3	6	0.74	0.31	28	2.42	1.41	1.68
30	2.4	2.5	9915	4.9	15	1.03	0.51	54	2.70	1.81	1.67
40	4.0	4.9	4563	8.7	26	1.12	0.65	81	2.62	2.03	1.50
50	5.6	7.5	2553	11.2	37	1.07	0.74	106	2.36	2.12	1.29
60	7.0	9.8	1670	12.5	47	0.94	0.79	128	2.03	2.13	1.09
70	8.2	11.7	1231	13.2	56	0.79	0.80	147	1.70	2.09	0.91
80	9.2	13.2	991	13.5	63	0.64	0.79	162	1.40	2.03	0.76
90	10.0	14.3	850	13.7	69	0.51	0.76	175	1.13	1.94	0.62
100	10.6	15.2	763	13.8	73	0.39	0.73	185	0.90	1.85	0.51
110	11.0	15.8	708	13.8	77	0.30	0.70	193	0.72	1.75	0.42
120	11.4	16.2	671	13.8	79	0.23	0.66	199	0.57	1.66	0.34
130	11.6	16.5	647	13.8	81	0.18	0.63	204	0.45	1.57	0.27
140	11.8	16.7	631	13.8	83	0.13	0.59	208	0.35	1.49	0.22

Dynamics of Modal Pine Stands

in Forest Tundra and Northern Taiga Ecoregions of the European North

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
Vb Site Index											
20	0.5	0.4	90329	1.0	2	0.28	0.12	11	0.88	0.55	0.60
30	1.4	1.4	26954	4.2	6	0.38	0.19	20	0.97	0.68	0.58
40	2.5	3.0	10577	7.3	10	0.42	0.25	30	0.95	0.75	0.54
50	3.7	4.6	5391	9.1	14	0.40	0.28	39	0.88	0.78	0.48
60	4.8	6.1	3374	9.9	18	0.35	0.30	47	0.78	0.79	0.43
70	5.7	7.3	2452	10.2	21	0.30	0.30	55	0.68	0.78	0.38
80	6.5	8.2	1978	10.4	24	0.25	0.30	61	0.58	0.76	0.34
90	7.1	8.8	1712	10.4	26	0.20	0.29	66	0.49	0.74	0.29
100	7.6	9.2	1556	10.4	28	0.16	0.28	71	0.41	0.71	0.25
110	7.9	9.6	1460	10.5	29	0.12	0.26	75	0.34	0.68	0.22
120	8.2	9.8	1399	10.5	30	0.09	0.25	78	0.28	0.65	0.19
130	8.4	9.9	1360	10.5	31	0.07	0.24	80	0.23	0.62	0.16
140	8.5	10.0	1335	10.5	32	0.06	0.23	82	0.19	0.59	0.13

Dynamics of Modal Pine Stands

in Central Regions of European Part

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						I Site Index					
20	9.3	10.0	1949	15.3	77	6.00	3.85	122	10.57	6.12	4.57
30	13.2	14.8	1160	20.0	137	5.81	4.57	233	11.08	7.75	5.27
40	16.5	19.1	802	23.0	191	4.90	4.77	338	9.92	8.46	5.02
50	19.4	22.8	606	24.8	235	3.86	4.69	429	8.18	8.58	4.33
60	21.8	26.0	486	25.9	268	2.91	4.47	502	6.44	8.37	3.52
70	23.9	28.8	408	26.6	293	2.15	4.19	559	4.91	7.98	2.77
80	25.7	31.1	354	27.0	312	1.56	3.90	601	3.68	7.52	2.12
90	27.2	33.2	315	27.2	325	1.12	3.61	633	2.72	7.04	1.60
100	28.4	34.9	287	27.4	335	0.80	3.35	657	1.99	6.57	1.20
110	29.5	36.3	265	27.4	341	0.56	3.10	674	1.45	6.12	0.88
120	30.4	37.5	249	27.5	346	0.40	2.88	686	1.05	5.72	0.65
130	31.2	38.5	236	27.5	349	0.28	2.69	695	0.76	5.35	0.48
140	31.8	39.4	226	27.6	352	0.20	2.51	701	0.55	5.01	0.35
II Site Index											
20	7.7	9.0	2016	12.7	56	4.26	2.78	86	7.41	4.29	3.15
30	11.2	13.1	1207	16.3	99	4.26	3.30	164	8.05	5.48	3.79
40	14.3	16.8	842	18.7	139	3.77	3.48	243	7.54	6.08	3.77
50	16.9	20.1	641	20.4	174	3.13	3.48	314	6.53	6.27	3.40
60	19.2	23.0	516	21.5	202	2.50	3.36	373	5.41	6.22	2.90
70	21.1	25.6	433	22.3	224	1.95	3.20	422	4.34	6.03	2.39
80	22.8	27.9	374	22.8	241	1.50	3.02	461	3.42	5.76	1.92
90	24.2	29.8	332	23.2	254	1.14	2.83	491	2.66	5.45	1.52
100	25.4	31.6	300	23.4	264	0.86	2.64	514	2.05	5.14	1.18
110	26.4	33.1	275	23.6	272	0.65	2.47	532	1.56	4.84	0.92
120	27.2	34.4	256	23.7	278	0.48	2.31	546	1.19	4.55	0.70
130	28.0	35.5	240	23.8	282	0.36	2.17	556	0.90	4.28	0.54
140	28.6	36.5	228	23.8	285	0.27	2.03	564	0.68	4.03	0.41
III Site Index											
20	6.3	7.6	2427	11.0	41	2.99	2.04	61	5.11	3.04	2.12
30	9.3	11.0	1453	13.8	71	3.04	2.38	115	5.66	3.85	2.61
40	12.0	14.1	1017	15.8	101	2.80	2.52	171	5.49	4.29	2.69
50	14.3	16.8	776	17.2	127	2.44	2.54	224	4.96	4.48	2.52
60	16.3	19.3	626	18.3	149	2.05	2.49	270	4.30	4.50	2.25
70	18.0	21.5	525	19.0	168	1.70	2.40	310	3.63	4.43	1.93
80	19.5	23.5	453	19.6	183	1.38	2.29	343	3.00	4.29	1.62
90	20.8	25.3	400	20.1	196	1.11	2.18	370	2.45	4.11	1.34
100	21.8	26.8	360	20.4	206	0.89	2.06	392	1.98	3.92	1.09
110	22.8	28.3	329	20.6	214	0.71	1.94	410	1.59	3.73	0.88
120	23.6	29.5	304	20.8	220	0.56	1.83	424	1.27	3.53	0.71
130	24.2	30.6	284	20.9	225	0.44	1.73	435	1.01	3.35	0.56
140	24.8	31.7	267	21.0	229	0.35	1.64	444	0.80	3.17	0.45

Dynamics of Modal Pine Stands

in Central Regions of European Part

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						IV Site Index					
20	5.0	6.0	3418	9.8	31	2.11	1.55	44	3.50	2.20	1.39
30	7.4	8.7	2058	12.1	52	2.14	1.75	81	3.87	2.71	1.73
40	9.6	11.1	1446	13.9	73	2.02	1.83	120	3.84	3.00	1.82
50	11.5	13.2	1106	15.2	93	1.83	1.85	157	3.59	3.15	1.76
60	13.2	15.2	893	16.2	110	1.61	1.83	192	3.24	3.19	1.63
70	14.6	17.0	749	16.9	125	1.40	1.78	222	2.85	3.17	1.45
80	15.9	18.6	646	17.5	138	1.20	1.72	249	2.47	3.11	1.27
90	17.0	20.0	569	18.0	149	1.02	1.65	271	2.11	3.02	1.09
100	17.9	21.4	511	18.3	158	0.86	1.58	291	1.79	2.91	0.92
110	18.7	22.6	465	18.6	166	0.72	1.51	307	1.50	2.79	0.78
120	19.4	23.7	428	18.8	173	0.61	1.44	321	1.26	2.67	0.65
130	20.0	24.7	398	19.0	178	0.51	1.37	332	1.05	2.56	0.54
140	20.5	25.6	373	19.1	183	0.42	1.31	342	0.87	2.44	0.45
V Site Index											
20	3.7	4.4	5965	8.9	25	1.50	1.24	33	2.42	1.67	0.91
30	5.5	6.2	3656	11.2	40	1.50	1.33	59	2.61	1.96	1.12
40	7.2	8.0	2593	12.9	55	1.42	1.36	85	2.61	2.12	1.18
50	8.6	9.5	1994	14.2	68	1.32	1.37	110	2.49	2.21	1.17
60	9.9	10.9	1615	15.2	81	1.21	1.35	134	2.31	2.24	1.10
70	11.0	12.2	1356	16.0	92	1.09	1.32	157	2.11	2.24	1.02
80	12.0	13.4	1170	16.6	103	0.98	1.28	177	1.90	2.21	0.92
90	12.9	14.5	1030	17.1	112	0.87	1.25	195	1.69	2.16	0.82
100	13.6	15.5	923	17.4	120	0.78	1.20	210	1.50	2.10	0.72
110	14.3	16.4	838	17.7	128	0.69	1.16	225	1.32	2.04	0.63
120	14.9	17.3	769	18.0	134	0.61	1.12	237	1.15	1.97	0.54
130	15.4	18.0	713	18.2	140	0.54	1.08	248	1.00	1.90	0.47
140	15.8	18.7	667	18.3	145	0.47	1.03	257	0.87	1.84	0.40

Dynamics of Modal Mixed Pine Stands

in Northern Taiga Ecoregions of the West Siberian Plain

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
III Site Index											
20	4.8	3.9	10051	12.1	30	3.97	1.52	51	6.20	2.55	2.22
30	8.0	7.0	4781	18.1	79	5.41	2.62	126	8.43	4.20	3.02
40	11.0	10.1	2753	22.1	133	5.34	3.34	213	8.78	5.33	3.44
50	13.7	13.2	1789	24.6	183	4.50	3.66	298	7.98	5.96	3.48
60	16.0	16.2	1266	26.0	223	3.46	3.71	371	6.69	6.19	3.23
70	17.8	18.9	957	26.8	252	2.52	3.61	431	5.33	6.16	2.81
80	19.4	21.4	761	27.3	274	1.78	3.42	478	4.12	5.98	2.34
90	20.6	23.6	630	27.6	289	1.23	3.21	514	3.11	5.72	1.88
100	21.6	25.6	539	27.7	299	0.84	2.99	541	2.31	5.41	1.47
110	22.4	27.4	473	27.8	306	0.57	2.78	561	1.70	5.10	1.13
120	23.0	28.9	424	27.8	311	0.38	2.59	576	1.24	4.80	0.86
130	23.5	30.3	387	27.9	314	0.25	2.41	586	0.90	4.51	0.65
140	23.9	31.5	359	27.9	316	0.17	2.26	594	0.65	4.24	0.48
150	24.2	32.5	336	27.9	317	0.11	2.11	600	0.47	4.00	0.36
160	24.5	33.4	318	27.9	318	0.07	1.99	604	0.34	3.77	0.26
170	24.7	34.2	304	27.9	319	0.05	1.87	607	0.24	3.57	0.19
180	24.8	34.9	292	27.9	319	0.03	1.77	609	0.17	3.38	0.14
190	25.0	35.5	283	27.9	319	0.02	1.68	610	0.13	3.21	0.10
200	25.1	36.0	275	27.9	320	0.01	1.60	611	0.09	3.06	0.08
210	25.1	36.4	268	27.9	320	0.01	1.52	612	0.06	2.91	0.06
220	25.2	36.8	263	27.9	320	0.01	1.45	612	0.05	2.78	0.04
230	25.2	37.1	258	27.9	320	0.00	1.39	613	0.03	2.66	0.03
240	25.3	37.4	254	27.9	320	0.00	1.33	613	0.02	2.55	0.02
250	25.3	37.6	251	27.9	320	0.00	1.28	613	0.02	2.45	0.02
IV Site Index											
20	3.3	3.5	10917	10.7	17	2.13	0.84	25	3.17	1.24	1.05
30	5.9	6.0	5172	14.5	43	3.05	1.44	65	4.73	2.17	1.68
40	8.4	8.5	3065	17.3	75	3.30	1.89	116	5.37	2.91	2.07
50	10.6	10.9	2062	19.2	108	3.09	2.15	170	5.30	3.40	2.21
60	12.6	13.2	1506	20.5	137	2.66	2.28	221	4.80	3.68	2.15
70	14.3	15.3	1166	21.4	161	2.17	2.30	266	4.12	3.80	1.96
80	15.6	17.3	943	22.1	180	1.70	2.25	303	3.41	3.79	1.71
90	16.7	19.1	790	22.5	195	1.31	2.17	334	2.75	3.71	1.45
100	17.7	20.7	680	22.8	206	0.99	2.06	359	2.18	3.59	1.19
110	18.4	22.1	599	23.0	215	0.74	1.95	378	1.71	3.44	0.97
120	19.0	23.4	537	23.2	221	0.55	1.85	393	1.32	3.28	0.78
130	19.4	24.6	489	23.3	226	0.40	1.74	405	1.02	3.11	0.61
140	19.8	25.7	452	23.4	230	0.29	1.64	414	0.78	2.96	0.48
150	20.1	26.6	421	23.4	232	0.22	1.55	421	0.59	2.80	0.38
160	20.3	27.4	397	23.4	234	0.16	1.46	426	0.45	2.66	0.29
170	20.5	28.2	377	23.5	235	0.11	1.38	430	0.34	2.53	0.23
180	20.7	28.8	360	23.5	236	0.08	1.31	433	0.26	2.40	0.18
190	20.8	29.4	346	23.5	237	0.06	1.25	435	0.20	2.29	0.14

Dynamics of Modal Mixed Pine Stands

in Northern Taiga Ecoregions of the West Siberian Plain

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
200	20.9	29.9	335	23.5	238	0.04	1.19	437	0.15	2.18	0.10
210	20.9	30.3	325	23.5	238	0.03	1.13	438	0.11	2.09	0.08
220	21.0	30.7	317	23.5	238	0.02	1.08	439	0.08	2.00	0.06
230	21.0	31.1	310	23.5	238	0.02	1.04	440	0.06	1.91	0.05
240	21.1	31.4	304	23.5	239	0.01	0.99	440	0.05	1.83	0.04
250	21.1	31.7	299	23.5	239	0.01	0.95	441	0.04	1.76	0.03

V Site Index

20	1.9	2.7	13239	7.6	8	1.08	0.42	12	1.58	0.59	0.49
30	3.8	4.6	6264	10.4	22	1.65	0.74	33	2.53	1.09	0.88
40	5.8	6.5	3739	12.5	40	1.92	1.01	61	3.06	1.52	1.14
50	7.7	8.4	2538	14.2	60	1.94	1.20	93	3.21	1.85	1.27
60	9.3	10.3	1871	15.5	79	1.79	1.31	124	3.07	2.07	1.28
70	10.8	12.0	1460	16.4	96	1.57	1.36	153	2.77	2.19	1.20
80	12.0	13.6	1189	17.2	110	1.33	1.38	179	2.41	2.24	1.08
90	13.0	15.0	1001	17.7	122	1.09	1.36	202	2.03	2.24	0.94
100	13.8	16.3	864	18.1	132	0.88	1.32	220	1.68	2.20	0.80
110	14.4	17.6	763	18.4	140	0.70	1.27	235	1.37	2.14	0.67
120	15.0	18.6	685	18.7	146	0.55	1.22	248	1.10	2.06	0.55
130	15.4	19.6	624	18.9	151	0.43	1.16	258	0.88	1.98	0.45
140	15.7	20.5	575	19.0	155	0.34	1.11	266	0.70	1.90	0.36
150	16.0	21.3	536	19.1	158	0.26	1.05	272	0.55	1.81	0.29
160	16.2	22.0	504	19.2	160	0.20	1.00	277	0.44	1.73	0.23
170	16.3	22.7	477	19.2	162	0.15	0.95	281	0.34	1.65	0.19
180	16.4	23.2	455	19.3	163	0.12	0.91	284	0.27	1.58	0.15
190	16.5	23.7	437	19.3	164	0.09	0.86	286	0.21	1.51	0.12
200	16.6	24.2	421	19.4	165	0.07	0.82	288	0.16	1.44	0.09
210	16.7	24.6	408	19.4	166	0.05	0.79	289	0.13	1.38	0.07
220	16.7	24.9	397	19.4	166	0.04	0.75	290	0.10	1.32	0.06
230	16.8	25.3	387	19.4	166	0.03	0.72	291	0.08	1.27	0.05
240	16.8	25.5	379	19.4	167	0.02	0.69	292	0.06	1.22	0.04
250	16.8	25.8	372	19.4	167	0.02	0.67	293	0.05	1.17	0.03

Va Site Index

20	1.0	1.7	15050	3.4	4	0.52	0.19	5	0.76	0.27	0.24
30	2.2	3.1	7696	5.8	11	0.87	0.36	16	1.29	0.53	0.42
40	3.6	4.6	4786	7.8	21	1.08	0.52	31	1.63	0.77	0.55
50	5.1	6.1	3324	9.6	32	1.15	0.64	48	1.76	0.95	0.61
60	6.4	7.5	2481	11.0	43	1.11	0.72	65	1.74	1.09	0.63
70	7.6	8.9	1950	12.1	54	1.01	0.77	82	1.61	1.17	0.60
80	8.6	10.2	1594	13.0	64	0.88	0.79	97	1.43	1.22	0.55
90	9.4	11.4	1343	13.6	72	0.75	0.80	111	1.23	1.23	0.49
100	10.1	12.5	1160	14.1	79	0.62	0.79	122	1.04	1.22	0.42
110	10.6	13.4	1023	14.5	84	0.51	0.77	132	0.86	1.20	0.36
120	11.0	14.3	918	14.8	89	0.41	0.74	139	0.71	1.16	0.30
130	11.3	15.1	835	15.0	92	0.33	0.71	146	0.57	1.12	0.25

Dynamics of Modal Mixed Pine Stands

in Northern Taiga Ecoregions of the West Siberian Plain

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
140	11.6	15.9	770	15.2	95	0.26	0.68	151	0.46	1.08	0.20
150	11.8	16.5	717	15.3	98	0.21	0.65	155	0.37	1.03	0.17
160	11.9	17.1	674	15.4	99	0.16	0.62	159	0.30	0.99	0.14
170	12.1	17.6	639	15.5	101	0.13	0.59	161	0.24	0.95	0.11
180	12.2	18.0	609	15.5	102	0.10	0.57	163	0.19	0.91	0.09
190	12.2	18.4	585	15.6	103	0.08	0.54	165	0.15	0.87	0.07
200	12.3	18.8	564	15.6	104	0.06	0.52	166	0.12	0.83	0.06
210	12.3	19.1	547	15.6	104	0.05	0.50	167	0.09	0.80	0.05
220	12.4	19.3	532	15.6	105	0.04	0.48	168	0.07	0.76	0.04
230	12.4	19.6	519	15.6	105	0.03	0.46	169	0.06	0.73	0.03
240	12.4	19.8	509	15.7	105	0.02	0.44	169	0.05	0.71	0.02
250	12.4	20.0	499	15.7	105	0.02	0.42	170	0.04	0.68	0.02

Vb Site Index

20	0.4	0.9	26391	1.6	1	0.23	0.07	2	0.31	0.11	0.08
30	1.1	1.8	14535	3.7	5	0.43	0.16	6	0.55	0.22	0.11
40	2.0	2.8	9096	5.8	10	0.57	0.25	13	0.70	0.32	0.13
50	3.0	4.0	6193	7.6	16	0.62	0.32	20	0.76	0.40	0.14
60	3.9	5.0	4492	9.0	22	0.60	0.37	28	0.75	0.46	0.15
70	4.7	6.1	3426	10.0	28	0.55	0.40	35	0.70	0.50	0.15
80	5.4	7.1	2724	10.7	33	0.47	0.41	42	0.62	0.52	0.14
90	6.0	8.0	2243	11.2	37	0.40	0.41	47	0.53	0.53	0.13
100	6.4	8.8	1902	11.6	41	0.32	0.41	52	0.44	0.52	0.12
110	6.8	9.5	1653	11.8	44	0.26	0.40	56	0.36	0.51	0.11
120	7.1	10.2	1467	11.9	46	0.21	0.38	60	0.30	0.50	0.09
130	7.3	10.8	1326	12.0	48	0.16	0.37	62	0.24	0.48	0.08
140	7.4	11.3	1217	12.1	49	0.13	0.35	64	0.19	0.46	0.07
150	7.6	11.7	1131	12.2	51	0.10	0.34	66	0.15	0.44	0.06
160	7.7	12.1	1063	12.2	51	0.07	0.32	67	0.12	0.42	0.05
170	7.7	12.4	1008	12.2	52	0.06	0.31	69	0.10	0.40	0.04
180	7.8	12.7	964	12.2	53	0.04	0.29	69	0.07	0.39	0.03
190	7.8	13.0	927	12.2	53	0.03	0.28	70	0.06	0.37	0.03
200	7.9	13.2	898	12.2	53	0.03	0.27	71	0.05	0.35	0.02
210	7.9	13.4	873	12.2	53	0.02	0.25	71	0.04	0.34	0.02
220	7.9	13.5	853	12.2	54	0.02	0.24	71	0.03	0.32	0.01
230	7.9	13.7	836	12.2	54	0.01	0.23	72	0.02	0.31	0.01
240	7.9	13.8	821	12.2	54	0.01	0.22	72	0.02	0.30	0.01
250	7.9	13.9	810	12.2	54	0.01	0.22	72	0.01	0.29	0.01

Dynamics of Modal Pine Stands

**in Northern, Middle and Southern Taiga Ecoregions of Siberia
(automorphic conditions);**

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
III Site Index											
20	7.0	10.2	836	6.9	31	2.65	1.54	36	3.21	1.82	0.56
30	10.1	13.2	746	10.2	60	3.07	1.99	72	3.89	2.41	0.82
40	12.9	15.7	669	13.0	91	3.13	2.27	113	4.15	2.82	1.02
50	15.2	17.9	603	15.2	122	2.97	2.43	154	4.13	3.09	1.16
60	17.1	19.9	547	17.0	150	2.71	2.50	195	3.94	3.25	1.24
70	18.7	21.7	498	18.5	176	2.40	2.51	233	3.66	3.33	1.26
80	20.1	23.4	457	19.6	198	2.08	2.47	268	3.33	3.35	1.25
90	21.2	24.9	421	20.5	217	1.78	2.41	299	2.98	3.33	1.20
100	22.1	26.3	390	21.2	234	1.51	2.34	327	2.64	3.27	1.13
110	22.8	27.6	364	21.7	247	1.26	2.25	352	2.32	3.20	1.05
120	23.4	28.8	340	22.2	259	1.05	2.16	374	2.02	3.11	0.97
130	23.9	29.9	320	22.5	269	0.88	2.07	393	1.75	3.02	0.88
140	24.3	31.0	302	22.8	277	0.72	1.98	409	1.51	2.92	0.79
150	24.6	32.0	286	22.9	283	0.60	1.89	423	1.30	2.82	0.70
160	24.9	32.9	272	23.1	289	0.49	1.80	435	1.12	2.72	0.62
170	25.1	33.7	260	23.2	293	0.40	1.72	445	0.95	2.62	0.55
180	25.3	34.5	249	23.3	297	0.33	1.65	454	0.81	2.52	0.48
IV Site Index											
20	3.9	3.3	9218	8.1	23	2.17	1.13	26	2.54	1.29	0.36
30	6.5	5.7	4682	11.8	47	2.73	1.58	55	3.31	1.85	0.58
40	8.9	8.0	2965	14.9	76	2.93	1.90	91	3.71	2.27	0.78
50	11.1	10.2	2118	17.5	105	2.90	2.11	129	3.83	2.58	0.94
60	12.9	12.4	1633	19.6	133	2.72	2.22	167	3.76	2.78	1.04
70	14.5	14.3	1326	21.4	159	2.46	2.28	204	3.56	2.91	1.10
80	15.9	16.1	1119	22.9	183	2.18	2.28	238	3.29	2.97	1.11
90	17.0	17.8	971	24.1	203	1.89	2.26	269	2.99	2.99	1.09
100	17.8	19.3	863	25.1	221	1.63	2.21	298	2.68	2.98	1.05
110	18.6	20.6	780	25.9	236	1.38	2.14	323	2.37	2.94	0.99
120	19.2	21.8	716	26.6	248	1.17	2.07	345	2.08	2.88	0.92
130	19.7	22.8	665	27.1	259	0.98	1.99	365	1.82	2.81	0.84
140	20.0	23.7	624	27.6	268	0.81	1.91	382	1.58	2.73	0.76
150	20.4	24.6	590	28.0	275	0.68	1.84	396	1.36	2.64	0.69
160	20.6	25.3	563	28.2	282	0.56	1.76	409	1.18	2.56	0.61
170	20.8	25.9	540	28.5	287	0.46	1.69	420	1.01	2.47	0.55
180	21.0	26.5	521	28.7	291	0.38	1.62	429	0.86	2.38	0.48
V Site Index											
20	2.8	2.5	11910	6.0	13	1.44	0.63	15	1.66	0.73	0.22
30	4.9	4.5	6012	9.4	30	2.06	1.01	35	2.44	1.18	0.38
40	6.8	6.5	3775	12.5	53	2.38	1.32	62	2.93	1.56	0.55
50	8.6	8.5	2673	15.2	77	2.46	1.54	93	3.16	1.86	0.69
60	10.2	10.5	2041	17.5	101	2.37	1.69	125	3.18	2.08	0.80
70	11.5	12.3	1642	19.5	124	2.19	1.77	156	3.05	2.23	0.87

Dynamics of Modal Pine Stands

**in Northern, Middle and Southern Taiga Ecoregions of Siberia
(automorphic conditions);**

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						80	12.6		14.0	1373	
90	13.5	15.6	1182	22.6	163	1.70	1.81	213	2.59	2.36	0.89
100	14.2	17.0	1041	23.7	179	1.46	1.79	237	2.32	2.37	0.86
110	14.8	18.4	933	24.7	192	1.23	1.75	259	2.04	2.36	0.81
120	15.2	19.5	850	25.5	204	1.03	1.70	278	1.78	2.32	0.75
130	15.6	20.6	784	26.2	213	0.86	1.64	295	1.54	2.27	0.69
140	15.9	21.6	731	26.7	221	0.71	1.58	309	1.33	2.21	0.62
150	16.1	22.4	687	27.2	227	0.58	1.52	322	1.14	2.14	0.55
160	16.3	23.2	651	27.5	233	0.48	1.45	332	0.97	2.07	0.49
170	16.5	23.9	621	27.8	237	0.39	1.39	341	0.82	2.01	0.43
180	16.6	24.5	596	28.1	240	0.32	1.34	348	0.69	1.94	0.38

Va Site Index

20	2.4	2.6	5803	3.1	5	0.68	0.24	6	0.79	0.29	0.11
30	4.0	3.8	4968	5.7	14	1.16	0.47	17	1.35	0.55	0.19
40	5.5	5.0	4246	8.4	27	1.46	0.69	32	1.75	0.81	0.29
50	6.8	6.1	3642	10.8	43	1.57	0.85	51	1.96	1.02	0.39
60	7.9	7.2	3139	12.9	58	1.53	0.97	71	2.00	1.18	0.47
70	8.7	8.3	2723	14.8	73	1.41	1.04	91	1.93	1.29	0.52
80	9.5	9.3	2377	16.3	86	1.24	1.08	109	1.78	1.37	0.54
90	10.1	10.3	2088	17.6	98	1.06	1.09	126	1.60	1.40	0.54
100	10.6	11.3	1847	18.6	108	0.89	1.08	141	1.41	1.41	0.51
110	10.9	12.3	1644	19.4	116	0.73	1.05	154	1.21	1.40	0.48
120	11.2	13.2	1472	20.1	122	0.60	1.02	165	1.03	1.38	0.44
130	11.5	14.1	1327	20.6	128	0.48	0.98	175	0.87	1.35	0.39
140	11.7	14.9	1202	21.0	132	0.38	0.94	183	0.73	1.31	0.34
150	11.8	15.8	1095	21.4	136	0.31	0.90	190	0.61	1.26	0.30
160	12.0	16.6	1003	21.6	138	0.24	0.86	195	0.50	1.22	0.26
170	12.1	17.4	923	21.9	140	0.19	0.83	200	0.41	1.17	0.22
180	12.1	18.1	853	22.0	142	0.15	0.79	203	0.34	1.13	0.19

Dynamics of Modal Pine Stands

**in Northern, Middle and Southern Taiga Ecoregions of West Siberia
(hydromorphic conditions)**

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
						IV Site Index					
20	4.5	3.4	21016	18.6	34	3.72	1.70	49	4.61	2.46	0.90
30	7.2	5.5	9847	23.8	77	4.73	2.57	101	5.64	3.37	0.91
40	9.6	7.8	5805	27.5	126	4.82	3.14	159	5.92	3.99	1.10
50	11.6	9.9	3888	30.2	172	4.37	3.44	218	5.72	4.36	1.35
60	13.3	12.0	2826	32.2	212	3.70	3.54	273	5.26	4.55	1.56
70	14.6	14.0	2176	33.7	246	3.00	3.51	323	4.68	4.61	1.68
80	15.7	15.9	1749	34.7	273	2.37	3.41	367	4.07	4.58	1.70
90	16.6	17.6	1452	35.5	293	1.83	3.26	404	3.48	4.49	1.65
100	17.3	19.3	1239	36.1	309	1.39	3.09	436	2.94	4.36	1.55
110	17.8	20.8	1079	36.5	322	1.05	2.92	463	2.46	4.21	1.41
120	18.2	22.1	958	36.8	331	0.79	2.76	486	2.04	4.05	1.26
130	18.5	23.4	862	37.1	338	0.59	2.60	504	1.69	3.88	1.10
140	18.8	24.5	787	37.2	343	0.44	2.45	520	1.39	3.71	0.95
150	19.0	25.6	725	37.3	346	0.32	2.31	532	1.14	3.55	0.81
160	19.1	26.6	675	37.4	349	0.24	2.18	543	0.93	3.39	0.69
170	19.3	27.4	634	37.5	351	0.18	2.07	551	0.76	3.24	0.58
180	19.4	28.2	599	37.6	353	0.13	1.96	558	0.62	3.10	0.49
190	19.4	29.0	570	37.6	354	0.10	1.86	563	0.50	2.97	0.41
200	19.5	29.6	545	37.6	355	0.07	1.77	568	0.41	2.84	0.34
V Site Index											
20	2.6	2.9	7339	5.0	16	1.66	0.79	22	1.99	1.11	0.33
30	4.5	4.9	5217	9.7	35	2.17	1.18	45	2.47	1.49	0.30
40	6.4	6.8	3855	13.9	58	2.33	1.45	71	2.69	1.77	0.35
50	8.1	8.6	2951	17.3	81	2.26	1.62	98	2.73	1.96	0.46
60	9.6	10.4	2332	19.8	103	2.07	1.71	125	2.65	2.08	0.59
70	10.9	12.0	1897	21.5	122	1.81	1.75	151	2.50	2.15	0.69
80	12.0	13.5	1583	22.7	139	1.54	1.74	175	2.32	2.18	0.77
90	13.0	14.9	1352	23.5	153	1.29	1.70	197	2.11	2.19	0.82
100	13.7	16.1	1179	24.1	165	1.06	1.65	217	1.90	2.17	0.84
110	14.4	17.2	1046	24.4	174	0.86	1.59	235	1.69	2.13	0.83
120	14.9	18.2	943	24.7	182	0.70	1.52	251	1.50	2.09	0.80
130	15.3	19.1	861	24.8	189	0.56	1.45	265	1.32	2.04	0.76
140	15.7	20.0	796	24.9	194	0.45	1.38	277	1.16	1.98	0.71
150	16.0	20.7	744	25.0	198	0.36	1.32	288	1.01	1.92	0.65
160	16.2	21.3	701	25.0	201	0.28	1.25	297	0.88	1.86	0.59
170	16.4	21.9	665	25.1	203	0.22	1.20	306	0.76	1.80	0.54
180	16.6	22.4	636	25.1	205	0.18	1.14	313	0.66	1.74	0.48
190	16.7	22.9	611	25.1	207	0.14	1.09	319	0.57	1.68	0.43
200	16.8	23.3	590	25.1	208	0.11	1.04	324	0.49	1.62	0.38
Va Site Index											
20	1.3	1.8	8265	2.2	5	0.62	0.24	7	0.75	0.34	0.14
30	2.6	3.3	5684	4.8	13	0.95	0.43	16	1.09	0.54	0.14

Dynamics of Modal Pine Stands

**in Northern, Middle and Southern Taiga Ecoregions of West Siberia
(hydromorphic conditions)**

Age	Average Height [m]	Average Diameter [cm]	Number of Trees	Basal Area [m ² /ha]	Growing Stock [m ³ /ha]	Net Growth [m ³ /(ha · year)]		Total Volume [m ³ /ha]	Gross Growth [m ³ /(ha · year)]		Mortality [m ³ /(ha · year)]
						current	average		current	average	
40	4.0	4.8	4131	7.4	23	1.14	0.58	28	1.30	0.70	0.16
50	5.3	6.3	3134	9.6	35	1.19	0.70	42	1.41	0.84	0.22
60	6.5	7.7	2463	11.4	47	1.14	0.78	56	1.44	0.94	0.29
70	7.6	9.0	1997	12.7	58	1.04	0.82	70	1.40	1.00	0.36
80	8.6	10.2	1663	13.7	67	0.91	0.84	84	1.33	1.05	0.42
90	9.4	11.4	1419	14.4	76	0.78	0.84	97	1.23	1.08	0.45
100	10.0	12.4	1236	14.9	83	0.65	0.83	109	1.12	1.09	0.47
110	10.6	13.3	1096	15.2	89	0.53	0.81	119	1.01	1.08	0.47
120	11.1	14.1	988	15.4	94	0.44	0.78	129	0.90	1.07	0.46
130	11.5	14.8	903	15.6	98	0.35	0.75	137	0.79	1.05	0.44
140	11.8	15.5	835	15.7	101	0.28	0.72	145	0.69	1.03	0.41
150	12.0	16.0	781	15.8	103	0.23	0.69	151	0.60	1.01	0.38
160	12.2	16.5	736	15.8	105	0.18	0.66	157	0.52	0.98	0.34
170	12.4	17.0	700	15.8	107	0.14	0.63	162	0.45	0.95	0.31
180	12.5	17.4	670	15.9	108	0.11	0.60	166	0.39	0.92	0.28
190	12.7	17.7	645	15.9	109	0.09	0.58	169	0.34	0.89	0.25
200	12.8	18.0	625	15.9	110	0.07	0.55	172	0.29	0.86	0.22

Vb Site Index

20	0.6	0.9	19229	1.3	1	0.25	0.07	2	0.32	0.11	0.07
30	1.4	1.9	8124	2.3	5	0.50	0.17	7	0.59	0.22	0.08
40	2.2	3.0	4576	3.3	11	0.68	0.28	14	0.78	0.34	0.10
50	3.1	4.2	3015	4.2	18	0.74	0.37	22	0.89	0.44	0.15
60	3.9	5.4	2191	5.1	26	0.71	0.43	31	0.90	0.52	0.19
70	4.6	6.6	1703	5.8	32	0.63	0.46	40	0.86	0.57	0.23
80	5.2	7.7	1389	6.5	38	0.52	0.48	48	0.78	0.60	0.25
90	5.6	8.8	1175	7.1	43	0.42	0.48	55	0.68	0.61	0.26
100	6.0	9.7	1022	7.6	47	0.33	0.47	62	0.58	0.62	0.25
110	6.3	10.6	910	8.0	50	0.26	0.45	67	0.49	0.61	0.23
120	6.6	11.4	824	8.3	52	0.20	0.43	72	0.41	0.60	0.21
130	6.8	12.0	758	8.6	54	0.15	0.41	75	0.33	0.58	0.19
140	6.9	12.7	705	8.9	55	0.11	0.39	78	0.27	0.56	0.16
150	7.0	13.2	664	9.1	56	0.08	0.37	81	0.22	0.54	0.14
160	7.1	13.7	629	9.3	57	0.06	0.35	83	0.18	0.52	0.11
170	7.2	14.1	601	9.4	57	0.05	0.34	84	0.14	0.50	0.10
180	7.2	14.5	578	9.5	57	0.03	0.32	86	0.11	0.48	0.08
190	7.3	14.8	559	9.6	58	0.02	0.30	87	0.09	0.46	0.06
200	7.3	15.1	543	9.7	58	0.02	0.29	87	0.07	0.44	0.05

APPENDIX 3

GROSS GROWTH, MORTALITY AND NET GROWTH OF PINE BY ADMINISTRATIVE UNITS IN RUSSIA

Net growth of Pine stands by administrative units in Russia, expressed in million m³

Administrative unit/economic region	Forested area under state management (mill.ha)	Growing stock under state management (mill. m ³)	Young stands	Middle-aged stands	Immature stands	Mature and over-mature stands	Total
Kaliningradskaja	0.040	7.16	0.1995	0.0747	0.0119	0.0044	0.2905
Pribaltiiskii	0.040	7.16	0.1995	0.0747	0.0119	0.0044	0.2905
Archangel'skaia	5.398	542.24	1.9181	1.1076	0.2637	1.1018	4.3911
Vologodskaja	1.708	234.75	1.4534	1.2384	0.3672	0.2816	3.3406
Murmanskaja	2.155	89.31	0.7961	0.4083	0.0581	0.1395	1.4021
Karelia R	5.730	493.72	4.8098	2.0147	0.6359	0.5346	7.9949
Komi R	7.072	637.27	2.0276	1.2892	0.3437	1.2363	4.8968
North	22.065	1997.29	11.0050	6.0581	1.6686	3.2938	22.0255
Leningradskaja	1.288	208.45	1.5795	1.2404	0.7922	0.3640	3.9761
Novgorodskaja	0.503	75.56	1.1573	0.7288	0.3172	0.1570	2.3603
Pskovskaja	0.478	66.09	1.2483	0.7161	0.2862	0.0645	2.3152
North West	2.268	350.10	3.9851	2.6853	1.3957	0.5855	8.6516
Brianskaia	0.282	62.79	1.3643	0.8419	0.1865	0.0350	2.4278
Vladimirskaja	0.505	93.61	1.9548	1.1834	0.4123	0.0468	3.5973
Ivanovskaja	0.266	46.45	1.1825	0.4891	0.1765	0.0173	1.8654
Tverskaia	0.595	98.20	1.9435	1.3971	0.5775	0.2816	4.1997
Kaluzhskaja	0.093	20.92	0.6878	0.2227	0.0862	0.0168	1.0135
Kostromskaja	0.915	128.41	2.8338	1.2167	0.3724	0.3136	4.7364
Moskovskaja	0.336	76.68	0.8177	0.8755	0.2765	0.0515	2.0213
Orlovskaja	0.019	3.59	0.1027	0.0532	0.0023	0.0000	0.1582
Riazanskaja	0.300	60.94	1.0079	0.6911	0.2284	0.0469	1.9743
Smolenskaja	0.108	16.82	0.4402	0.1987	0.0725	0.0117	0.7231
Tul'skaia	0.012	2.78	0.0679	0.0287	0.0049	0.0013	0.1028
Jaroslavskaja	0.115	23.61	0.6102	0.3024	0.1234	0.0388	1.0748
Central	3.545	634.80	13.0132	7.5005	2.5195	0.8615	23.8947
Nizhegorodskaja	1.205	158.29	4.6445	1.7021	0.5025	0.1676	7.0166
Kirovskaja	1.376	202.05	2.9788	1.7340	0.4958	0.8325	6.0412
Mari-El R	0.428	53.03	0.9530	0.5530	0.1292	0.0688	1.7041
Mordovia R	0.167	21.05	0.9704	0.2499	0.0694	0.0088	1.2985
Chuvashia R	0.156	21.56	0.5216	0.2069	0.0389	0.0114	0.7789
Volgo-Viatskii	3.357	456.18	10.0684	4.4460	1.2358	1.0891	16.8393
Belgorodskaja	0.023	3.10	0.1680	0.0238	0.0018	0.0001	0.1937
Voronezhskaja	0.102	18.76	0.7248	0.2343	0.0208	0.0042	0.9841
Kurskaia	0.022	3.74	0.1656	0.0384	0.0012	0.0000	0.2052
Lipezkaia	0.053	10.87	0.2583	0.1732	0.0144	0.0022	0.4481
Tambovskaja	0.136	29.01	0.6372	0.3337	0.0607	0.0155	1.0471
Cental.	0.335	65.48	1.9539	0.8033	0.0989	0.0221	2.8781
Chernozemn							
Astrachanskaja	0.000	0.00	0.0000		0.0000		0.0000
Volgogradskaja	0.047	2.34	0.1774	0.0239	0.0002	0.0000	0.2015
Samarskaja	0.083	13.20	0.2798	0.0984	0.0194	0.0186	0.4162

Penzenskaia	0.233	44.94	1.1157	0.3672	0.1040	0.0338	1.6207
Saratovskaia	0.045	3.47	0.1336	0.0344	0.0078	0.0012	0.1769
Ulianovskaia	0.340	67.15	1.3276	0.7209	0.1308	0.0395	2.2187
Kalmykia R	0.000	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
Tatarstan R	0.163	31.85	1.0547	0.2955	0.0497	0.0119	1.4118
Povolzhskii	0.911	162.95	4.0888	1.5403	0.3119	0.1048	6.0458
Krasnodarskii Krai	0.041	2.75	0.0261	0.0052	0.0045	0.0083	0.0441
Adygeia R	0.003	0.49	0.0005	0.0003	0.0009	0.0019	0.0037
Stavroplsii krai	0.004	0.18	0.0178	0.0000	0.0000	0.0000	0.0178
Karach. Cherkesia R.	0/074	14.96	0.0346	0.1087	0.0500	0.0315	0.2248
Rostovskaia	0.070	4.83	0.3142	0.0175	0.0002	0.0000	0.3319
Dagestan R	0.064	9.74	0.0331	0.1934	0.0152	0.0018	0.2435
Kabard. Balkaria R	0.006	0.82	0.0008	0.0055	0.0019	0.0013	0.0096
Sev. Osetia R	0.007	0.80	0.0067	0.0182	0.0006	0.0000	0.0255
Chech.R+ Ingush. R	0.008	0.85	0.0065	0.0173	0.0015	0.0001	0.0253
North Caucasus	0.278	35.42	0.4141	0.3610	0.0703	0.0368	0.8822
Kurganskaia	0.363	63.28	1.1709	0.4653	0.1390	0.0441	1.8193
Orenburgskaia	0.057	10.47	0.2309	0.0693	0.0079	0.0169	0.3250
Permskaia	1.276	133.29	1.5414	0.6019	0.1724	0.5626	2.8783
Sverdlovskaia	4.056	644.82	6.3512	5.6833	1.2382	1.3738	14.6465
Cheliabinskaia	0.579	100.00	1.3687	0.9817	0.1875	0.1089	2.6468
Bashkortostan R	0.714	118.50	1.6304	0.6347	0.3082	0.1866	2.7599
Udmurtia R	0.276	36.45	0.8339	0.2827	0.1048	0.0597	1.2810
Ural	7.322	1106.81	13.1273	8.7189	2.1580	2.3525	26.3568
European part of Russia	40.121	4816.19	57.8553	32.1881	9.4706	8.3504	107.8645
Altaiskii krai	1.070	194.94	0.8365	1.7936	0.4048	0.0758	3.1107
Altai R	0.021	4.00	0.0079	0.0324	0.0110	0.0043	0.0557
Kemrovskaia	0.106	15.79	0.0641	0.0622	0.0477	0.0091	0.1830
Novosibirskaia	0.857	96.20	0.6260	1.0897	0.2503	0.0352	2.0012
Omskaia	0.706	64.72	0.4580	0.5448	0.1537	0.0300	1.1866
Tomskaia	5.369	620.34	1.3247	2.0774	1.3880	0.6463	5.4365
Tiumenskaia	1.757	181.48	1.0229	0.7577	0.4176	0.1894	2.3875
Chanty-Mans. AO	14.460	1431.55	1.8518	7.4441	2.1390	1.4702	12.9051
Jamlo-Nenez AO	4.163	295.78	0.2451	1.5986	0.3287	0.3197	2.4921
West Siberia	28.510	2904.80	6.4371	15.4005	5.1408	2.7799	29.7583
Krasnoarskii krai	9.744	1706.25	2.5923	4.1419	1.8308	2.2034	10.7685
Khakassia R	0.216	29.12	0.1339	0.1615	0.0486	0.0195	0.3635
Evenkiisk. AO	3.195	495.50	0.5633	0.8368	0.1948	0.7039	2.2988
Irkutskaia	14.806	2741.04	9.7651	11.7895	2.4462	3.1345	27.1352
Ust'Ordyn. Buriat. AO	0.259	52.92	0.2185	0.2262	0.0765	0.0879	0.6091
Chitinskaia	2.402	283.10	1.5643	1.8769	0.3447	0.2775	4.0634
Aginskii Buriatskii AO	0.061	7.42	0.0246	0.0683	0.0143	0.0039	0.1111

Buriatia R	3.036	367.31	2.0787	2.7913	0.4160	0.4004	5.6864
Tuva R	0.102	16.85	0.0472	0.1434	0.0150	0.0154	0.2210
East Siberia	33.822	5699.51	16.9880	22.0356	5.3869	6.8465	51.2571
Primorskii krai	0.004	0.25	0.0002	0.0017	0.0003	0.0003	0.0025
Khabarovskii krai	1.103	116.48	0.4289	0.3976	0.1145	0.1867	1.1278
Evreiskaia AOb	0.006	0.11	0.0004	0.0008	0.0002	0.0001	0.0014
Amurskaia	0.696	58.01	0.2623	0.2475	0.0628	0.0748	0.6475
Kamchatskaia	0.013	0.14	0.0003	0.0002	0.0000	0.0003	0.0008
Koriakskii AO	0.000	0.00	0.0000		0.0000		0.0000
Magadanskaia	0.000	0.00	0.0000		0.0000		0.0000
Chukotskii AO	0.000	0.00	0.0000		0.0000		0.0000
Sakhalinskaia	0.070	1.45	0.0073	0.0065	0.0011	0.0021	0.0171
Sakha (Jakutia) R	9.980	1038.91	4.4450	3.3947	0.6604	0.8688	9.3690
Far East	11.873	1215.35	5.1444	4.0490	0.8394	1.1332	11.1660
Asian part of Russia	74.205	9819.66	28.5695	41.4851	11.3671	10.7597	92.1814
Russia total	114.326	14635.85	86.43	73.67	20.84	19.11	200.05

Mortality of Pine stands by administrative units in Russia, expressed in million m³

Administrative unit/economic region	Forested area under state management (mill.ha)	Growing stock under state management (mill. m ³)	Young stands	Middle-aged stands	Immature stands	Mature and over-mature stands	Total
Kaliningradskaia	0.040	7.16	0.1581	0.0821	0.0132	0.0050	0.2584
Pribaltiiskii	0.040	7.16	0.1581	0.0821	0.0132	0.0050	0.2584
Archangel'skaia	5.398	542.24	1.4327	1.1108	0.3031	1.3221	4.1687
Vologodslaia	1.708	234.75	1.0989	1.1970	0.4166	0.3380	3.0505
Murmanskaia	2.155	89.31	0.5762	0.4151	0.0655	0.1674	1.2243
Karelia R	5.730	493.72	3.6358	1.9571	0.7236	0.6415	6.9581
Komi R	7.072	637.27	1.5029	1.3016	0.3941	1.4836	4.6822
North	22.065	1997.29	8.2466	5.9816	1.9030	3.9526	20.0837
Leningradskaia	1.288	208.45	1.3771	1.3841	0.9631	0.4250	4.1493
Novgorodskaia	0.503	75.56	1.0065	0.8388	0.3955	0.1842	2.4249
Pskovskaia	0.478	66.09	1.0880	0.8113	0.3525	0.0756	2.3274
North West	2.268	350.10	3.4716	3.0343	1.7111	0.6847	8.9017
Brianskaia	0.282	62.79	0.9844	0.7563	0.2053	0.0393	1.9854
Vladimirskaia	0.505	93.61	1.4138	1.0636	0.4546	0.0527	2.9847
Ivanovskaia	0.266	46.45	0.8571	0.4399	0.1950	0.0196	1.5116
Tverskaia	0.595	98.20	1.4297	1.2921	0.6609	0.3307	3.7133
Kaluzhskaia	0.093	20.92	0.4963	0.2000	0.0949	0.0189	0.8101
Kostromskaia	0.915	128.41	2.0829	1.1175	0.4229	0.3658	3.9891
Moskovskaia	0.336	76.68	0.5927	0.7875	0.3054	0.0582	1.7438
Orlovskaaia	0.019	3.59	0.0739	0.0478	0.0025	0.0000	0.1242
Riazanskaia	0.300	60.94	0.7321	0.6222	0.2527	0.0532	1.6602
Smolenskaia	0.108	16.82	0.3236	0.1825	0.0824	0.0137	0.6021
Tul'skaia	0.012	2.78	0.0490	0.0258	0.0054	0.0015	0.0817
Jaroslavskaia	0.115	23.61	0.4469	0.2746	0.1383	0.0447	0.9044
Central	3.545	634.80	9.4824	6.8098	2.8202	0.9981	20.1106
Nizhegorodskaia	1.205	158.29	3.9788	1.6102	0.5698	0.1924	6.3512
Kirovskaaia	1.376	202.05	2.5886	1.6852	0.5793	0.9805	5.8336
Mari-El R	0.428	53.03	0.8144	0.5673	0.1461	0.0788	1.6066
Mordovia R	0.167	21.05	0.8148	0.2539	0.0774	0.0099	1.1559
Chuvashia R	0.156	21.56	0.4394	0.2105	0.0435	0.0129	0.7062
Volgo-Viatskii	3.357	456.18	8.6360	4.3271	1.4161	1.2744	15.6536
Belgorodskaaia	0.023	3.10	0.1218	0.0243	0.0019	0.0001	0.1480
Voronezhskaaia	0.102	18.76	0.5275	0.2393	0.0223	0.0048	0.7939
Kurskaia	0.022	3.74	0.1189	0.0389	0.0013	0.0000	0.1591
Lipezkaia	0.053	10.87	0.1859	0.1582	0.0153	0.0025	0.3620
Tambovskaaia	0.136	29.01	0.4587	0.3049	0.0647	0.0175	0.8458
Cental.	0.335	65.48	1.4127	0.7657	0.1055	0.0249	2.3088
Chernozemn							
Astrachanskaia	0.000	0.00	0.0000		0.0000		0.0000
Volgogradskaaia	0.047	2.34	0.1810	0.0234	0.0002	0.0000	0.2045
Samarskaja	0.083	13.20	0.2756	0.0939	0.0222	0.0209	0.4125
Penzenskaaia	0.233	44.94	1.0791	0.3483	0.1178	0.0375	1.5827
Saratovskaaia	0.045	3.47	0.1363	0.0336	0.0091	0.0014	0.1804

Ulianovskaia	0.340	67.15	1.2840	0.6839	0.1481	0.0438	2.1598
Kalmykia R	0.000	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
Tatarstan R	0.163	31.85	1.0249	0.2806	0.0564	0.0132	1.3751
Povolzhskii	0.911	162.95	3.9808	1.4637	0.3539	0.1168	5.9151
Krasnodarskii Krai	0.041	2.75	0.0299	0.0057	0.0055	0.0094	0.0505
Adygeia R	0.003	0.49	0.0006	0.0004	0.0011	0.0022	0.0043
Stavroplsii krai	0.004	0.18	0.0199	0.0000	0.0000	0.0000	0.0199
Karach. Cherkesia R.	0/074	14.96	0.0402	0.1242	0.0633	0.0359	0.2636
Rostovskaia	0.070	4.83	0.3582	0.0190	0.0003	0.0000	0.3775
Dagestan R	0.064	9.74	0.0384	0.2267	0.0196	0.0021	0.2868
Kabard. Balkaria R	0.006	0.82	0.0009	0.0065	0.0025	0.0015	0.0115
Sev. Osetia R	0.007	0.80	0.0077	0.0202	0.0007	0.0000	0.0286
Chech.R + Ingush. R	0.008	0.85	0.0075	0.0191	0.0018	0.0001	0.0285
North Caucasus	0.278	35.42	0.4735	0.4161	0.0894	0.0418	1.0208
Kurganskaia	0.363	63.28	0.9980	0.4317	0.1602	0.0488	1.6387
Orenburgskaia	0.057	10.47	0.1973	0.0644	0.0092	0.0188	0.2897
Permskaia	1.276	133.29	1.3435	0.6017	0.2144	0.6645	2.8241
Sverdlovskaia	4.056	644.82	5.4767	5.3523	1.4518	1.5565	13.8373
Cheliabinskaia	0.579	100.00	1.1863	0.9352	0.2226	0.1249	2.4690
Bashkortostan R	0.714	118.50	1.3967	0.5920	0.3575	0.2087	2.5548
Udmurtia R	0.276	36.45	0.7176	0.2653	0.1224	0.0673	1.1726
Ural	7.322	1106.81	11.3160	8.2425	2.5380	2.6896	24.7861
European part of Russia	40.121	4816.19	47.1776	31.1228	10.9504	9.7879	99.0387
Altaiskii krai	1.070	194.94	0.4989	1.5716	0.4809	0.0910	2.6424
Altai R	0.021	4.00	0.0048	0.0299	0.0137	0.0052	0.0537
Kemrovskaaia	0.106	15.79	0.0486	0.0585	0.0572	0.0109	0.1752
Novosibirskaia	0.857	96.20	0.4818	1.1000	0.3004	0.0426	1.9248
Omskaia	0.706	64.72	0.3558	0.5580	0.1845	0.0363	1.1346
Tomskaaia	5.369	620.34	1.0442	2.1989	1.8109	0.7820	5.8361
Tiumenskaia	1.757	181.48	0.8033	0.7956	0.5424	0.2291	2.3704
Chanty-Mans. AO	14.460	1431.55	1.5994	8.5245	2.1960	1.6760	13.9960
Jamlo-Nenez AO	4.163	295.78	0.2135	1.8304	0.3379	0.3644	2.7463
West Siberia	28.510	2904.80	5.0504	16.6675	5.9240	3.2375	30.8794
Krasnoarskii krai	9.744	1706.25	1.6948	3.6892	2.5264	2.3797	10.2901
Khakassia R	0.216	29.12	0.0874	0.1432	0.0664	0.0211	0.3181
Evenkiisk. AO	3.195	495.50	0.4163	0.7771	0.2716	0.7602	2.2252
Irkutskaia	14.806	2741.04	6.4159	10.6483	3.3821	3.3852	23.8315
Ust'Ordyn. Buriat. AO	0.259	52.92	0.1441	0.2084	0.1076	0.0905	0.5507
Chitinskaia	2.402	283.10	1.0314	1.7760	0.4974	0.2859	3.5907
Aginskii Buriatskii AO	0.061	7.42	0.0162	0.0629	0.0204	0.0040	0.1036
Buriatia R	3.036	367.31	1.3710	2.7215	0.5913	0.4125	5.0962
Tuva R	0.102	16.85	0.0402	0.1527	0.0220	0.0159	0.2308
East Siberia	33.822	5699.51	11.2173	20.1793	7.4852	7.3550	46.2367
Primorskii krai	0.004	0.25	0.0001	0.0015	0.0003	0.0003	0.0023
Khabarovskii krai	1.103	116.48	0.3242	0.3867	0.1184	0.1979	1.0272
Evreiskaia AOb	0.006	0.11	0.0002	0.0007	0.0002	0.0001	0.0012
Amurskaia	0.696	58.01	0.1726	0.2346	0.0644	0.0793	0.5509

Kamchatskaia	0.013	0.14	0.0002	0.0002	0.0000	0.0003	0.0007
Koriakskii AO	0.000	0.00	0.0000		0.0000		0.0000
Magadanskaia	0.000	0.00	0.0000		0.0000		0.0000
Chukotskii AO	0.000	0.00	0.0000		0.0000		0.0000
Sakhalinskaia	0.070	1.45	0.0041	0.0056	0.0011	0.0022	0.0131
Sakha (Jakutia) R	9.980	1038.91	4.2070	4.8697	0.6793	0.8287	10.5848
Far East	11.873	1215.35	4.7085	5.4989	0.8637	1.1090	12.1801
Asian part of Russia	74.205	9819.66	20.9761	42.3457	14.2729	11.7015	89.2963
Total Russia	114.326	14635.85	68.15	73.47	25.22	21.49	188.33

Gross growth of Pine stands by administrative units in Russia, expressed in million m³

Administrative unit/economic region	Forested areas under state management (mill.ha)	Growing stock under state management (mill. m ³)	Young stands	Middle-aged stands	Immature stands	Mature and over-mature stands	Total
Kaliningradskaia	0.040	7.16	0.3576	0.1568	0.0251	0.0094	0.5489
Pribaltiiskii	0.040	7.16	0.3576	0.1568	0.0251	0.0094	0.5489
Archangel'skaia	5.398	542.24	3.3508	2.2183	0.5668	2.4239	8.5598
Vologodslaia	1.708	234.75	2.5523	2.4354	0.7837	0.6196	6.3911
Murmanskaia	2.155	89.31	1.3723	0.8234	0.1237	0.3070	2.6264
Karelia R	5.730	493.72	8.4456	3.9718	1.3595	1.1760	14.9529
Komi R	7.072	637.27	3.5305	2.5907	0.7378	2.7199	9.5789
North	22.065	1997.29	19.2516	12.0397	3.5716	7.2464	42.1092
Leningradskaia	1.288	208.45	2.9566	2.6245	1.7554	0.7890	8.1254
Novgorodskaia	0.503	75.56	2.1638	1.5675	0.7127	0.3412	4.7853
Pskovskaia	0.478	66.09	2.3364	1.5275	0.6387	0.1401	4.6426
North West	2.268	350.10	7.4568	5.7195	3.1067	1.2703	17.5533
Brianskaia	0.282	62.79	2.3487	1.5983	0.3919	0.0743	4.4132
Vladimirskaia	0.505	93.61	3.3686	2.2469	0.8669	0.0995	6.5820
Ivanovskaia	0.266	46.45	2.0396	0.9290	0.3715	0.0369	3.3770
Tverskaia	0.595	98.20	3.3731	2.6892	1.2384	0.6122	7.9130
Kaluzhskaia	0.093	20.92	1.1840	0.4227	0.1811	0.0357	1.8236
Kostromskaia	0.915	128.41	4.9167	2.3342	0.7953	0.6793	8.7255
Moskovskaia	0.336	76.68	1.4105	1.6630	0.5819	0.1097	3.7651
Orlovskaaia	0.019	3.59	0.1767	0.1010	0.0048	0.0000	0.2825
Riazanskaia	0.300	60.94	1.7401	1.3133	0.4811	0.1001	3.6346
Smolenskaia	0.108	16.82	0.7638	0.3811	0.1549	0.0255	1.3252
Tul'skaia	0.012	2.78	0.1168	0.0546	0.0103	0.0029	0.1845
Jaroslavskaia	0.115	23.61	1.0571	0.5770	0.2617	0.0835	1.9792
Central	3.545	634.80	22.4957	14.3103	5.3397	1.8596	44.0053
Nizhegorodskaia	1.205	158.29	8.6234	3.3123	1.0723	0.3599	13.3679
Kirovskaaia	1.376	202.05	5.5674	3.4192	1.0751	1.8130	11.8748
Mari-El R	0.428	53.03	1.7673	1.1203	0.2753	0.1476	3.3106
Mordovia R	0.167	21.05	1.7852	0.5038	0.1467	0.0186	2.4544
Chuvashia R	0.156	21.56	0.9610	0.4174	0.0824	0.0243	1.4851
Volgo-Viatskii	3.357	456.18	18.7044	8.7731	2.6519	2.3635	32.4929
Belgorodskaia	0.023	3.10	0.2897	0.0481	0.0037	0.0001	0.3417
Voronezhskaia	0.102	18.76	1.2522	0.4736	0.0431	0.0090	1.7780
Kurskaia	0.022	3.74	0.2845	0.0773	0.0025	0.0000	0.3643
Lipezkaia	0.053	10.87	0.4442	0.3314	0.0297	0.0048	0.8101
Tambovskaaia	0.136	29.01	1.0958	0.6386	0.1254	0.0330	1.8929
Cental. Chernozemn	0.335	65.48	3.3666	1.5690	0.2044	0.0470	5.1869
Astrachanskaia	0.000	0.00	0.0000		0.0000		0.0000
Volgogradskaaia	0.047	2.34	0.3584	0.0473	0.0004	0.0000	0.4061
Samarskaja	0.083	13.20	0.5554	0.1923	0.0416	0.0395	0.8287
Penzenskaaia	0.233	44.94	2.1949	0.7155	0.2219	0.0712	3.2035

Saratovskaia	0.045	3.47	0.2699	0.0680	0.0169	0.0025	0.3573
Ulianovskaia	0.340	67.15	2.6115	1.4047	0.2790	0.0833	4.3785
Kalmykia R	0.000	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
Tatarstan R	0.163	31.85	2.0796	0.5761	0.1061	0.0251	2.7869
Povolzhskii	0.911	162.95	8.0696	3.0040	0.6658	0.2216	11.9609
Krasnodarskii Krai	0.041	2.75	0.0560	0.0109	0.0099	0.0177	0.0946
Adygeia R	0.003	0.49	0.0012	0.0007	0.0020	0.0041	0.0080
Stavropolskii kraï	0.004	0.18	0.0377	0.0000	0.0000	0.0000	0.0377
Karach. Cherkesia R.	0/074	14.96	0.0748	0.2328	0.1133	0.0675	0.4884
Rostovskaia	0.070	4.83	0.6724	0.0366	0.0005	0.0000	0.7095
Dagestan R	0.064	9.74	0.0715	0.4201	0.0348	0.0039	0.5303
Kabard. Balkaria R	0.006	0.82	0.0017	0.0120	0.0045	0.0029	0.0211
Sev. Osetia R	0.007	0.80	0.0143	0.0384	0.0013	0.0001	0.0542
Chech.R + Ingush. R	0.008	0.85	0.0140	0.0364	0.0032	0.0001	0.0538
North Caucasus	0.278	35.42	0.8876	0.7771	0.1597	0.0786	1.9029
Kurganskaia	0.363	63.28	2.1688	0.8971	0.2992	0.0929	3.4580
Orenburgskaia	0.057	10.47	0.4282	0.1337	0.0171	0.0357	0.6147
Permskaia	1.276	133.29	2.8849	1.2036	0.3868	1.2271	5.7024
Sverdlovskaia	4.056	644.82	11.8279	11.0355	2.6900	2.9304	28.4837
Cheliabinskaia	0.579	100.00	2.5550	1.9169	0.4101	0.2338	5.1158
Bashkortostan R	0.714	118.50	3.0271	1.2267	0.6657	0.3953	5.3147
Udmurtia R	0.276	36.45	1.5514	0.5480	0.2272	0.1269	2.4536
Ural	7.322	1106.81	24.4433	16.9614	4.6961	5.0421	51.1429
European part of Russia	40.121	4816.19	105.0330	63.3109	20.4210	18.1384	206.9032
Altaiskii kraï	1.070	194.94	1.3355	3.3652	0.8857	0.1668	5.7531
Altai R	0.021	4.00	0.0128	0.0624	0.0247	0.0095	0.1094
Kemrovskaia	0.106	15.79	0.1126	0.1207	0.1049	0.0200	0.3582
Novosibirskaia	0.857	96.20	1.1078	2.1896	0.5507	0.0778	3.9260
Omskaia	0.706	64.72	0.8138	1.1029	0.3382	0.0664	2.3212
Tomskaia	5.369	620.34	2.3690	4.2763	3.1989	1.4283	11.2726
Tiumenskaia	1.757	181.48	1.8262	1.5532	0.9600	0.4185	4.7579
Chanty-Mans. AO	14.460	1431.55	3.4512	15.9686	4.3351	3.1462	26.9010
Jamlo-Nenez AO	4.163	295.78	0.4586	3.4290	0.6666	0.6841	5.2383
West Siberia	28.510	2904.80	11.4874	32.0680	11.0648	6.0175	60.6378
Krasnoarskii kraï	9.744	1706.25	4.2871	7.8311	4.3572	4.5830	21.0585
Khakassia R	0.216	29.12	0.2213	0.3046	0.1150	0.0407	0.6816
Evenkiisk. AO	3.195	495.50	0.9796	1.6139	0.4664	1.4642	4.5240
Irkutskaia	14.806	2741.04	16.1810	22.4378	5.8283	6.5197	50.9667
Ust'Ordyn. Buriat. AO	0.259	52.92	0.3626	0.4346	0.1841	0.1784	1.1597
Chitinskaia	2.402	283.10	2.5957	3.6528	0.8421	0.5634	7.6540
Aginskii Buriatskii AO	0.061	7.42	0.0408	0.1312	0.0347	0.0079	0.2147
Buriatia R	3.036	367.31	3.4497	5.5127	1.0072	0.8129	10.7826
Tuva R	0.102	16.85	0.0874	0.2961	0.0370	0.0313	0.4518
East Siberia	33.822	5699.51	28.2053	42.2149	12.8720	14.2016	97.4938
Primorskii kraï	0.004	0.25	0.0004	0.0032	0.0007	0.0006	0.0048
Khabarovskii kraï	1.103	116.48	0.7531	0.7843	0.2328	0.3847	2.1550
Evreiskaia AOb	0.006	0.11	0.0006	0.0014	0.0004	0.0002	0.0026
Amurskaia	0.696	58.01	0.4349	0.4821	0.1273	0.1542	1.1984

Kamchatskaia	0.013	0.14	0.0004	0.0003	0.0001	0.0006	0.0014
Koriakskii AO	0.000	0.00	0.0000		0.0000		0.0000
Magadanskaia	0.000	0.00	0.0000		0.0000		0.0000
Chukotskii AO	0.000	0.00	0.0000		0.0000		0.0000
Sakhalinskaia	0.070	1.45	0.0115	0.0121	0.0023	0.0044	0.0302
Sakha (Jakutia) R	9.980	1038.91	8.6521	8.2644	1.3397	1.6976	19.9538
Far East	11.873	1215.35	9.8529	9.5479	1.7031	2.2422	23.3461
Asian part of Russia	74.205	9819.66	49.5456	83.8308	25.6400	22.4613	181.4777
Russia total	114.326	14635.85	154.58	147.14	46.06	40.60	388.38