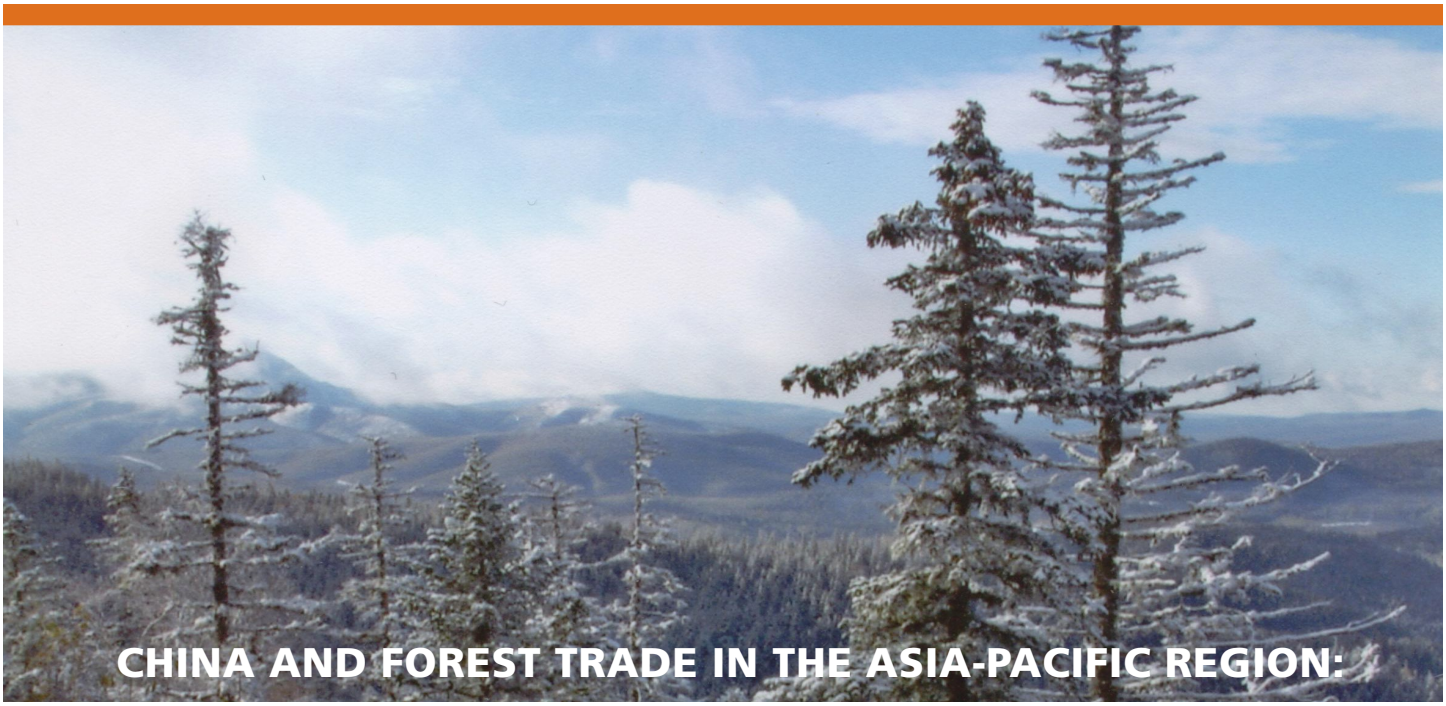

CHINA AND FOREST TRADE IN THE ASIA-PACIFIC REGION:

IMPLICATIONS FOR FORESTS AND LIVELIHOODS

中国与亚太地区国家林产品贸易研究

OVERVIEW OF THE FOREST SECTOR IN THE RUSSIAN FAR EAST:

PRODUCTION, INDUSTRY, AND THE PROBLEM OF ILLEGAL LOGGING

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FOREST TRENDS

CIFOR
CENTER FOR INTERNATIONAL FORESTRY RESEARCH

DFID Department for International Development

COLLABORATING INSTITUTIONS

Forest Trends (http://www.forest-trends.org): Forest Trends is a non-profit organization that advances sustainable forestry and forestry's contribution to community livelihoods worldwide. It aims to expand the focus of forestry beyond timber and promotes markets for ecosystem services provided by forests such as watershed protection, biodiversity and carbon storage. Forest Trends analyzes strategic market and policy issues, catalyzes connections between forward-looking producers, communities, and investors and develops new financial tools to help markets work for conservation and people. It was created in 1999 by an international group of leaders from forest industry, environmental NGOs and investment institutions.

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Overview of the Forest Sector in the Russian Far East: Production, Industry, and the Problem of Illegal Logging

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INTRODUCTION

Russia and China have been bound by long-standing ties since the middle of the 17th century, with mutual trade as an important aspect. It is natural that regions such as the Russian Far East (RFE) and Southeastern Siberia developed firm links with China, because they are the closest neighbors. These relations, particularly in the timber trade, became even stronger (with some fluctuations) following World War II.

The timber trade between China and these regions turned out to be crucial when China became one of the world's largest importers of wood. This is because the RFE and Eastern Siberia have vast areas of forested land. A substantial amount of timber and other forest products has been flowing from Russian to Chinese territory. Only areas that are economically viable for export/import operations are involved in the supply of these products; this constitutes a relatively small portion of Russia. **Figure 1.1** shows this area. The red line marks the Russian/Chinese border; the green line marks the approximate northern limit of the main supply area that transports timber to China by land and sea. Some other provinces of Siberia also export timber products to China but for their forest sectors, these exports are not significant.

Figure 1.1: Area of Russian Forests Supplying Timber Exports to China

Source: Geographicheskiy atlas Rossiyskoy Federatsii (Geographical Atlas of the Russian Federation). Moscow, Rosgeodesiya 1999.

Provinces that are main actors of timber export to China are part of two Federal Okrugs:[1] the RFE and Siberia. The RFE is made up of 10 provinces, Siberia has 13. Chinese imports capture almost all of the timber production potential of the RFE and a significant portion of the Siberian timber production po-

[1] The Russian President Vladimir Putin has divided Russia into 7 Federal Okrugs that are headed by the President's Plenipotentiaries, which are virtually Governor-Generals.

tential. As a result, this study focuses on the RFE forest sector with the addition of selected southeastern provinces of Siberia.

The RFE consists of the following provinces (also known as Subjects of Federation): Sakha Republic (Yakutiya), Yevreiskaya Autonomous Oblast, Chukotskiy and Koryakskiy Autonomous Okrugs, Primorskiy and Khabarovskiy Krais, Amurskaya, Kamchatskaya, Magadanskaya and Sakhalinskaya Oblasts. In Eastern Siberia (and Western Siberia to a lesser extent), many provinces hope to sell timber to China and are currently establishing trade relations. However, a number of Siberian provinces are also included in this study because their forest sectors are highly connected to China. These provinces include Republic Buryatiya, Aginskiy-Buryatskiy and Ust-Ordynskiy Buryatskiy Autonomous Okrugs, Irkutskaya and Chitinskaya Oblasts.[2]

The paper is based on official statistical data. There are many different statements about unreliability of the Russian statistics. A partial unreliability of the data is therefore a reality. During the Soviet planned economy, the statistical information had been distorted 1) To make socialism look as attractive as possible and even impossible; and 2) To make production figures correspond with planned ones (one of the "socialism's laws").

Current distortions exist because 1) a large percentage of private firms, especially small and middle-sized ones, does not submit their reports to the state statistical bureaus; 2) firms that submit their reports try to disfigure their production and financial data to decrease or to avoid tax payments in the current situation of weak authorities control. At the same time, the only comprehensive data available in Russia are the official ones. Even people who criticize these data construct their estimations by amending the official data. The author of the paper also uses such a method. The description of the 'big picture' is based on official statistics; and the chapter focusing on illegality is based on the author's estimations.

FOREST RESOURCE BASE

FOREST OWNERSHIP AND CLASSIFICATION

The RFE has abundant forest resources that include 280.4 million hectares of dense forests and 20.6 billion cubic meters of wood stock. In the beginning of the socialist era all Russian forests were nationalized. Forest resources were divided into three categories according to the Forest Code of the Russian Federation (RF) of 1997:

- *'Lesnoy Fond'* is forests under the control of the RF Ministry of Natural Resources;[3]
- Forests not included into *Lesnoy Fond* consist of two categories: city forests and forests under the control of the RF Ministry of Defense (*'Lesa na zemlyakh oborony'*). The Ministry of Defense's forest re-

[2] Confusion can arise with the implementation of the term "okrug" in Russia. There are seven "Federal Okrugs" that include several provinces each. There are also "Autonomous Okrugs" which are provinces. Statistical data for some of them are included into oblasts' data to which okrugs belonged previously. This is the case especially for past years. Such a situation is indicated in some tables by special notes.

[3] The term '*Lesnoy Fond*' is unclear even in the Russian language. Literally it can be translated as "forest fund". Its definition changed during past decades many times. It is very difficult to translate the term into English adequately. The term bears a similarity to the federally owned forests in the USA or the National Forests in Japan. So, we use it here optionally and only because of the very wide use in the Russian forest sector.

sources are uncontested as federal property, but the ownership of city forests varies between federal, provincial and municipal levels. The division of city forests among these three levels is now in progress based on the federal "Law on the Delimitation of State Land Property" (2001);

- Tree-Bush Vegetation (*'Drevesno-kustarnikovaya rastitel'nost'*) that is located on agricultural lands, next to roads, on settled land (excluding city lands), along water channels, and lands of other uses. The ownership of these lands varies greatly, as do their shapes: they occur in the form of groves, belts, strips etc.

Confusion in the tenure system arose during the past two decades with the beginning of a movement promoting property rights of indigenous peoples. New tenure types arose, such as the Territory of Traditional Nature Resource Use (*'Territoriya Traditsionogo Prirodopol'zovaniya'*) – TTU. Its status was initially uncertain and remains somewhat unclear even after adoption of the federal "Law on Territories of Traditional Nature Resource Use of Aboriginal Small Nations of the North, Siberia and the Far East of the Russian Federation" of 2001. The law states that these lands are state property and officially recognizes Aboriginal Peoples rights of gratis (free of charge) use. The law does not establish any disposal (e.g. sale, transfer, etc.) rights of Aboriginal Peoples or their communities. They received only the very uncertain right of "concordance" (agreement) for any projects allocated to TTU. Form and mechanism of such concordance is not fixed by law which is why it is very difficult to defend these aboriginal rights in court.

Thus, all RFE and Siberian forests are in the central authorities' ownership and no forests belong to local levels of government or communities. Currently, there are two levels of state bodies: federal (the Russian Federation - RF) and provincial (subjects of the RF). According to the Constitution of the Russian Federation, the RF and its provinces are mutually responsible for the use and management of natural resources. The implementation order of this mutual responsibility is described in the next chapter.

The issue of forest ownership is currently being debated in the government and society in the content of the proposed new Forest Code.

'Lesnoy Fond'

Lesnoy Fond is by far the largest form of tenure in the RFE and Southeastern Siberia. It covers 98.6 percent of all the RFE forests, varying from 90.2 percent in Primorskiy Krai to 100 percent in Magadanskaya Oblast. Most forests of Southeastern Siberia are included in *Lesnoy Fond* as well. For example in Irkutskaya Oblast the share of the *Lesnoy Fond* is 94.6 percent. Other forests are primarily on agricultural lands and secondarily on land managed by the RF Ministry of Defense and the RF Ministry of Interior Affairs.

In the RFE, the *Lesnoy Fond* is partly composed of 275.1 million hectares of dense forest and 20.0 billion cubic meters of wood stock. Its total area of 496.1 million hectares is categorized into forest land and non-forest land, both of which are further subdivided (**Table 1.1**).[4]

[4] The State Forest Accountings (*Uchet Lesnogo Fonda)* are carried out every five years. The data from the most recent state accounting of January 1, 2003 are used in this paper.

Table 1.1: Area and Wood Stock of *Lesnoy Fond* Land in the RFE, January 1, 2003

Territory	Area									Growing wood stock
	Dense forests	Plantations in progress	Nurseries	Sparse forests	Other deforested areas	Deforested areas, subtotal	*Forestlands, total*	*Non-forest lands, total*	*Forest Tenure, total*	
Thousand hectares										***Million m3***
Sakha Republic	143062	-	-	37002.3	12445.5	49447.8	192509.6	62243.7	254753	**8825.6**
Yevreiskaya	1563.1	6.1	0.2	5.8	47.8	59.9	1623	514.2	2137.2	**170.1**
Chukotskiy	4912.6	-	-	2876.7	1857.1	4733.8	9646.4	17823.8	27470.2	**82**
Primorskiy Krai	11373.3	8.1	0.2	32.2	98.1	138.6	11511.9	338.6	11850.5	**1753.1**
Khabarovskiy	50924.2	80.6	0.5	2047.7	4789.4	6918.2	57842.4	15862.7	73705.1	**5034.6**
Amurskaya	22654.8	21.5	0.3	1405	1400.1	2826.9	25481.7	5062.7	30544.4	**2000.4**
Kamchatskaya	9004.5	13.2	-	461.1	57.3	531.6	9536.1	5539.3	15075.4	**623.1**
Koryakskiy	9837.6	0.3	-	860.6	534.1	1395	11232.6	17682.4	28915	**553.4**
Magadanskaya	16259.9	5.8	-	8410.6	2728.5	11144.9	27404.8	17301.3	44706.1	**387.3**
Sakhalinskaya	5519.5	53.6	0.2	63.7	578.2	695.7	6215.2	732	6947.2	**618.3**
RFE Total	275111	189.2	1.4	53165.7	24536.1	77892.4	353003.7	143101	496104	**20047.9**
Percent										
Sakha Republic	56.2	-	-	14.5	4.9	19.4	75.6	24.4	100	-
Yevreiskaya	73.1	0.3	0.0094	0.3	2.2	2.8	75.9	24.1	100	-
Chukotskiy	17.9	-	-	10.5	6.8	17.2	35.1	64.9	100	-
Primorskiy Krai	96	0.1	0.0017	0.3	0.8	1.2	97.1	2.9	100	-
Khabarovskiy	69.1	0.1	0.0007	2.8	6.5	9.4	78.5	21.5	100	-
Amurskaya	74.2	0.1	0.001	4.6	4.6	9.3	83.4	16.6	100	-
Kamchatskaya	59.7	0.1	-	3.1	0.4	3.5	63.3	36.7	100	-
Koryakskiy	34	0.001	-	3	1.8	4.8	38.8	61.2	100	-
Magadanskaya	36.4	0.013	-	18.8	6.1	24.9	61.3	38.7	100	-
Sakhalinskaya	79.4	0.8	0.0029	0.9	8.3	10	89.5	10.5	100	-
RFE Total	55.5	0.04	0.0003	10.7	4.9	15.7	71.2	28.8	100	-

Source: Database of the Economic Research Institute (ERI), Khabarovsk, 2003 and author's calculations.

Lesnoy Fond is the primary land-use category in the RFE: its share is 79.8 percent of the region's territory. Its structure is relatively complex, varies by provinces, and includes forest and non-forest lands. Forest lands designated for forest production consist of sites with dense forests as well as deforested sites (lands burnt by forest fires, logging sites, sparse forests, forest nurseries, and plantations in progress that are not dense forests yet). Non-forest lands are mostly composed of swamps and mountain deserts, but also include farms, roads, hay lands, and pastures. The percentage of deforested lands (15.7 percent of the total *Lesnoy Fond* area) and non-forest lands (28.8 percent) is rather high.

The proportion of forest area differs greatly between provinces. Due to the size differences between provinces, **Table 1.2** displays the proportion of *Lesnoy Fond* timber production in percent allocated to each province in the RFE, and the percent coverage of forests per province.

Table 1.2: Allocation of Area and Wood Stock of the RFE *Lesnoy Fond* by Provinces

Territory	Allocation of Forest Tenure Area (%)	Growing Wood Stock Allocation (%)	Percent of Province forested (%)
Sakha Republic (Yakutiya)	51.4	44	46.5
Yevreiskaya Auton. Oblast	0.4	0.8	45.6
Chukotskiy Auton. Okrug	5.5	0.4	6.8
Primorskiy Krai	2.4	8.7	75.8
Khabarovskiy Krai	14.9	25.1	66.1
Amurskaya Oblast	6.2	10	64.1
Kamchatskaya Oblast	3	3.1	56.7
Koryakskiy Auton. Okrug	5.8	2.8	32.6
Magadanskaya Oblast	9	1.9	35.2
Sakhalinskaya Oblast	1.4	3.1	65.2
RFE Total	**100**	**100**	**45.1**

Source: Author's calculations 2003.

Dense forests as well as scrub forests and bushes make up slightly more than half (55.5 percent) of the total *Lesnoy Fond* area. They have been developed but still remain as forests of natural type because plantations that grow up to become dense forests make up only 0.2 percent of forest lands and do not play any significant role in the forest cover of the RFE.

Coniferous species dominate on the majority of forest land. Larch (*Larix dahurica*) is by far the most broadly distributed species. Birches (white, stone, yellow etc. – *Betula spp.*) come in a distant second, with spruce (*Picea spp.*) and fir (*Abies spp.*) forests in third place. The distribution of forest land in the RFE by area and growing stock according to dominant tree species is described in Appendix Tables 1-5.

In the southern part of the RFE there are a mixture of zones with different dominant species, such as Korean pine (called cedar in Russia – *Pinus koraiensis*), Mongolian oak (*Quercus mongolica*), linden (*Tilia spp.*), Manchurian ash (*Fraxinus mandshurica*), elm (*Ulmus spp.*), and maple (*Acer spp.*). They are mixed forests: most of them are second growth, followed by virgin mixed Korean pine-broadleaved forests. They are rich with cedar and hardwood timber which are of the highest value in the Chinese market. These forests are growing close to the Russia-China border and have the highest average wood stock in the RFE (Appendix Table 5), hence they are the primary species harvested for export to China.

Scrub forests grow in higher mountain zones and on flat lands in the northern RFE. They are very simple and are composed of scrub pine (*Pinus pumila*) and scrub alder (*Alnus kamtschatica*). Mature and overmature stands (merchantable stands) cover 41.7 percent of the total forest area (**Table 1.3**) and contain 58.3 percent of total growing wood stock (**Table 1.4**).

Table 1.3: Distribution of Forest Land Area by Age Class of the RFE *Lesnoy Fond*, January 1, 2003

Territory	Young	Middle age	Premature	Mature & overmature	Total
Thousand hectares					
Sakha Republic (Yakutiya)	31231	43568.1	9839.1	58423.6	143062
Yevreiskaya Auton. Oblast	318.4	485.3	206.7	552.7	1563.1
Chukotskiy Auton. Okrug	711.1	1232.7	852.7	2116.1	4912.6
Primorskiy Krai	703.8	4072.5	1846.5	4750.5	11373.3
Khabarovskiy Krai	9141.5	15619.9	5125.8	21037	50924.2
Amurskaya Oblast	5272.6	6931.6	2621.2	7829.4	22654.8
Kamchatskaya Oblast	283.3	3476.4	554	4690.8	9004.5
Koryakskiy Auton. Okrug	45.5	1571.4	2073.9	6146.8	9837.6
Magadanskaya Oblast	2295.3	4109.7	2699.9	7155	16259.9
Sakhalinskaya Oblast	1333.6	1650.1	537.6	1998.2	5519.5
RFE Total	51336	82717.7	26357.4	114700.1	275111
Percent					
Sakha Republic (Yakutiya)	21.8	30.5	6.9	40.8	100
Yevreiskaya Auton. Oblast	20.4	31	13.2	35.4	100
Chukotskiy Auton. Okrug	14.5	25.1	17.4	43.1	100
Primorskiy Krai	6.2	35.8	16.2	41.8	100
Khabarovskiy Krai	18	30.7	10.1	41.3	100
Amurskaya Oblast	23.3	30.6	11.6	34.6	100
Kamchatskaya Oblast	3.1	38.6	6.2	52.1	100
Koryakskiy Auton. Okrug	0.5	16	21.1	62.5	100
Magadanskaya Oblast	14.1	25.3	16.6	44	100
Sakhalinskaya Oblast	24.2	29.9	9.7	36.2	100
RFE Total	18.7	30.1	9.6	41.7	100

Source: Database of the ERI 2003 and author's calculations.

Table 1.4: Provincial Distribution of Growing Stock by Age Class in the RFE *Lesnoy Fond*, January 1, 2003

Territory	Young	Middle age	Premature	Mature & Overmature	Total
Million cubic meters					
Sakha Republic (Yakutiya)	489.05	2216.15	837.7	5282.71	8825.61
Yevreiskaya Auton. Oblast	8.83	52.77	30	78.47	170.07
Chukotskiy Auton. Okrug	3.43	20.26	9.35	48.98	82.02
Primorskiy Krai	30.35	585.77	295.23	841.77	1753.12
Khabarovskiy Krai	240.62	1208.3	611.83	2973.85	5034.6
Amurskaya Oblast	125.72	543.47	319.08	1012.11	2000.38
Kamchatskaya Oblast	8.26	125.75	35.83	453.29	623.13
Koryakskiy Auton. Okrug	1.07	46.18	93.21	412.95	553.41
Magadanskaya Oblast	11.56	76.35	44.18	255.22	387.31
Sakhalinskaya Oblast	44.17	173.2	79.73	321.22	618.32
RFE Total	963.06	5048.2	2356.1	11680.6	20048
Percent					
Sakha Republic (Yakutiya)	5.5	25.1	9.5	59.9	100
Yevreiskaya Auton. Oblast	5.2	31	17.6	46.1	100
Chukotskiy Auton. Okrug	4.2	24.7	11.4	59.7	100
Primorskiy Krai	1.7	33.4	16.8	48	100
Khabarovskiy Krai	4.8	24	12.2	59.1	100
Amurskaya Oblast	6.3	27.2	16	50.6	100
Kamchatskaya Oblast	1.3	20.2	5.8	72.7	100
Koryakskiy Auton. Okrug	0.2	8.3	16.8	74.6	100
Magadanskaya Oblast	3	19.7	11.4	65.9	100
Sakhalinskaya Oblast	7.1	28	12.9	52	100
RFE Total	4.8	25.2	11.8	58.3	100

Source: Database of the ERI 2003 and author's calculations.

The official method of annual allowable cut (AAC) calculation has been in effect for many decades. Since World War II, it has not fundamentally changed. It is based on the data of the forest area distribution by age classes and average growing stock. The data is processed using four formulas, but the final results are the only information used for decision making. The final decision must take into account the development of the district and some economic features of the nearest logging enterprises. Such an AAC is now referred to as the "Total AAC". Now in the RFE, it is 92.6 million cubic meters.

Since 1990, the so-called "Accessible AAC" has also been computed. To calculate this AAC, some forest sites are excluded from the data of the resource base. These are sites with very small growing stock, with low density of forest layer, with very low annual productivity etc., i.e. sites that are commercially unprofitable. The size of accessible AAC now is 66.9 million cubic meters (**Table 1.5**), but even using this calculation method, only half of accessible AAC is deemed actually economically viable. High-tech equipment and road system development are needed to harvest the remaining part of the AAC.

AAC are calculated by the Forest Inventory enterprises every 5 years after the State Forest Accounting for each *leskhoz*. Besides that, a calculation is obvious after each new inventory of *leskhoz* forests. Therefore, there are some *leskhozes* in which use of AAC is close to 100 percent and there are some *leskhozes* in which use of AAC is about zero.

The AAC for a Subject of Federation (province) is the sum of *leskhozes* AACs. The same procedure is being implemented for regions and the Russian Federation as a whole.

Table 1.5: Annual Allowable Cut, Use and Intermediate Cutting in the RFE 2002

Territory	Annual allowable cut, mln cu m		Harvesting, mln cu m	AAC use, % (accessible)	Intermediate cutting, mln cu m
	Total	Accessible			
Sakha Republic (Yakutiya)	35.4	30.6	0.4	1.3	0.066
Yevreiskaya Auton. Oblast	1.3	0.6	0.08	13.3	0.016
Chukotskiy Auton. Okrug	0.04	0	0	0.0	0.004
Primorskiy Krai	8.3	6.0	2.4	40.0	0.689
Khabarovskiy Krai	26.5	16.6	7.1	42.8	0.454
Amurskaya Oblast	16.0	10.0	1.2	12.0	0.041
Kamchatskaya Oblast	1.4	0.9	0.1	11.1	0.006
Koryakskiy Auton. Okrug	0	0	0	0.0	0.000
Magadanskaya Oblast	0.1	0.04	0.001	2.5	0.016
Sakhalinskaya Oblast	3.6	2.2	0.9	40.9	0.131
RFE Total	92.6	66.9	12.2	18.2	1.4

Source: Department of State Control of the RF Ministry of Natural Resources in the Far Eastern Federal Okrug, 2003.

Together with fiber production, the RFE forests play an important environmental role and are stabilizing factors at both the regional and global level. These forests contribute significantly to water and soil protection, as well as fish conservation; 13.8 percent of the total RFE forest area are under protected status and codified title "forests of the first group"; 1.5 percent are under commercial-protected status – "forests of the second group"; the remaining 84.7 percent are commercial forests – "forests of the third group". There is a growing awareness of the social importance of forests and of the role they play in recreation and public health. The RF Forest Code determined that the forests of the first group fulfill these functions. However, as a rule, this role is provided by all forest groups.

Use of the Resource

According to the official statistics, even accessible AAC is far from being fully utilized; its average use was 20.5 percent in 2002, with the magnitude of use ranging from 3.9 percent in Republic Sakha (Yakutiya) to 41–43 percent in Khabarovskiy Krai, Primorskiy Krai and Sakhalinskaya Oblast (see **Table 1.5**).[5] The last three southern provinces, with the addition of Amurskaya Oblast, contribute approximately 95 percent of products produced in the RFE forest sector. The same areas supply timber to the Chinese market.

[5] For Chukotskiy and Koryakskiy Autonomous Okrugs AAC is not adopted by the Ministry of Natural Resources of the RF.

The most common harvesting method is high-grading which extracts the best timber (30-50 percent of growing wood stock) and leaves only low-grade timber on cutting sites. Such methods degrade the forests. Intermediate cuttings (thinning, sanitary cutting etc.) yield ten time less timber than commercial harvesting (see Table **1.5**). However, they produce a significant share of Russia's hardwood supply, especially prohibited or strictly limited species such as ash (*Fraxinus mandshurica*) and linden (*Tilia spp.*). Cedar (*Pinus koraiensis*), which has been banned from commercial harvesting since 1991, is now extracted under the guise of intermediate cutting. As a result, this kind of cutting ostensibly improves the stand, but is in fact the most damaging of commercial harvesting in the region.

The annual area under production is very small at less than 0.4 percent of forest lands (**Table 1.6**). The average annual area consumed by wild forest fires is twice as much. Fires are the main source of disturbance and negative forest transformation. Catastrophic fires are especially harmful, occurring at roughly ten-year intervals. They are usually four to five times larger than regular forest fires.

Table 1.6: Development, Dynamics and Disturbance of the RFE Forests

Territory	Average Annual Area Under Production, 1999-2001, official data, thou. ha			Average Annual Area of Fires, 1991–2000, official data, thou. Ha	Share of Developed Forest Area, % (assessment)	The dynamics, 1998–2003, by official data		Average Percent of Forest Disturbance (assessment)
	Harvesting	Interim cuttings	Planting			Forest covered area, thou. ha	Growing wood stock, thou. cu m	
Sakha Republic (Yakutiya)	3.8	2.8	0	97.3	12	-164.7	-18.3	37
Yevreiskaya Auton. Oblast	1.0	3.7	0.8	2.7	100	33.6	4.4	60
Chukotskiy Auton. Okrug	0	0	0	…	20	-151	-4.4	35
Primorskiy Krai	23.4	37.5	4.0	17.9	90	38	-17.5	43
Khabarovskiy Krai	69.8	39.7	12.5	235.0	80	-1579.3	-230.7	40
Amurskaya Oblast	11.4	13.3	3.0	63.7	100	194.7	8.4	46
Kamchatskaya Oblast	1.4	6.1	0.5	70.5	45	59.2	3.2	30
Koryakskiy Auton. Okrug	0	0	0	…	20	-396.2	-18.6	27
Magadanskaya Oblast	0	12.1	0.1	8.0	50	-810.2	-43	30
Sakhalinskaya Oblast	9.2	8.4	3.5	6.4	100	52.9	1.7	48
RFE Total	120.0	123.6	24.4	501.5	35	-2723.0	-314.8	37

Source: Database of the ERI 2003 and author's calculations.

Current inventory procedures do not provide accurate information on the state or dynamics of RFE forest resources, nor the impact of various externalities. Nevertheless, several trends are apparent. Despite the impact of forest fires and timber harvesting, the forest-covered area increased gradually from 1966 (the first reliable State Forest Accountings) until 1998. During 1978–1998, it rose from 257.3 to 277.8

million hectares, or by 8.0 percent. This trend was reversed in the past five years, with a decrease of the forest-covered area from 277.8 to 275.1 million hectares even though legal harvesting rates declined by 3.5 times (**Table 1.6**). In such a situation, only wild fires can be considered as a cause of the forested area decrease.

Based on the above-mentioned figures and several field studies, one can roughly estimate the developed forest area which, on average, is 35 percent for the RFE (**Table 1.6**). However, for the Southern provinces it is as high as 80–100 percent. The development entails forest disturbance, but degrees of development and transformation are not fully equal. The RFE average degree of forest transformation estimated using a special method (Karakin, Sheingauz, 1998) is about 37 percent. It is more than the proportion of developed area in the Northern provinces with fragile ecosystems, and less than the share of the developed area in the Southern provinces where forest ecosystems are more resilient to the effects of external impacts.

The forests of Southeastern Siberia are simpler in structure than the RFE forests (**Tables 1.7 and 1.8**). The majority of the provinces are heavily forested at 80.4 percent in Irkutskaya Oblast, 69.6 percent in Chitinskaya Oblast, 63.4 percent in Republic Buryatiya, 49.8 percent in Ust-Ordynskiy Buryatskiy Autonomous Okrug, and 32.0 percent in Aginskiy-Buryatskiy Autonomous Okrug.

Table 1.7: Area and Wood Stock of the *Lesnoy Fond* in Southeastern Siberia, January 1, 2003

Territory	Area									Growing Wood Stock, mln m^3
	Dense Forests	Plantations in Progress	Nurseries	Sparse Forests	Other Deforested Areas	Deforested Areas, subtotal	Forestlands, total	Non-forest Lands, total	Forest Tenure, total	
Thousand hectares										
Republic Buryatiya	19429	16	0.3	514	384.4	914.7	20343.7	5525.8	25869.5	1835.4
Aginskiy-Buryatskiy Auton.	401.3	1.6	0	0	20.1	21.7	423	42.9	465.9	46.2
Ust-Ordynskiy Buryatskiy Auton.	1026.2	4.7	0.1	0.6	17.2	22.6	1048.8	19	1067.8	149.7
Irkutskaya Oblast*	57798.7	106.6	0.7	1468.2	2280.5	3856	61654.7	5129.9	66784.6	8900
Chitinskaya Oblast	27028.9	31.6	0.5	642.5	479.7	1154.3	28183.2	3125	31308.2	2381.9
Total	105684.1	160.5	1.6	2625.3	3181.9	5969.3	111653.4	13842.6	125496	13313.2
Percent										
Republic Buryatiya	75.1	0.1	0	2	1.5	3.5	78.6	21.4	100	-
Aginskiy-Buryatskiy Auton.	86.1	0.3	0	0	4.3	4.7	90.8	9.2	100	-
Ust-Ordynskiy Buryatskiy Auton.	96.1	0.4	0	0.1	1.6	2.1	98.2	1.8	100	-
Irkutskaya Oblast*	86.5	0.2	0	2.2	3.4	5.8	92.3	7.7	100	-
Chitinskaya Oblast	86.3	0.1	0	2.1	1.5	3.7	90	10	100	-
Total	84.2	0.1	0	2.1	2.5	4.8	89	11	100	-

January 1, 1998 *Source: Database of the ERI 2003 and author's calculations.*

Table 1.8: Distribution of Forest Lands according to the Dominant Tree Species of Southeastern Siberia, January 1, 2003

Dominant tree species	Republic Buryatiya	Aginskiy-Buryatskiy Auton. Okrug	Ust-Ordynskiy Buryatskiy Auton. Okrug*	Irkutskaya Oblast*	Chitinskaya Oblast	Total
Thousand hectares						
Cedar	1469	1.2	13	6958.2	978.4	9419.8
Pine	2933.6	38.2	388.9	14989.6	2384.9	20735.2
Spruce & fir	421.9	0	25.3	4778.2	17.2	5242.6
Larch	9802.5	184.4	201.7	17372.5	15422.2	42983.3
Conifer, subtotal	14627	223.8	628.9	44098.5	18802.7	78380.9
Birches	1105.8	148.2	329.8	7386.6	4426.7	13397.1
Other deciduous	465.7	23.6	52.5	2641.8	471.8	3655.4
Deciduous, subtotal	1571.5	171.8	382.3	10028.4	4898.5	17052.5
Creeping forests and bushes	3230.5	5.7	15	3671.8	3327.7	10250.7
Total	**19429**	**401.3**	**1026.2**	**57798.7**	**27028.9**	**105684**
Percent						
Cedar	7.6	0.3	1.3	12	3.6	8.9
Pine	15.1	9.5	37.9	25.9	8.8	19.6
Spruce & fir	2.2	0	2.5	8.3	0.1	5
Larch	50.5	46	19.7	30.1	57.1	40.7
Conifer, subtotal	75.3	55.8	61.3	76.3	69.6	74.2
Birches	5.7	36.9	32.1	12.8	16.4	12.7
Other deciduous	2.4	5.9	5.1	4.6	1.7	3.5
Deciduous, subtotal	8.1	42.8	37.3	17.4	18.1	16.1
Creeping forests and bushes	16.6	1.4	1.5	6.4	12.3	9.7
Total	**100**	**100**	**100**	**100**	**100**	**100**

* January 1, 1998. *Source: Database of the ERI 2003 and author's calculations.*

A significant portion of Republic Buryatiya's and Irkutskaya Oblast's territories are situated in the Baikal Lake basin. There are many restrictions on the use of this area's forests, particularly for harvesting. This is demonstrated by the large percent of the area that is protected: protected forests (the first group) in Republic Buryatiya compose 32.1 percent of the *Lesnoy Fond* area, and commercially-protected (the second group) compose 17.6 percent (**Table 1.9**). The figures for Irkutskaya Oblast are 22.3 and 5.8 percent respectively.

Table 1.9: Allocation of the *Lesnoy Fond* Area by Category of Forest Protection in Southeastern Siberia, 2003

Territory	Forest Group			Total
	1st, Protected	2nd, Commercial-Protected	3rd, Commercial	
Thousand hectares				
Republic Buryatiya	8294.6	4547.5	13027.4	25869.5
Aginskiy-Buryatskiy	42.4	0.4	423.1	465.9
Ust-Ordynskiy Buryatskiy Auton. Okrug*	118.9	484	464.9	1067.8
Irkutskaya Oblast*	15192	2542.1	49050.5	66784.6
Chitinskaya Oblast	3213.6	3841	24253.6	31308.2
Total	26861.5	11415	87219.5	125496
Percent				
Republic Buryatiya	32.1	17.6	50.4	100
Aginskiy-Buryatskiy	9.1	0.1	90.8	100
Ust-Ordynskiy Buryatskiy Auton. Okrug*	11.1	45.3	43.5	100
Irkutskaya Oblast*	22.7	3.8	73.4	100
Chitinskaya Oblast	10.3	12.3	77.5	100
Total	21.4	9.1	69.5	100

* January 1, 1998 *Source: Database of the ERI 2003 and author's calculations.*

Despite the significant amount of protected area, the AAC of Irkutskaya Oblast including Ust-Ordynskiy Buryatskiy Autonomous Okrug is 54.4 million cubic meters, 13.6 million cubic meters in Chitinskaya Oblast, 6.2 in Republic Buryatiya and 0.6 in Aginskiy-Buryatskiy Autonomous Okrug. In the year 2001 the AACs were 32.7, 3.1, 9.2, and 1.7 percent respectively.

FOREST POLICY ENVIRONMENT

HISTORY

During the Soviet era, forest practices were regulated by the "Fundamentals of the Forest Legislation of the USSR", by the Forest Code of the Russian Soviet Federative Socialist Republic, and by multiple departmental acts. Both the law and the code put forth very positive statements about forest management and practices, but implementation was limited by a lack of mechanisms to accomplish the objectives, as

well as an insufficient legal basis. Practices were regulated based on the Forest Service's departmental regulations. Provincial legislation did not exist in the former USSR.

In the course of economic reform, Russia's forest sector appeared to be on the periphery of central power interests (Sheingauz et al. 1996). Central parts of the sector's state management were almost eliminated. Forest sector problems were either completely ignored or barely considered at the federal level until the last year or two. However, the new economic system demanded the creation of a new and more rational legislation.

In 1993, the "Fundamentals of the Forest Legislation of the Russian Federation" were adopted hastily. The text was largely a mixture of the old USSR law combined with completely new rules developed during the transition to a market economy, resulting in a highly contradictory and completely ineffective document. In 1997, the "Fundamentals" were replaced with the "Forest Code of the Russian Federation". This Code was more oriented towards the market conditions of the time.

The Forest Code of the Russian Federation

The Code for the first time defined a forest not only as an aggregate of vegetation but as an integrity of vegetation with land. The Code was very important because it included forest resources in the total natural resource potential of the country, provided the possibility of multiple uses of forests, and established a basis for multifunctional sustainable management. Approaches to ownership are very important in the transition to a market system. The Code did not reject the possibility of property plurality but, as mentioned in Chapter 1, retained an overwhelming area of forest land in federal state property. The Code does not allocate property rights to provinces but it gives them many rights of management although with unclear formulations. The Code annulled almost all rights previously held by municipalities.

The Code defines seven types of forest use: (1) timber harvesting; (2) coniferous resin extraction; (3) extraction of secondary forest resources (stumps, cork, Christmas-trees, etc.); (4) extraction of by-products (hay, honey-making, berry-picking, etc.); (5) use of hunting lots; (6) use for scientific purposes; and (7) use for cultural, sanitary, tourist and sport purposes. It is evident that this list of uses is incomplete and does not comply with the concept of multiple use and sustainable management. For example the Code does not mention such important uses as use for watershed protection, road protection and especially traditional aboriginal use.

The process of allocating usufructuary rights to users is very important. The RF Forest Code is the first forest law that identifies both gratuitous and chargeable uses. The latter are differentiated into various types: lease, concession, short-term use, etc. Each type entails specific terms and user rights. The maximum term of a lease agreement is 49 years. However, such terms do not correspond to the conditions required for forests to reach the definition of "mature" in the RFE commercial forests, which is 80–150 years. The RF Forest Code stresses that forest lot allocation must be made through competition via tenders and auctions, but it also permits direct allocation by authorities. Unfortunately, it does not contain exact stipulations as to how and when the direct allocations can be applied, thereby providing loopholes for bureaucratic corruption and arbitrariness.

The system of forest use payments consists of forest dues (*'podati'*) in case of short-term use (less than 1 year), and rents in case of long-term use (2–49 years). The federal Code divides forest use payments into two parts. The minimum rates are differentiated by region, wood species, and timber quality. They are

fixed and designated by the federal Government. Then at the local level, these rates can be augmented either as a fixed price list or through a bidding process. These two types of payments determine how much money will be allocated to the federal, provincial and municipal budgets. The ratios of transfers to budgets are determined by annual State Budget Laws and vary from year to year.

Unfortunately, the "Forest Code of the RF" contains a number of internal contradictions as well as inconsistencies with other laws in force, including central acts such as the 'Civil Code of the Russian Federation". Clauses of the federal Code require numerous clarifications and additional details, executed through the adoption of about twenty additional acts by the Russian Government and the Federal Forestry Service. The federal Code has not become fully democratic and market-oriented and it maintains the character of strong central power of the state. However, in spite of its imperfection, the Forest Code of the Russian Federation was a big step ahead for forest policy during the transition period.

After Putin's first administrative reform of 2000, with which the Forestry Service ceased to be an independent state agency, an elaboration of a new Forest Code was put on the agenda. Different proposals of a new code were produced until the middle of 2003. They were examined by the Russian Federal Government and the proposal of the Ministry of Economic Development and Trade was chosen for the final design. The selected proposal assumes implementation of leasing as prevailing form of forest use and the delivery of lease rights only via auctions. Commercial forests can be purchased for private ownership after 15 years of leasing. Protected forest can not be sold and will remain under state ownership.

Administrative control of forest use will be reduced; after the lease agreement has been signed, the forest use will be determined not by permissions of the Forest Service but by the user's declarations and business plan. Regulations of the forest sector will be carried out by the federal Government. The task of forest disposal (e.g. transfer, sale) will be given to provincial governments/administrations. A special federal system will be created to supervise all users and forestry bodies.

There are many other new approaches in the proposal. Undoubtedly, the proposed Code conforms with the transition of the Russian economy to a market economy. However, it is concerned mainly with the forest as property. It contains some declarations about sustainable forest management but it does not include any mechanisms for conservation and governance of the biological essence of forests.

At the beginning of 2004, it was expected that the new Forest Code would be adopted by the Russian Parliament during that year. However, the proposal met with strong public opposition, mainly from forest professionals and environmental NGOs including GreenPeace, WWF, Russian Social-Ecological Union etc. The opposition political parties also joined the struggle against the main tenets of the new Code.

Opposition is mainly directed against the privatization of forest. The opposition was supported by Russian authorities such as the Prime-Minister Michael Fradkov and the Speaker of the Upper Chamber of Parliament Sergey Mironov who expressed their opinion against forest privatization. President Vladimir Putin officially advised the new Minister of Natural Resources Trutnev "to be careful" with the new concept in the Forest Code.

The last version submitted to the Russian Government in April of 2004 does not mention forest privatization. However, this does not mean that forest cannot be privatized according to other laws: the Civil Code, the Land Code, etc. Thus, the final form of the new Code and its fate are uncertain.

PROVINCIAL POLICY

In contrast to the federal level, the situation in most of the RFE provinces is different from the central bodies' policy because in those provinces the forest sector plays not only an important economic role but also a vital social role. In many '*raions'* (districts), the forest sector is the principal industry supporting the territory's development and in many places it is the main factor in supporting and stabilizing villages. Consequently, both provincial and municipal administrations pay serious attention to the health of the forest sector.

Provincial legislation was a phenomenon of the new democratic regime. At the same time political and economic changes made the former USSR's forest legislation inadequate. Thus, from 1991 to 1993, there was an explosion of forest legislation activity at the provincial level. Development of provincial normative legislative acts took place because:

- this was the beginning of provincial sovereignty previously impossible in the totalitarian system;
- there was an urgent need to fill gaps that had sprung up in the federal legislation;
- there was a need to take into account local variation and specifics that were not considered by federal acts.

Many new institutes and instruments were created in the new provincial acts. Among them were users' attestations, provincial commissions on forest use, and forest pledges. Khabarovskiy Krai and Irkutskaya Oblast were the most active in forest legislation. The Forest Code of Irkutskaya Oblast (1995) was probably the first reasonably comprehensive provincial forest act. It was nullified in 1998 because of a lack of consistency with the federal Forest Code of 1997.

The preparation and then adoption of the federal Forest Code generated a new wave of local forest law development in the majority of forest provinces. Another pioneering act was the "Forest Code of Khabarovskiy Krai" (1999). It is a document that does not contradict the federal Forest Code and corresponds to all of its basic concepts. In addition, it takes the utmost account of local conditions of forest use in Khabarovskiy Krai. It contains such distinctive features as definitions of main terms and concepts, more exact descriptions of the responsibilities of provincial and municipal authorities, and a broader and more detailed classification of forest uses (4 classes, 24 uses). Among other functions, it also legitimized the Krai Commission on Forest Use and introduced a "green lease" that created lease terms of more than 49 years.

The Forest Code of Khabarovskiy Krai contains special clauses and sections devoted to the roles and rights of the public in the management and control of forest use and access to forest information. A special chapter about environmental assessments, including the role of the public, is incorporated. The anti-monopoly clause prohibits the concentration of more than 30 percent of the province's forest resources by a single entity. Such a clause is absent in the federal Code. In addition, particular attention is given to aboriginal forest use in this provincial Code. In comparison to the Forest Code of the Russian Federation, the Forest Code of Khabarovskiy Krai is more democratic, transparent, consistent with the spirit of economic reform, and more suitable for implementation.

A very similar draft of a local forest code was prepared in Amurskaya Oblast. However, it was not adopted by the Oblast's Soviet (local legislative body), and the draft went the way of many small and very

specific forest acts. Similar actions were taken by the Legislative Duma of Primorskiy Krai and certain other provinces.

The process of forest legislation development at the provincial level has become almost continuous. The most recent forest laws (at the time this report was written) on the use of Aboriginal Territories of Traditional Nature and on the use of urban forests were adopted by the Soviet of Amurskaya Oblast on November 16, 2003.

THE FEDERAL FOREST SERVICE

The federal Forest Code as well as provincial forest codes and the laws of 1997–1999 were tightly linked to the institutional structure of the Forest Service. Following World War II, the Forest Service was expanded and became highly structured and remained much the same until the year 2000. In May 2000, the Russian President Vladimir Putin carried out a substantial administrative reform. As mentioned, the Russian Federation was divided into seven Federal Okrugs headed by the President's Plenipotentiaries. One of the first tasks of the new Plenipotentiaries was to bring local legislative acts into full accord with federal legislation. The task was accomplished, but as a result all local forest acts were either abolished or lost details that reflected local conditions and variations.

As part of Putin's administrative reform, the independence of the Forest Service (as well as the independent Ecological Service) was abolished and the Forest Service became a department of the federal Ministry of Natural Resources. Provincial directorates of the Forest Service were also eliminated and were transformed into small divisions of local directorates of natural resources. Departments of State Control were established as bodies of the federal Ministry of Natural Resources in each of the seven Federal Okrugs. The Departments each contain a forest division.

The significant cutbacks to Forest Service staff and the weakening of management and control at the federal and provincial levels were also outcomes of Putin's administrative reform. Only the lowest primary units, called '*leskhozes*' or forest management units, from the former institutional structure remain, but their future is uncertain as there are plans to reorganize them as well.

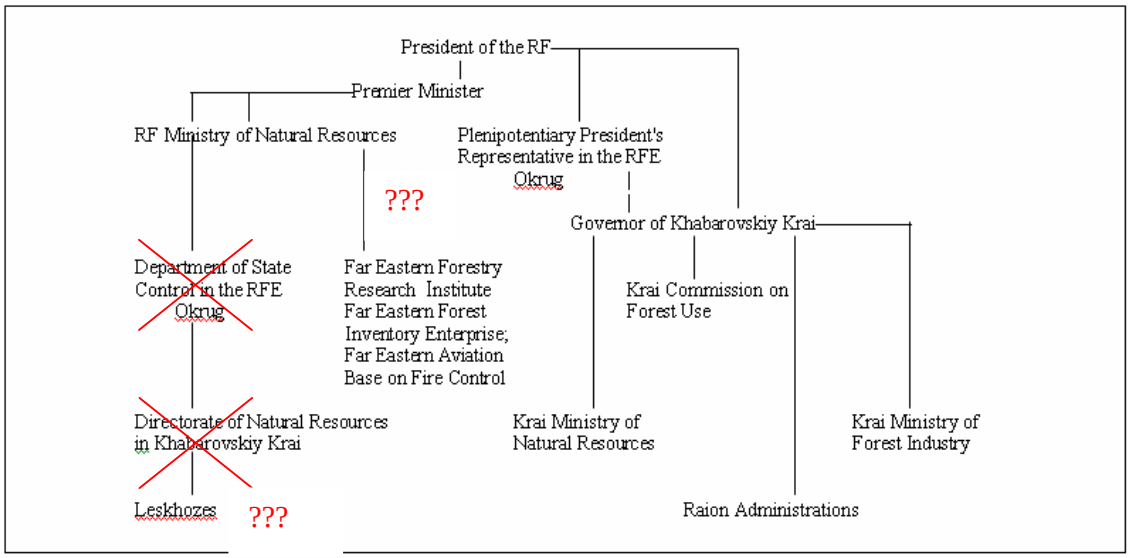
In early March of the year 2004, President Putin ordered another administrative restructuring that eliminated a number of existing Russian federal executive bodies and verticals, including the Forest Service. A new vertical has not been established as of the writing of this paper (June 2004).

On the federal level, there now exists a new body, the Federal Forestry Agency, but there are no bodies at lower levels and neither the vertical nor horizontal structure of a service that will replace the old system on the provincial and lower levels are clear. Reformers intend to separate so called "production" (intermediate cutting, tree planting etc.) and management functions and to design separate bodies. Russian forestry had experienced a similar reform during Khrushchev's era. However, it was recognized as an ineffective one and was abolished.

At the provincial level, forest bodies were established in almost all governments and administrations of forested provinces during Perestroika (Mikhail Gorbachev's program of economic, political, and social restructuring) and the subsequent Transition Period (the period of Yeltsins' and Putin's economic reforms). The organization of these bodies varies from province to province. For example, in Khabarovskiy Krai it is the Krai's Ministry of Forest Industry and some forest divisions in the Krai's Ministry

of Natural Resources that are responsible for forest management. In Primorskiy Krai, it is the Department of the Forest Sector in the Krai's Administration. There are also forest divisions in some '*raions*' administrations. This is the vertical organization of provincial forestry responsibilities which is parallel to the federal system. The relations of federal and provincial vertical organization differ somewhat by province, but overall they are very similar. An example of this structure is illustrated in **Figure 2.1**.

Figure 2.1: The Structure of Forest Administration in Khabarovskiy Krai (June 1, 2004)



Source: Sheingauz 2004.

The former institutional structure of authoritative bodies was in conflict with the Forest Code that, as stated above, was very much guided by the structure of the former Forest Service (*'Rosleskhoz'*). In addition, a shift in land policy sprang up following adoption of the new Land Code which introduced the possibility of land privatization, and a new period of forest legislation arose. The situation under the new forest Code is described above. In parallel, the Legislative Duma of Khabarovskiy Krai abolished the provincial Forest Code in October of 2003.

All of this misfortune which fell upon the Russian Forest Service after 1985 was the result of authorities neglecting forest policy. Naturally, all of this entailed a decrease in financing from the state budget. Due to high inflation, fiscal reforms and other factors, it is very difficult to understand the exact dynamics of forest funding in Russia. Some experts estimate that real financing for silviculture and forest science activities decreased by 10 times from 1990 to the present, and by 4 to 5 times for forest inventory and aerial fire control.

Forest Service Budgeting

Silvicultural treatments and forest protection are performed by Forest Service bodies called '*leschozes*' which are financed by the state budget. In 2002, these bodies were allocated $40.1 million from the state (see **Table 2.1**), which contributed an average of 8.1 cents per hectare of *Lesnoy Fond* area; this varied from 82.9 cents per hectare in Sakhalinskaya Oblast to zero in Koryakskiy Autonomous Okrug.

Allocations from the state budget are supposed to be the primary source of funding for the Forest Service's *leskhozes*; in reality they cover only a fraction of its costs. In Khabarovskiy Krai this funding covered 22.0 percent of the *leskhozes* costs in 1999, and 20.0 percent in 2002; in Primorskiy Krai it covered a paltry 13.6 percent in 2000 and 11.9 percent in 2001.The secondary source of the Forest Service's financing, according the Forest Code of the Russian Federation, is supposed to come from provincial budgets. In Khabarovskiy Krai the provincial coffers did not yield a penny, but in Primorskiy Krai the provincial budget provided 11.4 percent of financing in 2000 and 2.7 percent in 2001. The third major source of funding is supposed to be a portion of the stumpage fees and rent collected by the *leskhozes*. This covered 16.1 percent of costs in Khabarovskiy Krai in 1999; stumpage and rent provided Primorskiy Krai with 17.5 percent of its budget in 2000 and 29.4 percent in 2001.

Thus *leskhozes* are forced to earn approximately 60 percent of their funds from alternate sources. For the most part, these funds are collected from intermediate cutting, which, as discussed previously, has been transformed into commercial cutting due to the necessity to make a profit. Intermediate cutting has therefore become a major source of illegal logging.

Table 2.1 and **Figure 2.2** show the present level of Forest Service financing, which falls very short of covering the costs of basic forest management. In the year 2002, the RFE's average expenditure of the Forest Service was 7.8 cents (US$) per 1,000 hectares. During the Soviet era the state shouldered 90–95 percent of these costs; now a mere 25–30 percent of the financing is covered by the state budget. The Forest Service finances the rest from profits yielded by intermediate cutting. As a result, foresters are forced to switch from doing intermediate cutting for the purpose of stand improvement, to undertaking commercial high-grading for immediate returns. The Forest Guard, i.e. the Forest Service personnel who have police and security responsibilities, has therefore become a serious violator of forest regulations.[6] Right from the early planning stages of intermediate cutting operations, a significant portion of the extracted timber is destined for export to China. The reason for this is, as previously mentioned, intermediate cutting provides the opportunity to cut the most valuable species which are otherwise banned from commercial harvesting.

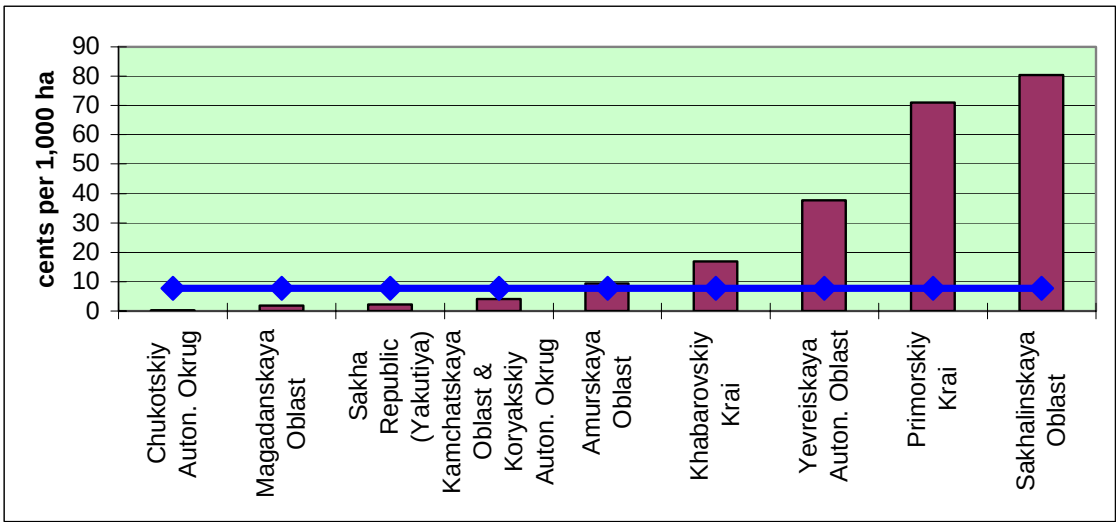
[6] The pivotal part of the Forest Service consists of the "Forest Guard (*'Lesnaya Okhrana)*". The employees of this system constitute an exact hierarchy with strong supervision and strong discipline. They have special uniforms and can have such weapon as rifles and guns. They also have special inspection rights.

Table 2.1: Costs of the Forest Service in the RFE, 2002

Territory	Current costs				Capital investments			
	Total		Per 1 ha		Total		Per 1 ha	
	Thousand rubles	Thousand USD	Rubles	Cents	Thousand rubles	Thousand USD	Ru-bles	Cents
Sakha Republic (Yakutiya)	182624.0	5816.1	0.72	2.3	8181.0	260.5	0.03	0.1
Yevreiskaya Auton. Oblast	25247.4	804.1	11.81	37.6	0	0	0	0
Chukotskiy Auton. Okrug	1924.7	61.3	0.07	0.2	0	0	0	0
Primorskiy Krai	264478.4	8422.9	22.32	71.1	18168.9	578.6	1.53	0.5
Khabarovskiy Krai	391256.0	12460.4	5.31	16.9	12851.0	409.3	0.17	0.6
Amurskaya Oblast	89322.6	2844.7	2.92	9.3	4184.5	133.3	0.14	0.4
Kamchatskaya Oblast	54693.0	1741.8	1.24	4.0	1145.0	36.5	0.03	0.08
Magadanskaya Oblast	26137.3	832.4	0.58	1.9	111.8	3.6	0.003	0.008
Sakhalinskaya Oblast	175287.9	5582.4	25.23	80.4	5726.1	182.4	0.82	2.6
RFE Total	1210971.3	38566.0	2.44	7.8	50368.3	1604.1	0.10	0.3

Note: 1) Data for Koryakskiy Autonomous Okrug are not available; 2) Average rate of exchange in 2002 was 31.4 ruble per US Dollar.
Source: Department of State Control of the RF Ministry of Natural Resources in the Far Eastern Federal Okrug 2003; Author's calculations.

Figure 2.2: Current Costs of the Forest Service in the RFE, 2002



Note: The blue line is the RFE average of 7.8 cents per 1,000 hectares.
Source: Department of State Control of the RF Ministry of Natural Resources in the Far Eastern Federal Okrug 2003; Author's calculations 2003.

The basic monthly salary of primary employees of the Forest Guard is US$35–40 (all dollars are U.S. dollars). Their real salary is $200–$300 per month. The difference is made up by earnings from participation in intermediate cuttings. Consequently, employees are interested in making these cuttings as profitable as possible; furthermore, only one step separates these violations from corruption. Unfortunately, many foresters take that step by deliberately turning a blind eye to violators who carry out illegal cutting, accepting bribes in return.

FOREST POLICY AT DIFFERENT LEVELS

Current forest policies have different levels of importance at each level of government and to different groups of citizens, and give rise to a variety of goals and opportunities. The federal authorities consider forest resources mainly as a source of revenue for the state budget. At the same time they keep stumpage fees low to create opportunities for forest users to reap the rewards of forest management. During the past year or two, however, the federal authorities have increased their awareness of the forest sector's needs.

The attitude of provincial authorities varies according to the economic importance of forests in their province. Authorities from provinces in which the forest sector is small are indifferent to federal forest policy. Conversely, the authorities of provinces with large forest sectors are actively engaged in forest policy development. However, their own forest policy is contradictory; on the one hand, they are eager to support large local businesses and even to make personal profit; on the other hand, they wish to support the forest sector as a whole to stabilize the province's economic and social spheres, and are still increasingly grasping the necessity of guarding forest cover.

Raion authorities have the same goals as provincial ones, with fewer opportunities to attain them. Rural municipal authorities are apathetic regarding forest policy due to a lack of influence. Most local populations do not consider forest policy to be their concern. Indigenous people appear to be more alarmed but they are even less organized than the rest of the population. Forest policy cannot be separated from the entire political, economic, and social situation of the country. Therefore, the region's forest policies have both positive and negative features that are inherent to current Russian society. Regrettably, the acceptance of double standards as a behavioral norm happens to be one of those features.

THE CURRENT SITUATION

A "shadow economy" existed even during the totalitarian Soviet era. It has since expanded and has penetrated almost all industries. Officially, it consists of about 40 percent of the whole economy. In reality its share is even larger, especially in industries associated with natural resources. Such a huge informal economy can exist only because it is based on moral norms that are not fully coinciding with legal norms (Blyakher 2003).

It is clear that reality is completely different from what is voiced as official policy in Russia. Economic reforms are initiated and implemented at upper levels, by authorities, not from the bottom, not by common people. It breaks and sometimes even stops reforms especially because the overwhelming majority of Russia's population distrusts officials in both political and economic spheres, in part because the aver-

age citizen is excluded from any sort of decision-making. This creates distortion and even disdain of reform at the local level: hence the local people who *could* be the most important barrier to illegal forest activity, in reality are the people who conceal unlawful actions and sometimes are even the perpetrators.

THE FOREST INDUSTRY

HISTORY

The forest industries of the Russian Far East and Siberia have had an interesting history of growth, crisis, and change. The RFE's forest industry began in the 1870s as commercial harvesting and sawn timber production for the construction of new settlements during the initial development of the region. In Southeastern Siberia this occurred 100–150 years earlier. After World War II, the forest industry developed a clear administrative-organizational structure that was comprised of two main components. The Ministry of Forest Industry of the USSR supervised logging and wood processing industries. Cellulose, paper and cardboard plants came under the direction of the Ministry of Cellulose-Paper Industry of the USSR. During the period of 1945 to 1985, these ministries were sometimes unified, sometimes separate. The Ministry of Forest Industry had local administrative units (*lesproms*) in each forested province. *Lesproms* supervised primary logging plants (*lespromkhozes*) and timber mills. The Ministry of Cellulose-Paper Industry supervised its plants from Moscow.

The system was entirely in state control and provided 65–70 percent of round wood harvested in the RFE and up to 80 percent in Khabarovskiy Krai and Sakhalinskaya Oblast; 60–65 percent of sawn wood; and 100 percent of paper and cardboard. A set of non-specialized bodies called *'samozagotoviteli'* (self-suppliers) produced the remaining percentage of wood products.

The centralized state control of most forest production provided opportunities for the sector in terms of financing, stable markets, centralized supply, steady employment, etc. Development of the RFE's and Siberia's forest sectors was prescribed by state plans and was highly supported by state investment. Additionally, there was a directive "to move forest industry from the European-Ural part into the Asian part of the USSR" (i.e. into Siberia and the RFE), which was successful. New logging and wood processing plants were designed and established, the product output increased constantly, and forested areas were newly developed until the mid 1980s (**Table 6** of the Appendix).

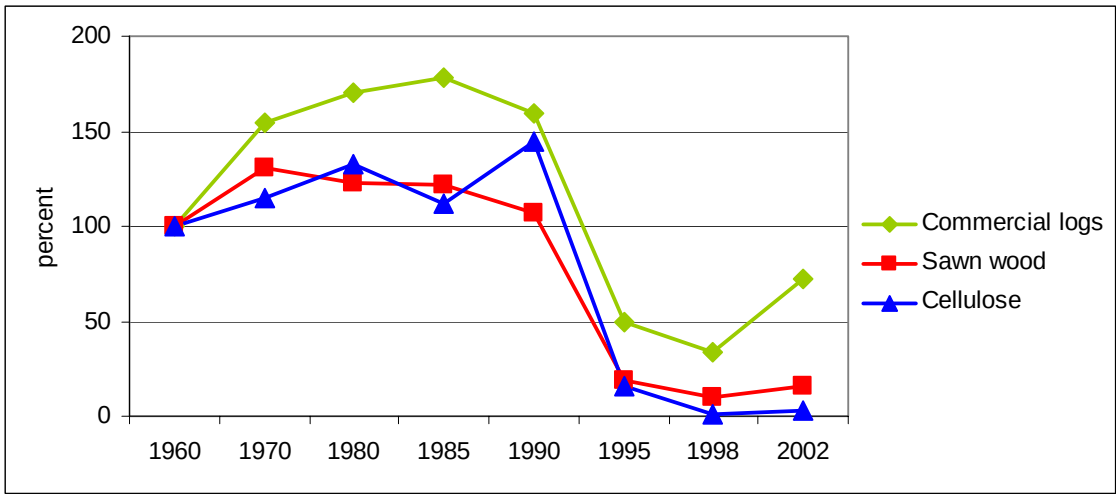
The forest sector's production peaked around the mid-1980s, give or take a couple of decades depending on the region and varying by product. Thus, the height of sawn wood output in the RFE occurred between 1960 and 1970, while it occurred during the 1980s and 1990s for Irkutskaya Oblast. Further variation in provincial production dynamics is displayed in **Table 6** of the Appendix. The crisis in the forest sector began before the general economic crisis and was triggered by a substantial disparity between new demands and old methods. The state ownership of production units and the highly centralized government made the management very sluggish and unreceptive to new technologies and methods. It generated a crisis of management, methods of production, profitability of enterprises and the gradual transformation of forested areas.

The symptoms of the RFE's forest sector crisis appeared for the first time in the mid-1970s. The central authorities of the former USSR did not recognize the new situation and prolonged the use of old meth-

ods, resulting in a rapid deterioration of production in the 1980s. Consequently, logging peaked in 1986 at a total of 36.7 million cubic meters of wood harvested and 28.8 million cubic meters of commercial round wood produced.

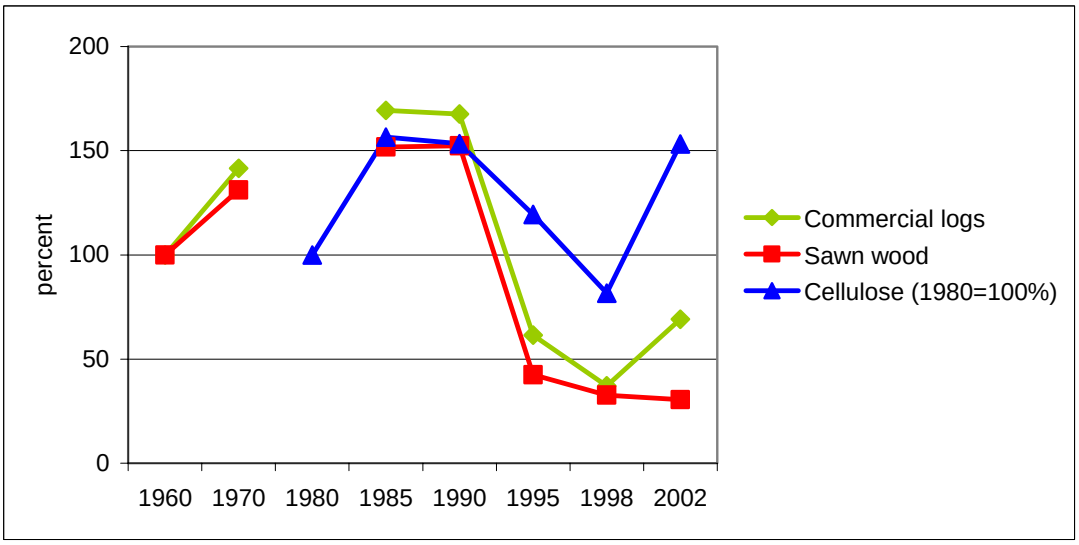
The crisis of technologies and management in the forest sector was magnified by Russia's general economic crisis of the 1990s. Since the sector was already unraveling, it was hit harder by the economic crisis than other sectors and its recession occurred more rapidly (**Table 7** of the Appendix, **Figures 3.1** and **3.2**). This resulted in a sharp decrease of the forest sector's role in the economy. From the early 1980s until 1991, the forest sector provided 10 percent of the industrial commodity output and employed up to 13 percent of the labor force in the RFE (*Ekonomika*, 1994). In 1998, at the lowest point of the slump, the forest sector's role in the regional economy was a mere 2.6 percent.

Figure 3.1: Changes in Production in the RFE Forest Sector (1960=100%)



Source: Database of the ERI 2003; Author's calculations 2003.

Figure 3.2: Changes in Production in the Forest Sector of Southeastern Siberia (1960=100%)



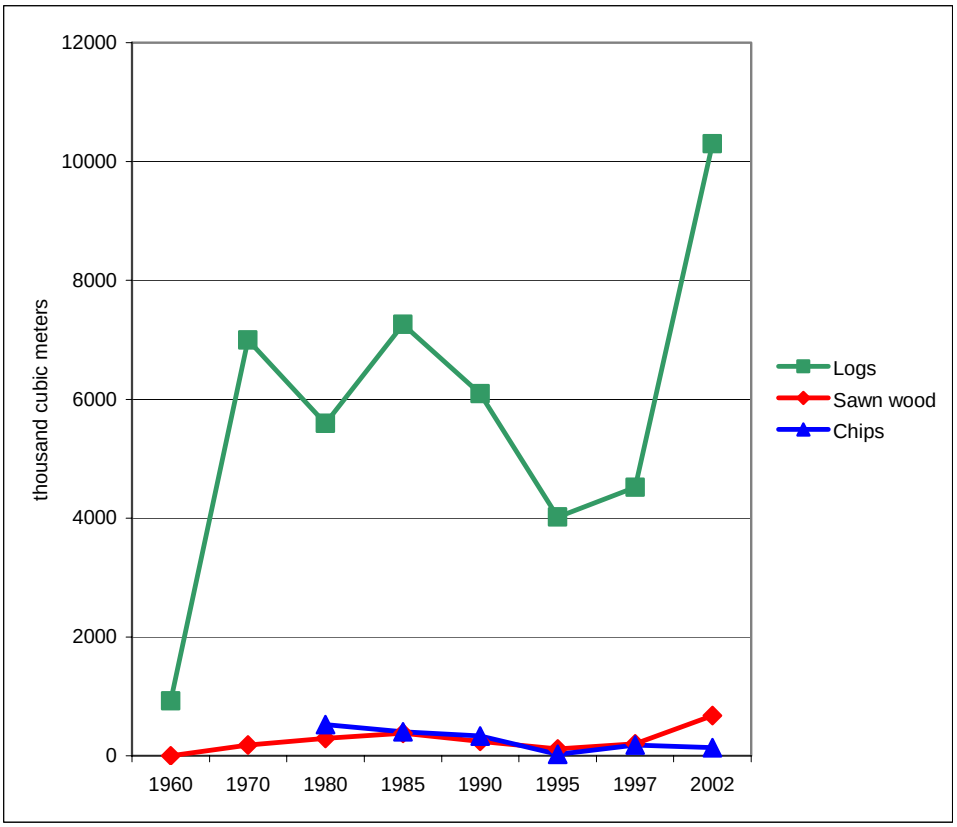
Source: Database of the ERI 2003.

The already unsteady forest sector slumped further due to a reduction in domestic demand. Before the crisis the regional market had consumed 50–60 percent of domestically produced timber, about 25 percent was exported to other regions of the USSR (mostly to Middle Asia), and 20–25 percent was exported abroad (mostly to Japan). Domestic consumption was primarily for house-building, construction of industrial enterprises, construction and support of roads, facilities, etc. All of these activities came to a halt during the crisis of the 1990s. At the same time the Japanese recession reduced foreign demand for exports.

EXPORTS

The RFE forest sector had been geared towards foreign export since the beginning of the 20th century. This tradition was interrupted during 1938–1953 but was renewed in 1954 (Kakizawa 1994). After that, RFE forest exports increased until 1986, when these reached a maximum volume of 8.0 million cubic meters of logs, 0.4 million cubic meters of sawn wood, and 0.4 million cubic meters of wood chips (**Figure 3.3**). During the economic crisis, the lowest export volume from the RFE forest sector was reached in 1995 with only 4.0 million cubic meters of logs, 0.1 million cubic meters of sawn wood, and 0.02 million cubic meters of wood chips. By 2002 the RFE's foreign exports were recovering, and actually exceeded its pre-crisis peak with 10.3 million cubic meters of logs, 0.7 million cubic meters of sawn wood and 0.1 million cubic meters of wood chips.

Figure 3.3: Changes in Forest Exports from the RFE



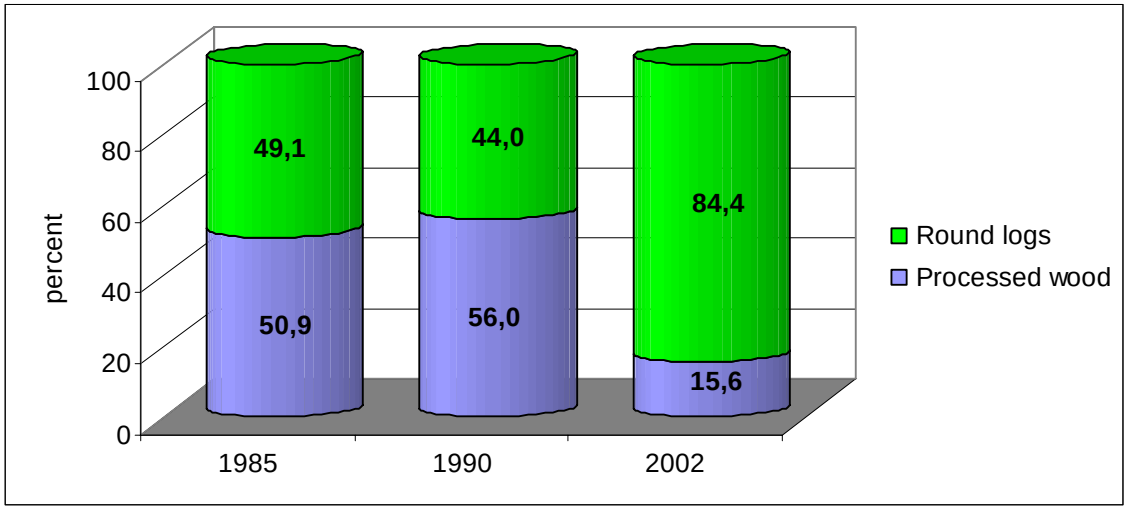
Source: The RFE Provincial Authorities 2003.

Regional forest exports were mostly oriented to Japan until the year 2000. In 2001, China became the main importer. Exports of wood products to China began after the establishment of communist power in the country. Following a collapse of relations between country leaders Khrushchev and Mao in 1962, exports to China were drastically reduced, but were restored in the late 1980s. By 2002, they had increased to a total of 14.8 million cubic meters of logs and 0.6 million cubic meters of sawn wood from Russia.

When Russia's domestic timber market collapsed and was stricken by total insolvency, foreign exports became the main source of the RFE's forest sector survival. Soon a staggering 80 percent of all timber produced in the region was being shipped out of Russia; foreign exports remain at this level today. Wood processing industries experienced particularly severe exportation problems due to very rapid growth in energy costs; in addition the quality of their products was inadequate for international markets.

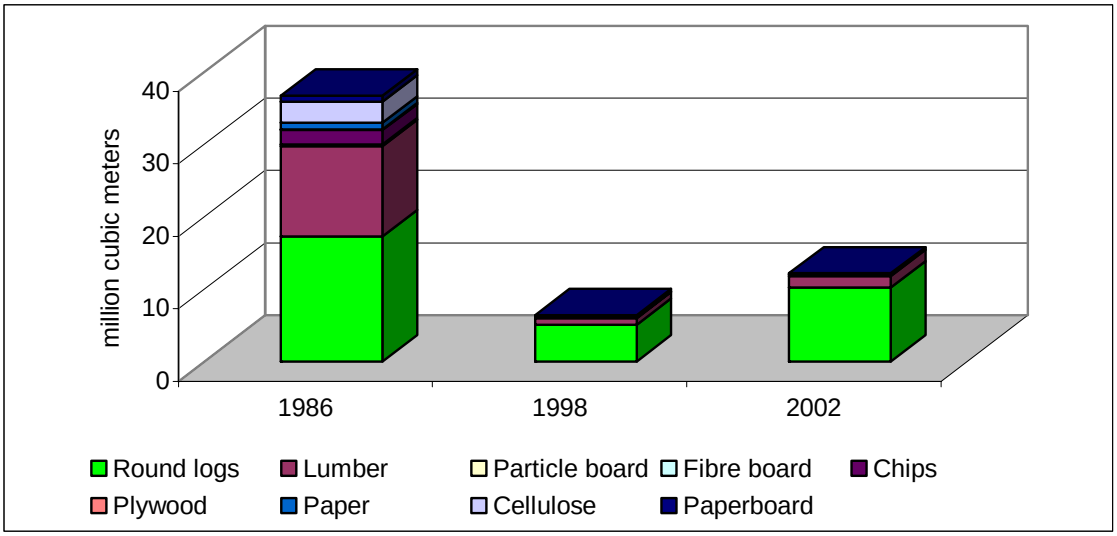
Following the recession, the production of forest goods shifted towards heavier unprocessed products, particularly round wood. The share of processed wood in the total production of the RFE forest sector rose from 50.9 percent in 1985 to 56.0 percent in 1990 (calculated in round wood equivalents), then fell to 16.6 percent in 2000 (**Figures 3.4** and **3.5**).

Figure 3.4: Share of Processed Wood in the RFE



Source: Author's Calculations 2003.

Figure 3.5: Forest Product Structure in the RFE



Source: Regions of Russia 2002.

INSTITUTIONAL CHANGE AND PRIVATIZATION

Along with these changes in production, the country underwent radical institutional changes as well. The USSR collapsed and the new independent Russian Federation proclaimed political and economic reforms directed at replacing the totalitarian planning system with a market economy. In accordance with these reforms, the state production system was brought to an end. The production ministries were abolished and state enterprises including *lespromkhozes* were privatized.

During the Soviet era, large firms such as Dallesprom, Primorsklesprom, and Sakahlinlesprom not only had administrative control of *lespromkhozes*: the firms also had real power because they were responsible for financing and supplying materials to the *lespromkhozes*. The emerging free market system did away with most of those functions, and the above-mentioned firms became responsible for coordination only. The big firms merged into joint-stock companies (in reality, holdings) that now coordinate the delivery of forest products according to mutual obligations between shareholders and provide timely payments as well as material and technical support to the industrial units. Owners of their shares include the State (mostly to control portfolios during the first steps of reform), the firm's administrators (personally) and the *lespromkhozes* that formed the company's assets. Most of the CEOs are skilled professionals, while the Heads of the various Boards of Directors are usually the chief of the provincial administration's forest industry department.

Almost all of the former forest industry enterprises have been converted into joint-stock companies. *Lespromkhozes* themselves became open joint-stock companies. The shares of *lespromkhozes* that remained in the structure of new holdings are owned by *lespromkhoz* administrators and other employees of the State and of the holding. Some *lespromkhozes* left holdings and became independent. However, they gave the shared portfolio to the State and very often the State entrusted the portfolios to the management of the same holdings that the *lespromkhozes* left. Some new logging enterprises refused to take the title of '*lespromkhoz*', to break with the Soviet past.

For all companies, the portion of shares that belonged to the State was 15 to 51 percent. Although quite often the controlling portion of the stocks belonged to the State, as a matter of fact these enterprises operated as private non-governmental firms. Officially the State shares were managed by provincial ministries, committees or departments of State Property Management. In reality they were managed by officers of the provincial government or administration divisions that were responsible for forest resource use.

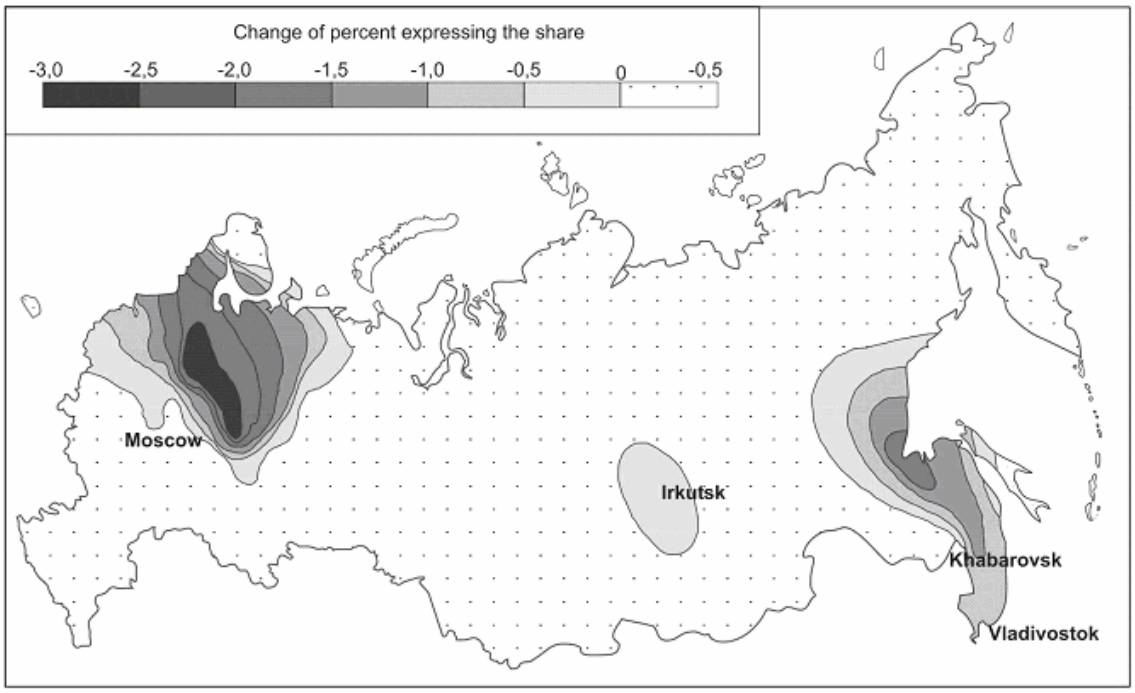
A redistribution of controlling share packages took place in 1995 and subsequent years, through exchanges between various owners and through the purchasing of shares on the stock market. As a result, shares became concentrated in the ownership of company managers. In 1998 and especially in 1999, another process of share redistribution appeared: provincial authorities acquired companies' shares in exchange for clearing debts owed to them by the enterprises. The proportion of shares owned provincially increased in comparison to those federally owned, boosting provincial influence.

According to the current principles of economic reform, the federal and provincial shares must gradually be sold off to private owners through an auction system. In addition to the privatization of formerly state-owned firms, brand new companies began to appear. Most of them were established as joint-stock companies, except that they did not include State portfolios. Family and individually-owned companies were also formed. Most of these businesses were small, occasionally mid-sized. New forest industry enterprises were established both in the form of corporate and private ownership. Now, 95 to 98 percent of harvested and processed timber is produced by private enterprises.

During the transition period, the number of enterprises and users in the forest sector increased four to five times. New firms multiplied rapidly in 1992 and 1993 during the period of mass privatization, after which the rate of establishment of new enterprises declined. Nevertheless, the number of enterprises in the regional forest sector grew faster than the regional economy's average. Many small enterprises were (and still are) established for short-term harvesting, some for only a couple winter months each year for the peak harvesting season (due to the difficulty in accessing remote harvest sites at other times).

Another factor that had a strong negative influence on the forest sector, in addition to the ones discussed above, was the jump in transport tariffs during the transition period. The rise of tariffs outstripped the growth of forest product prices and the inflation rate. The forest sector is sensitive to this situation because it produces such large quantities of products. As a result, logging became concentrated in areas convenient for exporting goods, such as seaports and land border crossings. **Figure 3.6** uses isolines to show these areas of the Russian Federation (*Prostranstvenniye transformatsi*i 2002).

Figure 3.6: The Dynamics of Russia's Concentration of Timber Harvesting 1990-2000



Source: Spatial Transformation in Russian Economy. Ed. By Pavel A. Minakir. Moscow, Economica, 2002 (Rus).

One of the areas is confined to Northwest Russia (seaports accessible to Europe and land passages to Finland), the second – to the southern RFE (seaports open to the Pacific Ocean and land passages to China). The third area is in Irkutskaya Oblast, in which relatively cheap energy and abundant forest outweigh the high transport tariffs: as a result Irkutskaya Oblast's forest sector can compete with the forest sector of the southern Far East. Conversely, the forest sector of Krasnoyarskiy Krai is not competitive despite a very similar situation in terms energy and forest resources, because it is located approximately 1,000 kilometers farther from Russian-China boarder and sea ports than Irkutskaya Oblast.

As illustrated in **Table 3.1**, the role of the RFE and Southeastern Siberia in Russian timber harvesting increased, although changes in their wood processing roles varied. Southeastern Siberia's share of processed wood products increased while the RFE's share declined.

Table 3.1: Share of the Regional Forest Sectors in Total Russian Production (in %)

Territory	1980	1985	1990	1995	1998	2000	2001	2002
Commercial round wood								
RFE	1.8	3.3	3.8	8.0	7.7	10.5	11.7	13.3
Southeastern Siberia	3.0	4.1	5.2	14.6	12.7	13.0	16.1	19.0
Sawn wood								
RFE	7.8	7.8	7.2	3.7	2.6	3.4	4.1	4.7
Southeastern Siberia	12.1	12.7	13.6	10.7	11.8	9.6	9.2	11.6
Plywood								
RFE	2.5	2.3	1.6	0.1	0	0	0	0
Southeastern Siberia	7.4	11.9	15.8	10.8	6.6	8.4	8.0	7.0
Cellulose								
RFE	7.4	5.3	7.2	1.4	0.1	0.2	0.2	0.1
Southeastern Siberia	15.6	20.8	21.5	30.0	26.8	28.1	28.4	29.0
Paperboard								
RFE	6.7	6.7	7.8	1.0	0.5	1.7	1.5	1.3
Southeastern Siberia	11.7	11.5	10.6	16.4	13.5	12.0	12.0	11.7

Source: Database of the Economic Research Institute, Khabarovsk, 2003 and Author's calculations.

PRODUCTION

Over the course of the transition period, the distribution of production between provinces changed as well, as shown in **Table 3.2**. Regional production became more concentrated in Primorskiy and Khabarovskiy Krais, which are the most economically-developed RFE provinces. Khabarovskiy Krai's share of the RFE Forest Sector increased from a third in 1990 to half in 2001. The share of Primorskiy Krai grew from an eighth to a quarter. Together the krais contributed 78 percent of the regional forest output. This distribution changed after 2001: in the first half of 2003, Irkutskaya Oblast ranked first among Russian provinces for harvesting the greatest volume of commercial timber. Khabarovskiy Krai ranked third, and Primorskiy Krai ranked fifteenth (*Lesnoy kur'yer*, 2003).

Table 3.2: Share of the RFE's Forest Industry by Province (in %)

Territory	**1990**	**1995**	**2000**
Sakha Republic (Yakutiya)	9.0	6.3	6.2
Yevreiskaya Autonomous Oblast	…	1.9	0.8
Chukotskiy Autonomous Okrug	**	**	0
Primorskiy Krai	15.8	22.4	26.6
Khabarovskiy Krai	32.4*	31.1	51.7
Amurskaya Oblast	14.9	12.8	5.0
Kamchatskaya Oblast	9.0***	2.1***	0.6
Koryakskiy Autonomous Okrug	…	…	0.1
Magadanskaya Oblast	**	0.9	0.1
Sakhalinskaya Oblast	18.9	22.5	8.9
RFE	100	100	100.0

* including Yevreiskaya Autonomous Oblast. ** less than 0.1. *** including Koryakskiy Autonomous Okrug. *Source: Regiony Rossii 2002.*

The devaluation of the ruble in the wake of August 1998's financial crisis stimulated the forest sector's growth along with the rest of the economy. Unfortunately, from 1998 to 2002 growth occurred mainly on the basis of round wood output. The average annual growth rate of round wood production during that period in the RFE and Southeastern Siberia combined was +21.1 percent. The post crisis dynamics of sawn wood production were different in the RFE and Southeastern Siberia. In the RFE the annual growth was +17.7 percent, while in Southeastern Siberia it was -7.1 percent. The total rate was negative, at –1.6 percent annually. Forecasts for 2003 project the growth rate of sawn wood in the RFE to be higher than in recent years.

Following the economic crisis the average annual growth rate was 20.4 percent for cellulose production, 50.4 percent for paper, and 22.3 percent for cardboard. In the RFE the rates were higher than in Southeastern Siberia. After four years of such qualitative growth, signs of qualitative restructuring of the forest sector production are beginning to show.

During the transition period there was a substantial reduction in the concentration of production in the forest sector. In the 1980s, about 70 percent of timber was produced by logging enterprises (*lespromkhozes*). In the transition period the number of forest enterprises rose four to five times the previous number, yet their average capacity declined by a factor of eight to ten. Previously a *lespromkhoz* was the only logging unit in a settlement, sometimes the only one in multiple settlements. This is no longer the case: it is now common to find two, three or more small logging firms operating in each settlement, all successors of the original *lespromkhoz* after having dividing up its outdated equipment. The new enterprises do not have the resources to implement new equipment and technologies, contribute to the social infrastructure of their settlement, or fulfill any of the other roles important to supporting the local people and economy.

In Khabarovskiy Krai (the RFE's most important province in terms of logging) in the early 1980s, prior to the beginning of the transition period, 40 *lespromkhozes* produced 11 to 12 million cubic meters per year. This was equivalent to 88 percent of the krai's total production (*Problemy* 1984). Meanwhile, the average production capacity of a *lespromkhoz* was 300 thousand cubic meters per year, the average annual labor productivity was 400 to 700 cubic meters per employee, profitability varied from –7 to +20 percent, and the share of foreign exports was 40 percent.

The official number of forest users in Khabarovskiy Krai increased to 1998 to approximately 500. The krai's Ministry of Natural Resources reported that the number of users decreased to 200 in the year 2002, as a result of deliberate policies and the financial crisis. The krai's Ministry of Forest Industry reports that in 2003 the number of constant "basic" logging enterprises (i.e. enterprises that have a forest lease) was 156, which had 207 leased lots with a total AAC of 8.8 million cubic meters. These enterprises produce 80 percent of officially harvested timber in the province. The average logging enterprise produces 33 thousand cubic meters per year, has 99 employees, and has an annual labor productivity of 333 cubic meters per employee. Together these enterprises produce 70–80 percent of foreign exports. A scientific analysis suggests that the most effective capacity of a logging enterprise in current conditions is in the range of 90–200 thousand cubic meters per year. Only 20 percent of the timber harvested in Khabarovskiy Krai is produced by enterprises of this size (*Lesnoy complex* 2001).

The Khabarovsk Krai Committee of State Statistics had very different findings. The Committee counted 558 logging enterprises in the Krai in 2002 (*Lesnoy komplex* 2003). The sizeable difference of 358 units can be attributed to two factors:

1. the Committee included all small enterprises that are not subjects of the Ministries; and

2. the Committee took into account "subsidiary manufacturers", i.e. non independent logging carried out by a subdivision or branch of a non-forest enterprise. The proportion of subsidiary manufacturers was 8 percent of all logging enterprises in Khabarovskiy Krai in 2002.

According to the Committee's statistics, the average annual production of logging plants in Khabarovskiy Krai was 12.3 thousand cubic meters in 2002.

In Primorskiy Krai, the second most important province of the RFE in terms of logging, the number of "basic" logging enterprises in 2001 was 146 with the following averages (*Kontseptual'niye osnovy* 2003):

Number of employees:	95 employees
Annual production:	22.7 thousand cubic meters
Share of foreign exports:	69 percent
Share of wood processed:	17 percent.

Degeneration of Forest Practices and Control

By now most of the forest enterprises have lost their potential to perform appropriate effective engineering. They frequently violate silviculture conditions placed on forest resource use and regularly implement deplorable harvesting methods such as high-grading and "conditional clear cutting" (intensive high-grading). Some firms do not even have legitimate business plans and other technical or guiding documents that promote sustainable management. The former planned economy had encouraged an exhaustive approach to forest resources management. Now, after the state control has been weakened, the degradation of Russia's forests is getting worse and more extensive. Logging concessions are currently "skimming the cream off" Russia's forest resources. The situation could potentially be ameliorated by making several changes, the most important of which would be the development of wood processing facilities and an increase in labor productivity. Sadly, the low rent and low stumpage rates promote thriftless use of forest resources in leased plots.

The species targeted for harvesting until the middle of the 1990s were coniferous: spruce and fir in Primorskiy Krai, Khabarovskiy Krai, and Sakhalinskaya oblast; pine and larch in Sakha Republic and Amurskaya oblast. The harvesting of cedar (Korean pine) was prohibited in 1991, but it is still being cut in small quantities under the pretext of intermediate cutting, road construction, and other activities. Since the mid 1990s, demand for hardwood species such as ash and oak has grown rapidly. This demand has been generated by China's forest sector which uses hardwoods for its domestic market as well as for re-exportation to Japan following processing. In Russia, this demand can only be filled by the mixed forests of Primorskiy Krai and the southern part of Khabarovskiy Krai.

Within stands designated for harvesting, approximately 75 percent of the volume is commercial timber; the rest is fuel wood, bark, thin parts of stems, and others. Logs of the first and second grades, which are the most competitive grades in the export market typically make up between 22 to 27 percent of the total growing wood stock. In reality, however, harvested volume contains 58 to 60 percent of the high grade logs. Evidently this indicates a severe situation of high grading: loggers are not using all timber sorts and are leaving low grade timber on cutting sites. This practice is unsustainable for forest resources, the forest

sector and the local economy, and will have significant environmental and social consequences. Illegal logging applies the same harvesting practices.

Harvesting of each 3 cubic meters of Russian wood currently entails a loss of 1.0–1.5 cubic meters. Following processing, this equates to a loss of 0.5 cubic meters per cubic meter of timber used. The ineffective use of forest resources stimulates very rapid expansion of harvested areas, at a greater rate than production development. Even now it is difficult to find leases that are both available and profitable: the establishment of new logging plants and investment in existing ones are also not very reliable.

Wood Processing

The number of wood processing enterprises in 2001, according to data provided by provincial authorities, was 104 in Khabarovskiy Krai and 43 in Primorskiy Krai. The Khabarovskiy Krai Committee of State Statistics counted 82 wood processing enterprises in 2002 (*Kontseptual'niye osnovy* 2003; *Lesnoy komplex* 2003; Shikhalev 2003). The average wood processing enterprise has annual production rates of 3.5 thousand cubic meters in Khabarovskiy Krai and 2.3 thousand cubic meters in Primorskiy Krai.

Wood processing plants can be divided into three groups. The first group is represented by old, usually large plants with obsolete equipment. The equipment has depreciated in value and most of it was manufactured using outdated concepts. Such plants cannot produce modern, competitive sawn wood and most are closed, bankrupt, or barely operating.

The second group is composed of similar plants that have more modern equipment, often imported. These plants produce lumber that can be sold in international markets but they are not maximizing their production potential.

The third group is made up of new plants with modern technologies and imported equipment. Some of these plants are quite large, such as three plants owned by Terneyles, which have full processing chains from sawing logs into boards up to production of semi-finished products, the quality of which even conforms to the Japanese Agricultural Standards (JAS). Nevertheless, the majority of plants in this group are very small and flexible. Some of their equipment and technology is new and is combined with elements of old technology; consequently, the quality of their products is inconsistent and often sub-standard. Regardless of such difficulties, these plants are very eager to develop their production methods and make high-tech products.

Throughout the era of Russia's planned economy, there were positive developments in the production of fiberboard, chipboard, and wood chips in particular. Now wood chips are produced by only two enterprises, on the sea ports of Plastun (Primorskiy Krai) and Vanino (Khabarovskiy Krai). Only one plant, situated in Khabarovskiy Krai, produces chipboards (although it is known that some new furniture plants produce chipboards as a stage of their full production process). Production has stopped completely for the following types of mills: fiberboard (seven plants closed in Khabarovskiy and Primorskiy Krais); plywood (three mills in Khabarovskiy and Primorskiy Krais); matches (one plant in Amurskaya oblast); furaldehyde (a solvent), nutrient yeast and hydrolytic spirit (3 plants in Khabarovskiy and Primorskiy Krais). Despite the seven fiberboard mill closures, a new plant in Amurskaya Oblast began operating in 1998.

The production of cellulose-paper was represented by the large combine in Amursk city (Khabarovskiy Krai), by seven old cellulose-papers mills and a paperboard-box plant in Sakhalinskaya Oblast, and by

plants that processed waste paper: one in Amurskaya Oblast and one in Yevreiskaya Autonomous Oblast. All of them, except for one cellulose-paper mill in Uglegorsk (Sakhalinskaya Oblast), are closed. These closures are mostly due to bankruptcies, stoppages, and productivity decreases resulting from financial difficulties: common factors include lack of funds, the insolvency of domestic markets, and high rates of loans.

Despite the dismal situation of most waste paper mills and paperboard-box plants, a few new ones have appeared in Khabarovskiy and Primorskiy Krais, and Amurskaya Oblast. Four such plants were established in Khabarovskiy Krai during the transition period.

Costs, Taxes, and Investment

The full production costs of logging enterprises in Khabarovskiy Krai were $30.43 per cubic meter in 1999 and $32.84 in 2000. In Primorskiy Krai the total production cost of logging was $37.87 per cubic meter in 2001. This difference is due to variations in the structure of harvested stands between each province. Primorskiy Krai has mixed forests. Khabarovskiy Krai has mixed stands in the South and simple coniferous stands in the central area, where harvesting is now concentrated. Costs of production in uniform stands were $22.3 per cubic meter in 1999 and $26.0 in 2000 (*Kontseptual'niye osnovy* 2003; *Lesnoy complex* 2001). The average structure of production costs for logging in Khabarovskiy Krai, Primorskiy Krai, Amurskaya Oblast, and Republic Buryatiya in recent years is shown in **Table 3.3**.

Table 3.3: Breakdown of Average Production Costs in Four Provinces (described in percent)

Cost Type	Share (%)
Logging production costs in Khabarovskiy Krai and Primorskiy Krai, 2001	
stumpage fees and rent:	2.7
labor costs:	17.4
tax payments	15.5
depreciation:	8.8
commercial costs:	14.6
fuel & energy, purchase of materials, outside service, etc.:	41
Logging and wood processing production costs in Amurskaya Oblast, 2002	
labor costs:	16
tax payments	17.8
depreciation:	5
commercial costs, fuel & energy, purchase of materials, outside service, etc.:	55.6
allocation of social payments:	5.6
Logging and wood processing production costs in Republic Buryatiya, 2002	
labor costs:	14.6
fuel & energy:	70.5
depreciation:	4.1
stumpage fees, rent, commercial costs, purchase of materials, outside service, etc.:	5.8
allocation of social payments:	5

It is apparent that the average structure of production costs is similar across these provinces and that there is a direct correlation between the depth of involvement in wood processing and increased costs for fuel and energy. Meanwhile, the profitability (i.e. profit margin on sales) of logging in Khabarovskiy Krai was 16.0 percent in 1999, 12.8 percent in 2000, and 14.6 percent in 2001. The profitability of logging in Primorskiy Krai was 10.6 percent in 2000, and 9.5 percent in 2001. The profitability of wood processing in Primorskiy Krai in 2002 was 11.3 percent.

The average payment for the right to forest use (stumpage fees and rent) in Khabarovskiy Krai was $0.78 per cubic meter of harvested wood in 1999 and $0.74 in 2000. Average payments for stumpage fees and rent in Primorskiy Krai were $0.86 per cubic meter of harvested wood in 1999, $1.37 in 2000, and $1.40 in 2001. It is expected that in 2003 the average payments in both krais will be over $2.0 per cubic meter.

Taxes in Khabarovskiy Krai averaged $2.66 per cubic meter harvested in 1999 and $2.43 in 2000; in Primorskiy Krai the average tax payment was $9.89 per cubic meter harvested in 1999, $11.19 in 2000, and $10.63 in 2001. The average tax payment per employee in Primorskiy Krai was $2,390 in 2000 and $2,320 in 2001.

Khabarovskiy Krai's forest sector contributed 6.4 percent of the total income of provincial and municipal budgets in 1999 and 5.7 percent in 2000. The forest sector ranked third out of Khabarovskiy Krai's industries in tax payments for the year 2000. The share of the forest sector in the total income of provincial and municipal budgets of Primorskiy Krai was 3.2 percent in 1999, 2.7 percent in 2000, and 2.4 percent in 2001. The forest sector ranked fourth largest tax payer of all industries in Primorskiy Krai. The tax structure in Primorskiy Krai can be broken down into value-added taxes (about 20 percent), export duties (20 percent), taxes on revenues (10 percent), stumpage fees/rent (10 percent), and 40 percent for other (income tax, road tax etc.).

In Primorskiy Krai, domestic investments in logging fixed assets were $4.2 million in 2000 and $6.2 million in 2001. Domestic investments in wood processing fixed assets were $4.7 and $1.5 million correspondingly, and $0.2 million in the cellulose-paper industry in both 2000 and 2001. The domestic investments in the forest sector in Khabarovskiy Krai were $12.4 million in 2000 and $22.5 million in 2001. The domestic investments in the forest sector in Amurskaya Oblast were $4.3 million in 2000 and $2.7 million in 2001. Thus the average investments in the forest sector in 2001 in dollars per cubic meter of harvested timber were 3.3 in Primorskiy Krai, 3.4 in Khabarovskiy Krai, and 2.5 in Amurskaya Oblast. In 2001, 88 percent of domestic investments in the forest sector of Primorskiy Krai were financed by the enterprises' own funds. Bank loans made up 8 percent. This ratio changed in 2002, with 59 percent of investment drawn from internal funds, 29 percent from bank loans, and 12 percent from loans from other firms. Foreign direct investments into the forest sector of Khabarovskiy Krai comprised $12.8 million in 2000 and $7.3 million in 2001. This scale of investment was absent in Primorskiy Krai in 2001 and 2002 but loans were available to help develop wood processing capacity.

ILLEGAL FOREST OPERATIONS AND THEIR IMPACTS

DEFINITIONS AND TYPES OF ILLEGAL FOREST ACTIVITIES

The term "illegal logging" is open to interpretation. Many definitions exist and it is surprising that there is an absence of any definition of this term in the most recently published and most comprehensive forest dictionary (Dictionary of Forestry 2003).

The simplest point of view is to consider logging associated with any violation of laws and official regulations as "illegal". In this scenario, the majority of logging in the RFE is illegal. It is more accurate, however, to accept that illegal logging is a very complicated phenomenon. The author of the best Russian review of the problem, Alexei Morozov, uses the definition of the Russian Federation Supreme Court in November of 1998: "Illegal logging is the felling of trees, bushes and lianas:

- without a logging card ('*lesorubochniy bilet*') or a logging warrant;
- with a logging card or a warrant of logging but with the violation of logging regulations;
- within an un-assigned site, beyond the bounds of the assigned site, over fixed quantity, or prohibited tree, bush and liana species."

However A. Morozov himself indicates incompleteness of this definition (Morozov 2002). D. Efremov defines illegal logging as poaching without permission or harvesting with intentional neglect of forest legislation (Efremov, 2001).

In current Russian experience, most officials and the public consider illegal logging and illegal forest practice to be activities that can be described as "criminal", in other words activities that can be punished according the Criminal Code of the Russian Federation and its application. This corresponds with the definition of the Supreme Court given above. In practice, however, illegal logging includes activities punishable according to the Criminal Code and the Administrative Code. This definition is used in this report.

In the RFE and Southern Siberia, illegal logging includes:

- logging in protected and prohibited areas, and outside boundaries of the sites legally allocated for cuttings;
- obtaining logging sites through bribes;
- falsification of felling licenses/permission;
- logging of protected species;
- removing under/oversized trees from public forests; and
- extracting more timber than authorized.

Illegal logging could not be carried out without strong ties between logging and other illegal activities such as:

- illegal timber transport, trade, and smuggling;
- implementation of "double prices" (i.e. low prices officially and higher prices really) and other illegal accounting practices;
- illegal forest practices; and
- arson of woodlands.

There are many classifications of illegal logging. One of the most complete is A. Morozov's classification, but it is made with some excesses and violation of classification rules (Morozov 2002). The most convenient is the domestic RFE classification by D. Efremov (Efremov 2001), which follows with some amendments by the author, taking into account Morozov's considerations. This classification is based on the above list and is as follows:

- Logging in legally leased lots but with violation of prescribed technologies, i.e. violations of silvicultural and ecological restrictions. It is punished by the Administrative or Civil Codes and usually is not considered as "illegal".
- Logging in legally leased lots but with intentional disregard to official regulations with respect to harvesting, fire control, etc. In essence this is a criminal offense but in Russian practice it is merely punished by imposing a small fine.
- Logging in legally leased lots but with intentional extension of the cutting site area and exceeding of the wood stock allocated for harvest. In reality it is poaching but in the Russian practice it is punished by imposing a fine.
- Logging with full pack of documents made by officials but those documents are arranged with violation of legislation because of either non-professionalism or intentional purpose.
- Unauthorized small-scale logging for personal use. It is a crime but Russian courts will not consider such small cases. Harvested timber is withheld and violator must pay a penalty.
- Unauthorized industrial logging for income. It is a "pure" crime. There are many variants of such activities, usually carried out by a small team equipped with automated machines as a one-night plundering raid to cut valuable trees. Sometimes the logging continues for a couple of days and even weeks; this is possible only with the averted eyes of bribed foresters.
- Intentional non-compliance to additional (social, forestry, production, etc.) obligations of logging agreements. Examples of these obligations include: rehabilitating stands following forest fires, supporting local schools or hospitals, employing local people, processing harvested wood, etc. This type of violation can consist of quickly harvesting only the best timber, of reneging on obligations, and shutting down a firm or plant ahead of schedule. As a rule it is very difficult to punish such violations, and officials do not usually consider them to be criminal.
- Logging on the basis of intentionally falsified documents.

This list covers many of the variations of fraudulent and criminal tricks that are being carried out in the RFE's forests.

MOTIVATIONS, METHODS AND COSTS

The motivations behind illegal forest activities are varied. Some perpetrators wish to:

- access forest resources that are not available through official procedures, such as prohibited species, protected forests, forests that are leased by other users, forests adjacent to roads and ports, etc.;
- access forest resources that are free of lease or another kind of use, and are previously undeveloped;
- gain surplus income through tax evasion and avoidance of other charges and fees.

The structure of costs and income for groups involved in illegal logging is very different than in legal harvesting situations. Illegal operators are not burdened with the costs of infrastructure associated with production such as garages, repair depots etc. They do not pay taxes or meet social responsibilities, and they do not deduct depreciation, pay stumpage or rent.

Illegal logging schemes are fairly simple. When carried out by official firms, the illegal timber is mixed with legal timber. In the case of rogue teams, illegally harvested timber is delivered directly to traders' warehouses, or traders go directly to the unauthorized cutting sites to buy timber. The prices paid to the rogue teams for illegal timber by traders vary widely, but are estimated to average $10 to $15 per cubic meter. On top of that, transportation expenses and bribes must be added on to the costs. Bribes are mostly standardized: for example a bribe of $100 will get a truck through a police control point along a transport route, while bribes of $300 to $500 are common for getting a truckload of timber through customs.

Full "production costs" of illegal timber after crossing the state border are probably $20 to $30 per cubic meter. Officially, the average price of 1 cubic meter of Russian round wood after passing through customs was $61 during the first half of 2003. During the same period, the auction price of Russian softwood logs in Central China's domestic market was $97.[7] The domestic price of hardwood is much higher, up to $300 (*Parlamentskaya Gazeta* 2003).

According to these calculations, illegal timber harvesting yields a surplus of $70 to $80 or more per cubic meter. (It should be noted that all of these figures are very rough estimations, but they are useful in giving an idea of the differences between legal and illegal transactions.)

Given that the RFE forest sector is so strongly oriented towards foreign trade, illegal operators look closely at the following factors when determining the potential of a site for illegal forest activities:

- proximity to a state border or port;
- availability of high quality forest resources; and
- degree of criminality/corruption in local public life, especially of local authorities and Forest Service officials.

[7] Information of the Ministry of Forest Industry of Khabarovsk Government 2003.

LOOPHOLES FOR ILLEGALITY

Each phase in the chain of timber production and sales has weak links that are used as loopholes for illegal activity. Such links are as follows:

Phase 1 -- Obtaining a valid lease. Valid leases can only be obtained from local or provincial authorities because Russian forests are in state ownership. According to the Forest Code of the Russian Federation, this must be done on the basis of honest competition. However, the same Code contains a loophole that gives officials the opportunity to directly award leases. It is almost impossible to detect bribing at this stage, especially since the errant officials are often quite high up in the government. These bribes are very large, amounting to tens and hundreds of thousands of dollars. Buying false lease agreements from a *leskhoz* is irrational because they only have the authority to sign agreements.

Phase 2 – Each licensee and operator must obtain documents permitting them to harvest specific sites. These logging cards or warrants (*lesorubochniy bilets*) are called 'the paper of strict responsibility'. Each of them has an identification number and is printed on special paper that thwarts forgery. These documents are the main papers proving the legality of timber origin. Unfortunately, false documents are now printed in China and delivered to Russia.

Phase 3 -- Logging. This is the core phase in illegal forest activities. All large and mid-sized illegal logging operations are only possible through bribing Forest Service officials who control logging during its fulfillment and after its completion. Some small-scale illegal logging can be done as direct theft without the bribing of officials.

Phase 4 – Transportation. Road police and the Forest Service control log transportation. Some provincial governments have introduced special legislation to control timber legality. However, with the ease in obtaining false documentation and the declaration of prosecutors that the provincial legislation is invalid, it is relatively easy to circumvent authorities during the transport phase. Although many authorities consider transportation control as a key mechanism in limiting the flow of illegal timber, they overestimate its effectiveness. As previously discussed, the going bribe rates are huge at $100 per truck of average quality illegal timber.

Phase 5 – Collecting and sorting timber in warehouses and yards. This phase serves to cover the tracks of illegal operations because both legal and illegal timber is bought and sold at these locations, and all logs are mixed during the process of piling and sorting. This makes it impossible to recognize timber origin because logs do not have personal identifying labels. Naturally, the owners of these warehouses and yards make extra profits from the trade of illegal timber.

Phase 6 – Customs examination for foreign exports. This is the final phase. Timber crosses the state border by different means: by sea and river, on ships and barges, by railroad cars, or directly on trucks. Customs houses are the last controlling institutions on the Russian side. Customs procedures are mostly limited to checking the conformity of prices, contracts, different documents, etc. At this point there is no real method of assessing timber origin. Furthermore, customs officers often do not even have sufficient knowledge to check important timber characteristics such as species and quality. Finally, the degree of corruption of customs staff is significant, limiting the effectiveness of these checkpoints in deterring or detecting illegal logging.

EXTERNAL FACTORS PROMOTING ILLEGALITY

In addition to the domestic factors described above that encourage illegal logging in Russia, there are foreign factors to be considered as well, first and foremost the profitable opportunity of selling this timber abroad, particularly to China. It is known that both the Russian and Chinese economies are highly corrupt. There are now many Chinese traders who own timber warehouses in Russian towns near the China-Russian border either personally or more often through Russian intermediaries. These warehouses are very unscrupulous about the origins of their timber purchases.

Many Chinese traders drive directly to logging sites and buy timber there. They immediately pay in cash. In general, payments in the illegal timber trade are done in cash to avoid detection and taxation. Cash payments were once executed in US dollars, but at present Russian rubles are also recognized as a stable currency and can be converted close to the border.

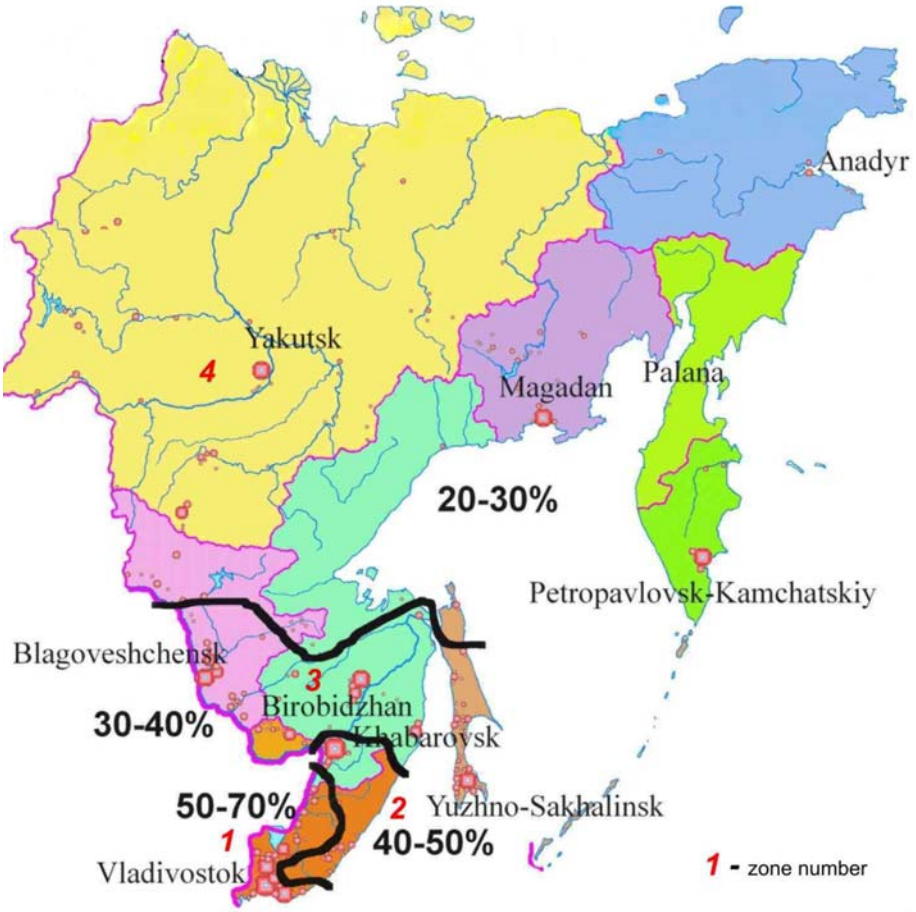
Illegal logging and trade flourished especially after a shift in Chinese forest policy in the second half of 1990s towards the conservation of forests growing north of the Yellow River. This coincided with the emergence of larger amounts of hard currency in the Chinese economy, creating a variety of opportunities for trade operations. Until that time, the Russian-Chinese illegal timber trade was mostly carried out through a bartering system that required more effort to wipe out illegal tracks. Following the policy and currency changes, the flow of round wood from Russia into China increased from 1.5 million cubic meters in 1999 to 14.8 million cubic meters in 2002 (*'Byulleten'* 2003).

Hardwoods are especially susceptible to illegal logging. This includes ash, oak, and most recently linden. As indicated before, these species grow only on certain sites and their harvesting is strictly limited. However there is a rising demand for them in China, stimulating intensive searches for high quality hardwood trees. Hardwood timber is sold at much higher prices than most species, and a significant portion of Russian hardwoods are re-exported from China to Japan after processing. This does not mean that there are no illegal logs among timber exported to Japan: illegal log exportation to Japan is more difficult to quantify than that shipped to China, but is definitely on a smaller scale.

Naturally, the actual volume of illegal logging is unknown and varies according to definition. The most extreme estimations vary from 0.5 percent of harvests according to official data of the Russian Forest Service to 100 percent according to data of officials, environmentalists and scholars (D. Efremov 2001; *Lesnaya gazeta, 2004; Lesnoy daidzhest* 2002; A. Kotlobay 2002; A. Morozov 2002; A. Sheingauz et al. 1996). One approach for assessing the trade as accurately as possible is given below.

First of all, one must consider that the shadow economy in Russia makes up 40 percent of the total economy. As the forest sector is more corrupt than the average level of the economy, it is likely that, on average, illegal logging accounts for over 50 percent of the RFE's forest sector's output. However, this figure will vary throughout the region. As indicated in Chapter 1, the incentives to carry out illegal logging vary by province and local area. The author's division of the RFE territory into four zones is illustrated in **Figure 4.1**.

Figure 4.1: Zoning of the Intensity of Illegal Logging in the Russian Far East



Source: Author 2002.

Zone 1: Most of Primorskiy Krai and the very southern part of Khabarovskiy Krai. Illegal timber is predominantly transported by trucks to Russian-Chinese border crossings and also to southern sea ports, both for transport to China and Japan. The most illegal logging in the RFE occurs in this area, at 50–70 percent of all harvesting. Some experts estimate that it has the highest rate of illegal logging in Russia.

Zone 2: The rest of Primorskiy Krai and a southern section of Khabarovskiy Krai. Illegal timber is mostly transported by rail along the Grodekovo – Suifunhe route or to the eastern sea ports of Primorskiy Krai. The zone has a very high degree of illegality, at 40–50 percent of all harvesting.

Zone 3: The central part of Khabarovskiy Krai, all of Yevreiskaya Autonomous Oblast, the southern part of Amurskaya Oblast, and the central and southern parts of Sakhalinskaya Oblast. Most of the illegal timber is consumed by the domestic market. The zone has a moderate degree of illegality, at 30–40 percent of all harvesting.

Zone 4: The northern parts of Khabarovskiy Krai, Amurskaya and Sakhalinskaya Oblasts, as well as all of the five northern RFE provinces. Most of the illegal timber is consumed by the domestic market. The zone has a relatively low degree of illegality, at 20–30 percent of all harvesting.

To estimate a volume of illegal logging all *leskhozes* were positioned into zones and for each *leskhoz* the illegal share and timber volume was estimated according to the zoning given above. Aggregated results are indicated by province in **Table 4.1**.

Table 4.1: Estimation of Illegal Share and Timber Volume in the RFE 2002

Territory	Official logging, thou. cu. m	Average weighted share of illegal logging, percent	Estimation of illegal logging, thou. cu. m	Estimation of total logging, thou. cu. m
Sakha Republic (Yakutiya)	358.0	25	90	450
Yevreiskaya Auton. Oblast	75.9	35	30	110
Chukotskiy Auton. Okrug	-	25	-	-
Primorskiy Krai	2415.6	53	1280	3700
Khabarovskiy Krai	7121.1	36	2580	9700
Amurskaya Oblast	1137.7	30	340	1480
Kamchatskaya Oblast	125.8	25	30	160
Koryakskiy Auton. Okrug	-	25	-	-
Magadanskaya Oblast	1.2	25	0.3	2
Sakhalinskaya Oblast	918.1	33	300	1220
RFE Total	12153.4	38	4650	16800

Source: Author's assessments 2004.

The real use of AAC, then, is not 18.2 percent as indicated by official data but, rather, 25.1 percent (**Table 4.2**).

Table 4.2: Use of AAC by Official and Estimated Volumes of Harvested Timber in the RFE 2002

Territory	Accessible AAC, mln cu m	AAC use, %	
		by official data	by estimation included illegal logging
Sakha Republic (Yakutiya)	30.6	1.3	1.5
Yevreiskaya Auton. Oblast	0.6	13.3	18.3
Chukotskiy Auton. Okrug	0	0	0
Primorskiy Krai	6.0	40.0	61.7
Khabarovskiy Krai	16.6	42.8	58.4
Amurskaya Oblast	10.0	12.0	14.8
Kamchatskaya Oblast	0.9	11.1	17.8
Koryakskiy Auton. Okrug	0	0	0
Magadanskaya Oblast	0.04	2.5	5.0
Sakhalinskaya Oblast	2.2	40.9	55.5
RFE Total	66.9	18.2	25.1

Source: Author's assessments 2004.

ATTITUDES TOWARDS ILLEGAL LOGGING AND MEASURES TAKEN

Naturally, questions arise concerning the positions of different groups in Russian society regarding illegal logging.

Russian officials

Russian officials and authorities take a very strict and condemning view of these practices. It is a concern at the federal and local levels of government, and both have taken measures to eliminate illegal logging. Some provinces, notably Khabarovskiy Krai, have established forest use commissions. These commissions control the allocation of the *Lesnoy Fond* for leasing and other uses, conditions of lease agreements and their fulfillment, etc. The commissions unite representatives from a broad range of backgrounds including local authorities, members of the Forest Service, environmental inspectors, business persons, indigenous people, scientists etc.

Measures are in place which aim to increase the transparency and publicity of all procedures, especially the process for tendering rights. These measures correspond to requirements of the Forest Code of the Russian Federation but are still not commonly implemented. Practically all southern provinces have installed control points on main roads which are patrolled by a combination of police and foresters. In Primorskiy and Khabarovskiy Krais, special patrolling brigades called '*Tiger*' and '*Kedr*' operate. They were created based on the State Ecological Control bodies with the support of WWF and other funds that equipped the brigades and provided them with decent salaries. The Forest Service also hired some policemen to act as the Forest Police within the configuration of the normal police force. In Primorskiy Krai and now Khabarovskiy Krai, customs houses (with the help of provincial authorities) have begun to concentrate sort yards into bigger operations that are under the full control of customs officers. These yards are replacing dozens of small warehouses that covered the tracks of illegal operations. This measure is widely recognized as being highly effective.

At present the federal Ministry of Natural Resources is developing a system of timber labeling as an important measure to eliminate illegal logging. According to this system, the stem of every tree destined for harvesting will have a plastic label with a barcode. A similar label will be placed on the butt-end of every log (**Figure 4.2**).

Figure 4.2: Examples of Plastic Labels for Trees (white) and Logs (black) Designed by the Ministry of Natural Resources of the Russian Federation to Eliminate Illegal Logging

Source: Author's photograph 2003.

A registry of all the barcodes will be maintained using computers and new communication technology. It is estimated that this system will cost about 20 US cents per cubic meter. It is scheduled for experimental implementation in the year 2004 in 12 out of the 89 Russian provinces, none of which are in the RFE. Primary obstacles to the system's implementation include:

- the substantial financial investment needed to computerize the entire Forest Service;
- the lack of computer skills on the part of most Forest Service personnel, many of whom are old and resist getting familiar with computers;
- the lack or absence of communication in remote taiga settlements where some *leskhozes* and their divisions are located; it is possible to establish brand new communication systems (radio, satellite links, etc.), but these too would require expensive equipment and the training of operators;
- the corruption among the ranks of the Forest Service staff: the full responsibility of this tracking, labeling, and data management system is supposed to fall upon the Forest Service, which is already known to have corrupt officials in its ranks.

Now this project is partly financed by the World Bank Pilot Project of Sustainable Management in the Russian Federation. It is necessary to recognize that all of the measures discussed above will only be effective if properly implemented by officials, because illegal logging on this scale is only possible with the cooperation of authorities. As long as some officials are corrupt, no measures will have the complete effect of stamping out illegal forest activities. Also, it is unrealistic to believe that illegality can be brought to an end in the forest sector while illegal activities are widely practiced in other facets of the economy; the level of corruption in Russian forestry is reflective of the society's norms. At present, widespread crime and corruption are high on Russia's list of problems; addressing them and finding solutions are very important national tasks.

Business People

There are varying attitudes toward illegal logging among business people operating in the forest sector. Licensees, especially large ones, protect their leased stands from poachers, while some of them practice illegal logging themselves. Short-term users (less than one year) are more likely to engage in illegal activities, and often resort to different tricks. On December 23, 2003, eleven big logging firms of the European part of Russia had passed a charter, in which they agreed to engage in only honest and transparent business both in production and in foreign trade (*Khartiya 2004*). They called upon other Russian logging firms to join to their charter. Unfortunately, it is not known if anybody joined.

The Public

The general population's attitude towards illegal cutting can be assessed based on two studies carried out in 2001. The first study was forest-specific and was a joint project of the Economic Research Institute (Khabarovsk, Russia) and the Institute for Global Environmental Strategies (Hayama, Japan) in the Lazo district of Khabarovskiy Krai. The questionnaire covered the Sita community that is in a depressed state because of the depletion of its forests, the Sukpai community that is in a more progressed state because of the development of local forest business, and the aboriginal village Gvasyugiand, as well as the Lazo *raion* (district) as a whole.

All respondents from the Lazo *raion* ranked illegal logging as the second strongest influence on forests. Forest fires were ranked first, with legal commercial logging ranked third. Sita residents believed that illegal logging comprised 61 percent of all logging, and Sukpai residents put the number at 35 percent. The average evaluation of illegal timber share by all respondents from the *raion* was 53 percent of total volume logged.

Of all respondents, 81 percent believed that illegal logging causes severe damage; 98 percent of respondents from the depressed settlement Sita and 70 percent of respondents from the progressed settlement of Sukpai consider illegal logging to cause severe damage. It is clear that negative attitudes towards the phenomenon dominate throughout the district: 69.5 percent of the respondents consider illegal logging to be a crime, but 30.5 percent believe that it is sufficient to fine those responsible. On this last point, aboriginal respondents from Gvasyugi felt more strongly, with 42.9 percent considering fines as adequate punishment.

At roughly the same time, the Khabarovsk Wildlife Fund carried out a survey in 8 southern districts of Khabarovskiy Krai as a part of a GEF project (Sheingauz, Sukhomirov 2002). When asked to evaluate illegal logging, an average of 60.8 percent of all respondents considered it to be a crime. When broken down, this study found that 64.7 percent of the urban population, 59.4 percent of the rural population and 42.9 percent of indigenous people considered illegal logging as a criminal activity. Thus the majority of the population considers illegal logging to be a crime. However, a significant proportion (40 percent) of the population does not regard such illegality as criminal. Perhaps these are the people who are involved in illegal logging since it can only occur if a portion of the labor force is willing to do it. People involved in illegal logging are usually recruited from the ranks of the unemployed, particularly in depressed settlements where participation in illegal logging has become the only source of income. This is a typical situation for aboriginal villages.

Various Non-Governmental Organizations (NGOs)

NGOs were the first to raise the alarm about illegal logging. Local NGOs, such as BROC, Strazh Taigi, Sakhalin Ecological Watch, Amur division of the Social-Ecological Union, and the Dahuriya Ecological Center (Chitinskaya Oblast) have been especially forceful. International NGOs such as Greenpeace, Pacific Environment, Friends of Earth, and WWF have also played important roles in developing public attention and opinion, and attracting the attention of officials. These organizations are very active in meetings, publications etc., as well as in real field control. Unfortunately, their statements and public complaints are often backed up by real case studies but are not supported by sufficient judicial and professional foundations.

ECOLOGICAL IMPACTS OF ILLEGAL LOGGING

As a rule, critics of illegal logging, led by NGOs, associate these activities with significant environmental damage. In reality, the ecological consequences of illegal logging are not as clearly defined. First of all, legal logging falls very short of full AAC utilization. Hence illegal logging does not translate into overharvesting of the RFE as a whole or of RFE provinces. However, in some *leskhozes* or their parts, cut volume become close to full AAS use.

At the site level, illegal logging usually has the same consequences as ordinary legal logging, in that natural reforestation follows unless there is a fire. Illegal logging of high quality timber is selective in character, as opposed to clear-cutting; as a result it does not cause significant damage to watershed protection and atmospheric regulation. Therefore the contention by some NGOs that illegal logging causes flooding is false and is also unsupported by scientific observation in the field.

Thus illegal logging in general brings the same damage resulting from legal logging. However there are specific damages. The first specific damage of illegal logging consists of the extraction of "protected" species such as cedar (*Pinus koraiensis*), linden (*Tilia spp.*), nut-tree (*Juglans mandshurica*), and velvet-tree (*Phellodendron amurensis*). The second specific damage is linked to cutting in protected forests, even in those where it is strictly prohibited. The third and the most wide-spread specific damage of illegal logging is disregard of harvesting regulations that are noted in some special legal acts, first of all in the "*Pravila rubok glavnogopol'zovaniya"* (2000). The acts demand implementation of many different silvicultural conditions and limitations to preserve a state of the harvested site that provides for either rehabilitation (in the case of selective cutting) or reforestation. In spite of weaker controls, many big and medium logging firms meet these demands. Naturally, illegal loggers do not obey these requirements. This has resulted in:

- the obliteration of natural undergrowth, which eliminates a potential source of natural reforestation;
- the destruction of the forest floor due to skidder tracks, owing to a lack of silviculture technology; this exposes mineral soils and instigates soil erosion;
- the introduction of debris and slash to cutting sites, increasing the fire hazard.

The forth specific damage is tax evasion. The fifth specific damage has social meaning and is very bad because it depraves the local population, persuading people that legislation violations are very profitable and non-punishable in reality, at minimum serving to undermine the moral principles of society.

RUSSIAN FORESTRY'S FUTURE

The two most likely scenarios for the forest sector of the territory analyzed in this paper are:

1. Scenario of inertia – similar to the status quo, with a slow increase in harvested volume and area. In this case, the share of illegal timber in comparison with legal timber will be stable but the physical volume of illegal timber flow will rise slowly, especially in the domestic market. There is an assumption that regulations in international markets will be strengthened due to suspicions about the origins of forest products. This scenario is not very dangerous in terms of forest cover decrease but is hazardous in terms of negative forest transformation and for the moral principles of Russia's economy.

2. Scenario of transformation – an increase in harvested volume, slower expansion of area harvested, increased harvesting of low-grade and small-size timber, a rapid decline in illegal logging, a slow shift to sustainability, and a strengthening of Russia's position in the international timber market. In this scenario, risks to the environment and the state of forest stands will gradually decrease. This scenario would facilitate progress towards a normal market economy, but a strong political resolve and ample investments into wood processing are required for this scenario to succeed.

RECOMMENDATIONS

The most important recommendation for the federal and local governments is to develop a strong political will. To do this they must remove all corrupt staff members. Then they need to implement current laws without any hesitation, improve others, and also introduce new legislation. Finally, they must stop the continuous reorganization of the crucial Forest Service that has been destroying the service and start reinforcing it. Only a strong, competent and uncorrupt Forest Service can truly put an end to illegal logging in Russia.

Those are the immediate measures that need to be taken. However, a persistent control system is needed as well. A special Geographic Information System (GIS) is required to monitor the entire logging system. This GIS is a more long-term measure but would be effective in contributing to positive change. It must include:

- comprehensive information about forest plots that have been allocated for logging; and
- information from space images about the actual location and size of clearings.

Businesspeople in the timber industry must understand that since illegal logging is common, it sheds suspicion upon all firms, even the honest ones. All firms stand to lose access to international timber markets as a result of illegal forest activities, so it is in the common interest of the local industry to cleanse all businesses of corruption.

It is also widely recognized that forest certification is a very strong measure against illegal logging and other illegalities in the forest sector. Some far-sighted firms have begun to move towards certification, while still waiting for further development of the certification situation. Hence pressure from consumer groups has the potential to catalyze both the certification movement and the reduction of illegality in Russia's forest sector.

CONCLUSIONS

The forest sector in the Russian Far East has long been geared towards foreign trade, especially after the 1950s. At the end of the Soviet era, roughly a quarter of all timber products were being exported abroad. That situation changed rapidly during the transition period, when the economic crisis, high inflation rates, huge reductions in domestic demand, and total insolvency had enormous impacts on the forest sector. Foreign timber markets became the most important factor allowing the sector to survive. Foreign exports turned into the major source of income for the forest sector, and took on an even greater role during the current development of the sector.

The strengthening of international economic ties continues to have more positive than negative impacts on Russia. Integration of the RFE economy with the economy of Northeast Asia and the Pacific Rim is inevitable due to the vast natural resource potential of the RFE and its relatively small domestic market. More importantly, this integration is now official policy.

For many years, the export policies of the RFE forest sector were generally oriented towards trade with Japan. However, Japan's long economic recession and the powerful development of the Chinese economy resulted in China becoming Russia's primary timber trade partner. This has special significance be-

cause the Chinese economy has many traits of style, methods, and management that are comparable to Russia's economy.

One of the major aspects of the Russian transition period was a substantial weakening of control and the subsequent flourishing of illegality, including crime and corruption. This initiated illegal logging. In this situation of extensive illegality, very different stakeholders must cooperate to conquer illegality and change forestry into a respectful sector. Unfortunately, some foreign trade partners are eager to share illegal profits with Russian loggers; the majority of these partners are from China, although there are also such partners from other countries. The Russian-Chinese land border is favored by timber smugglers because it is easier to export contraband by truck than by ship.

It is widely believed that the exhaustion of forest resources in Russia is occurring extensively. In fact, the forest resources were and remain one of the most important elements of the RFE's and Southeastern Siberia's economic development, and are the foundation of local economies in a number of provinces. Reform of the forest governance is urgently needed, although it is a political process and it does not go ahead without struggle between individuals and between institutions.

Without a doubt, illegal logging in Russia was not caused by Chinese import demands; it is a result of the general economic and moral situation in Russian society. The forest sector can not be treated separately until the society as a whole is healthier. However, one can hope that the moral situation will normalize in the wake of Russian societal development; and that positive changes in the RFE forest sector may accelerate Russia's transition into a state of social and economic maturity. At the current rate of extensive development, the growth of the forest sector may only last another 10 years before collapsing. The only solution is the development of the wood processing industry.

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APPENDIX

Appendix Table 1: Distribution of Forest Lands according to Dominant Tree Species of the RFE *Lesnoy Fond*

January 1, 2003. Distribution described in area (*thousands of hectares*)

Dominant tree species	Sakha Republic (Yakutiya)	Yevreiskaya Auton. Oblast	Chukotskiy Auton. Okrug	Primorskiy Krai	Khabarovskiy Krai	Amurskaya Oblast	Kamchatskaya Oblast	Koryakskiy Auton. Okrug	Magadanskaya Oblast	Sakhalinskaya Oblast	**RFE Total**
Cedar	396.1	177.4		2162.6	524.4	7.9	-	-	-	0.1	**3268.5**
Pine	9731.1	6.1	-	3.5	1102.5	681.6	16.0	-	0.2	76.9	**11617.9**
Spruce & fir	382.1	243.6	0.0	2966.7	7796.4	487.5	201.4	0.0	0.0	2136.0	**14213.7**
Larch	108959.8	166.3	1652.5	1219.2	28340.8	13441.6	493.0	417.5	6485.3	1625.7	**162802.0**
Conifer subtotal	119469.1	593.4	1652.5	6352.0	37764.1	14618.6	710.4	417.5	6485.5	3838.7	**191902.0**
Oak	-	335.4		1995.4	325.7	423.8	-	-	-	25.2	**3105.5**
Ash	-	3.8		306.3	93.4	0.6	-	-	-	-	**404.1**
Birches	1835.7	414.9	0.3	1814.9	4951.0	5196.1	4543.7	2047.9	10.1	1188.5	**22003.1**
Linden	-	99.5		406.2	307.1	19.0	-	-	-	-	**831.8**
deciduous	166.8	116.1	97.4	453.1	1227.6	214.5	1370.8	302.1	210.8	162.5	**4321.7**
Deciduous subtotal	2002.5	969.7	97.7	4975.9	6904.8	5854.0	5914.5	2350.0	220.9	1376.2	**30666.2**
Creeping forests & bushes	21590.2		3162.4	45.4	6255.3	2182.2	2379.6	7070.1	9553.5	304.6	**52543.3**
Total ha	**143061.8**	**1563.1**	**4912.6**	**11373.3**	**50924.2**	**22654.8**	**9004.5**	**9837.6**	**16259.9**	**5519.5**	**275111.0**

Source: Database of the ERI, 2003 and author's calculations.

Appendix Table 2: Distribution of Forest Lands according to Dominant Tree Species of the RFE *Lesnoy Fond*

January 1, 2003. Distribution described in area (%)

Dominant tree species	Sakha Republic (Yakutiya)	Yevreiskaya Auton. Oblast	Chukotskiy Auton. Okrug	Primorskiy Krai	Khabarovskiy Krai	Amurskaya Oblast	Kamchatskaya Oblast	Koryakskiy Auton. Okrug	Magadanskaya Oblast	Sakhalinskaya Oblast	**RFE Total**
Cedar	0.3	11.3	0.0	19.0	1.0	0.0	0.0	0.0	0.0	0.0	**1.2**
Pine	6.8	0.4	0.0	0.0	2.2	3.0	0.2	0.0	0.0	1.4	**4.2**
Spruce & fir	0.3	15.6	0.0	26.1	15.3	2.2	2.2	0.0	0.0	38.7	**5.2**
Larch	76.2	10.6	33.6	10.7	55.7	59.3	5.5	4.2	39.9	29.5	**59.2**
Conifer subtotal	83.5	38.0	33.6	55.9	74.2	64.5	7.9	4.2	39.9	69.5	**69.8**
Oak	0.0	21.5	0.0	17.5	0.6	1.9	0.0	0.0	0.0	0.5	**1.1**
Ash	0.0	0.2	0.0	2.7	0.2	0.0	0.0	0.0	0.0	0.0	**0.1**
Birches	1.3	26.5	0.0	16.0	9.7	22.9	50.5	20.8	0.1	21.5	**8.0**
Linden	0.0	6.4	0.0	3.6	0.6	0.1	0.0	0.0	0.0	0.0	**0.3**
Other deciduous	0.1	7.4	2.0	4.0	2.4	0.9	15.2	3.1	1.3	2.9	**1.6**
Deciduous subtotal	1.4	62.0	2.0	43.8	13.6	25.8	65.7	23.9	1.4	24.9	**11.1**
Creeping forests & bushes	15.1	0.0	64.4	0.4	12.3	9.6	26.4	71.9	58.8	5.5	**19.1**
Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Database of the ERI, 2003 and author's calculations.

Appendix Table 3: Distribution of Growing Wood Stock according to Dominant Tree Species of the RFE *Lesnoy Fond*

January 1, 2003. Distribution described in volume (*million cubic meters*)

Dominant tree species	Sakha Republic (Yakutiya)	Yevreiskaya Auton. Oblast	Chukotskiy Auton. Okrug	Primorskiy Krai	Khabarovskiy Krai	Amurskaya Oblast	Kamchatskaya Oblast	Koryakskiy Auton. Okrug	Magadanskaya Oblast	Sakhalinskaya Oblast	**RFE Total**
Cedar	74.17	30.52	-	425.83	104.81	1.44	-	-	-	-	**636.77**
Pine	1019.67	0.22	-	0.28	116.91	54.81	0.63	-	-	3.07	**1195.59**
Spruce & fir	49.24	33.71	-	528.65	1254.44	79.26	34.71	-	-	351.99	**2332.00**
Larch	7337.08	15.81	44.98	207.66	2735.72	1427.45	70.63	18.47	251.38	161.07	**12270.25**
Conifer subtotal	8480.16	80.26	44.98	1162.42	4211.88	1562.96	105.97	18.47	251.38	516.13	**16434.61**
Oak	-	28.14		214.15	33.44	18.48	-	-	-	2.46	**296.67**
Ash	-	0.39		39.75	11.19	0.06	-	-	-	-	**51.39**
Birches	65.92	33.65	0.02	214.90	337.94	335.39	375.02	181.04	0.44	71.91	**1616.23**
Linden	-	15.24	-	63.44	46.38	2.43	-	-	-	-	**127.49**
Other deciduous	18.11	12.39	8.12	55.44	121.70	22.72	55.37	21.64	25.43	10.46	**351.38**
Deciduous subtotal	84.03	89.81	8.14	587.68	550.65	379.08	430.39	202.68	25.87	84.83	**2443.16**
Creeping forests & bushes	261.42		28.90	3.02	272.07	58.34	86.77	332.26	110.06	17.36	**1170.20**
Total	**8825.61**	**170.07**	**82.02**	**1753.12**	**5034.60**	**2000.38**	**623.13**	**553.41**	**387.31**	**618.32**	**20047.97**

Source: Database of the ERI, 2003 and author's calculations.

Appendix Table 4: Distribution of Growing Wood Stock according to Dominant Tree Species of the RFE *Lesnoy Fond*

January 1, 2003. Distribution described in volume (%)

Dominant tree species	Sakha Republic (Yakutiya)	Yevreiskaya Auton. Oblast	Chukotskiy Auton. Okrug	Primorskiy Krai	Khabarovskiy Krai	Amurskaya Oblast	Kamchatskaya Oblast	Koryakskiy Auton. Okrug	Magadanskaya Oblast	Sakhalinskaya Oblast	**RFE Total**
Cedar	0.8	17.9	0.0	24.3	2.1	0.1	0.0	0.0	0.0	0.0	**3.2**
Pine	11.6	0.1	0.0	0.0	2.3	2.7	0.1	0.0	0.0	0.5	**6.0**
Spruce & fir	0.6	19.8	0.0	30.2	24.9	4.0	5.6	0.0	0.0	56.9	**11.6**
Larch	83.1	9.3	54.8	11.8	54.3	71.4	11.3	3.3	64.9	26.0	**61.2**
Conifer subtotal	96.1	47.2	54.8	66.3	83.7	78.1	17.0	3.3	64.9	83.5	**82.0**
Oak	0.0	16.5	0.0	12.2	0.7	0.9	0.0	0.0	0.0	0.4	**1.5**
Ash	0.0	0.2	0.0	2.3	0.2	0.0	0.0	0.0	0.0	0.0	**0.3**
Birches	0.7	19.8	0.0	12.3	6.7	16.8	60.2	32.7	0.1	11.6	**8.1**
Linden	0.0	9.0	0.0	3.6	0.9	0.1	0.0	0.0	0.0	0.0	**0.6**
Other deciduous	0.2	7.3	9.9	3.2	2.4	1.1	8.9	3.9	6.6	1.7	**1.8**
Deciduous subtotal	1.0	52.8	9.9	33.5	10.9	19.0	69.1	36.6	6.7	13.7	**12.2**
Creeping forests & bushes	3.0	0.0	35.2	0.2	5.4	2.9	13.9	60.0	28.4	2.8	**5.8**
Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Database of the ERI, 2003 and author's calculations.

Appendix Table 5: Distribution of Average Growing Wood Stock according to Dominant Tree Species of the RFE *Lesnoy Fond*

January 1, 2003. Distribution described in average volume *(cubic meters per hectare)*

Dominant tree species	Sakha Republic (Yakutiya)	Yevreiskaya Auton. Oblast	Chukotskiy Auton. Okrug	Primorskiy Krai	Khabarovskiy Krai	Amurskaya Oblast	Kamchatskaya Oblast	Koryakskiy Auton. Okrug	Magadanskaya Oblast	Sakhalinskaya Oblast	**RFE Total**
Cedar	187.3	172.0	-	196.9	199.9	182.3	-	-	-	0.0	**194.8**
Pine	104.8	36.1	-	80.0	106.0	80.4	39.4	-	0.0	39.9	**102.9**
Spruce & fir	128.9	138.4	-	178.2	160.9	162.6	172.3	-	-	164.8	**164.1**
Larch	67.3	95.1	27.2	170.3	96.5	106.2	143.3	44.2	38.8	99.1	**75.4**
Conifer subtotal	71.0	135.3	27.2	183.0	111.5	106.9	149.2	44.2	38.8	134.5	**85.6**
Oak	-	83.9		107.3	102.7	43.6	-	-	-	97.6	**95.5**
Ash	-	102.6		129.8	119.8	100.0	-	-	-	-	**127.2**
Birches	35.9	81.1	66.7	118.4	68.3	64.5	82.5	88.4	43.6	60.5	**73.5**
Linden	-	153.2	-	156.2	151.0	127.9	-	-	-	-	**153.3**
Other deciduous	108.6	106.7	83.4	122.4	99.1	105.9	40.4	71.6	120.6	64.4	**81.3**
Deciduous subtotal	42.0	92.6	83.3	118.1	79.7	64.8	72.8	86.2	117.1	61.6	**79.7**
Creeping forests & bushes	12.1		9.1	66.5	43.5	26.7	36.5	47.0	11.5	57.0	**22.3**
Total	**61.7**	**108.8**	**16.7**	**154.1**	**98.9**	**88.3**	**69.2**	**56.3**	**23.8**	**112.0**	**72.9**

Source: Database of the ERI, 2003 and author's calculations.

Appendix Table 6: Industrial Output of the Forest Sector during Pre-Crisis Development

Territory	1960	1970	1980	1985	1990
Commercial round wood, thousand cubic meters					
Sakha Republic (Yakutiya)	1656	1447	1638	1843	1886
Primorskiy Krai	2702	4625	4744	4519	3716
Khabarovskiy Krai & Yevreiskaya Auton. Oblast	5291	9927	11605	11327	9943
Amurskaya Oblast	2188	2821	3413	4700	4549
Kamchatskaya Oblast & Koryakskiy Auton. Okrug	393	542	589	659	517
Magadanskaya Oblast & Chukotskiy Auton. Okrug	297	340	308	252	181
Sakhalinskaya Oblast	2231	3101	2823	3017	2669
RFE Total	14758	22803	25120	26317	23462
Republic Buryatiya	4021	4221	…	3969	3208
Irkutskaya Oblast	15404	23369	…	29409	30713
Chitinskaya Oblast & Aginskiy-Buryatskiy Auton. Okrug	2437	3360	…	3635	2724
Southeastern Siberia Total	21862	30950	…	37013	36645
Sawn wood, thousand cubic meters					
Sakha Republic (Yakutiya)	443	588	730	810	809
Primorskiy Krai	1394	1652	1608	1495	1044
Khabarovskiy Krai & Yevreiskaya Auton. Oblast	1634	2388	2119	2075	1921
Amurskaya Oblast	585	864	777	756	863
Kamchatskaya Oblast & Koryakskiy Auton. Okrug	153	272	252	283	219
Magadanskaya Oblast & Chukotskiy Auton. Okrug	187	198	192	201	116
Sakhalinskaya Oblast	693	666	548	585	448
RFE Total	5089	6628	6226	6205	5420
Republic Buryatiya	935	1275	1323	1288	1192
Irkutskaya Oblast	5010	6434	7179	7670	7915
Chitinskaya Oblast & Aginskiy-Buryatskiy Auton. Okrug	731	1050	1184	1177	1065
Southeastern Siberia Total	6676	8759	9686	10135	10172
Plywood, thousand cubic meters					
Yevreiskaya Auton. Oblast	0	0.4	1.4	1.2	0.7
Primorskiy Krai	25.3	31.9	20.1	23.5	17.2
Khabarovskiy Krai	5.7	17.5	14.5	10	6.2
Amurskaya Oblast	0	0.9	0.2	1.2	1.2
RFE Total	31	50.7	36.2	35.9	25.3
Irkutskaya Oblast	17.3	38.8	107.7	190.3	201.5
Southeastern Siberia Total	17.3	38.8	107.7	190.3	252.1
Cellulose, thousand tons					
Khabarovskiy Krai	110.2	105.7	185.5	95.1	264.2
Sakhalinskaya Oblast	263.9	325.4	312.4	323.2	275.7
RFE Total	374.1	431.1	497.9	418.3	539.9
Republic Buryatiya	…	…	115.1	129.8	151.4
Irkutskaya Oblast	…	…	939.7	1520.9	1466.8
Southeastern Siberia Total	…	…	1054.8	1650.7	1618.2
Paperboard, thousand tons					
Khabarovskiy Krai	10.4	36.1	84.4	120.3	155.7
Sakhalinskaya Oblast	57.6	84.9	85.3	71.7	84.9
RFE Total	68	121	169.7	192	240.6
Republic Buryatiya	0	0	106,2	112,2	140,0
Irkutskaya Oblast	1,3	184,6	190,5	219,8	188,0
Southeastern Siberia Total	1,3	184,6	296,7	332,0	328,0

Source: Database of the ERI, 2003 and author's calculations.

Appendix Table 7: Industrial Output of the Forest Sector during and after the Economic Crisis

Territory	1991	1995	1998	2000	2001	2002
Commercial round wood, thousand cubic meters						
Sakha Republic (Yakutiya)	1534,9	349,6	177,3	268,6	279,5	279,8
Yevreiskaya Auton. Oblast	418,5	33,8	7,2	22,4	15,2	63,7
Chukotskiy Auton. Okrug	0,5	0	0	0	0	0
Primorskiy Krai	2755,4	1231,9	1131,4	1872,8	1968,5	2053,1
Khabarovskiy Krai	8053,8	3452,6	2708	4775,9	5814,9	6390,6
Amurskaya Oblast	3922,7	1154,2	436	698,6	816,7	943,3
Kamchatskaya Oblast	421,9	56,2	51,3	62,2	63,9	46,2
Koryakskiy Auton. Okrug	4,5	0,7	0	0	0	0,0
Magadanskaya Oblast	140,1	4,1	4,8	0,9	0	0,8
Sakhalinskaya Oblast	2395,3	1087,9	398,3	749,1	793,4	822
RFE Total	19643,1	7370,3	4914,3	8450,5	9752,1	10598,7
Republic Buryatiya	2474,8	885,7	300,3	404,6	458,2	502
Aginskiy-Buryatskiy Auton. Okrug	61,0	7,4	8,1	5,2	7,2	3,1
Irkutskaya Oblast	27723,6	12032,0	7557,7	9711,0	12601,0	14300
Chitinskaya Oblast	2405,5	517,8	255,9	336,9	343,7	306,3
Southeastern Siberia Total	32664,9	13442,9	8122,0	10457,7	13410,1	15111,4
Sawn wood, thousand cubic meters						
Sakha Republic (Yakutiya)	612,8	224,3	105,8	149,0	190,4	166,3
Yevreiskaya Auton. Oblast	315,6	30,5	4,9	6,1	5,4	4,0
Chukotskiy Auton. Okrug	14	0	0	0	0	0,0
Primorskiy Krai	842,4	133,7	69,0	150,7	150,8	163,8
Khabarovskiy Krai	1367,5	313,9	145,5	229,9	315,1	354,3
Amurskaya Oblast	727,4	121,5	60,8	53,9	49,0	60,9
Kamchatskaya Oblast	169,8	38,9	22,2	21,6	18,5	14,7
Koryakskiy Auton. Okrug	4,2	1,9	0	0	0	0,0
Magadanskaya Oblast	88,2	4,7	3,7	2,6	1,4	1,0
Sakhalinskaya Oblast	410,5	105,2	71,8	59,5	57,5	65,2
RFE Total	4548,2	972,7	483,7	673,3	788,1	830,2
Republic Buryatiya	983,3	205,8	139,0	138,0	80,9	132,3
Aginskiy-Buryatskiy Auton. Okrug	43,8	6,6	3,1	2,1	2,6	1,3
Irkutskaya Oblast	7198,1	2368,4	1925,8	1711,5	1597,4	1817,9
Chitinskaya Oblast	884,7	254,5	112,9	78,0	69,9	87,6
Southeastern Siberia Total	9109,9	2835,3	2180,8	1929,6	1750,8	2039,1
Plywood, thousand cubic meters						
Yevreiskaya Auton. Oblast	0,6	0	0	0	0	0
Primorskiy Krai	6,9	1,0	0	0	0	0
Khabarovskiy Krai	6,9	0	0	0	0	0

Amurskaya Oblast	0,7	0	0	0	0	0
RFE Total	15,1	1,0	0	0	0	0
Irkutskaya Oblast	153,2	101,1	72,7	124,3	126,8	127
Southeastern Siberia Total	153,2	101,1	72,7	124,3	126,8	127
Cellulose, thousand tons						
Khabarovskiy Krai	240,0	27,4	0	0	0	0
Sakhalinskaya Oblast	244,8	32,6	2,2	11,3	11,1	4,6
RFE Total	484,8	60,0	2,2	11,3	11,1	4,6
Republic Buryatiya	136,8	80,6	38,7	80,6	84,2	94,8
Irkutskaya Oblast	1215,4	1178,5	823,1	1313,4	1411,3	1521,5
Southeastern Siberia Total	1352,2	1259,1	861,8	1394,0	1495,5	1616,3
Paperboard, thousand tons						
Primorskiy Krai	0	0	0	18,5	19,3	21,1
Khabarovskiy Krai	143,2	5,0	3,7	4,7	5,4	6,1
Sakhalinskaya Oblast	77,3	8,1	2,4	9,6	7,3	3,6
RFE Total	220,5	13,1	6,1	32,8	32,0	30,8
Republic Buryatiya	127,8	72,4	32,5	76,6	78,2	88,4
Irkutskaya Oblast	174,9	141,0	121,8	162,3	183,3	194,6
Southeastern Siberia Total	302,7	213,4	154,3	238,9	261,5	283

Source: Database of the ERI 2004.

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