Part I: OVERVIEW

I. FORESTS OF RUSSIA

Russia's vast forests represent 25% of the world's remaining forests and over 57% of the earth's coniferous forests (Rosencranz, 1992). And what makes these forests particularly important globally is that huge tracts of forest remain relatively pristine, particularly when compared with other northern forests. Logging has reduced old-growth forests to 1%-2% of their original size in Sweden and Finland. Western Europe, as a whole, only has about 1% of its original forests left (Dudley, 1995).

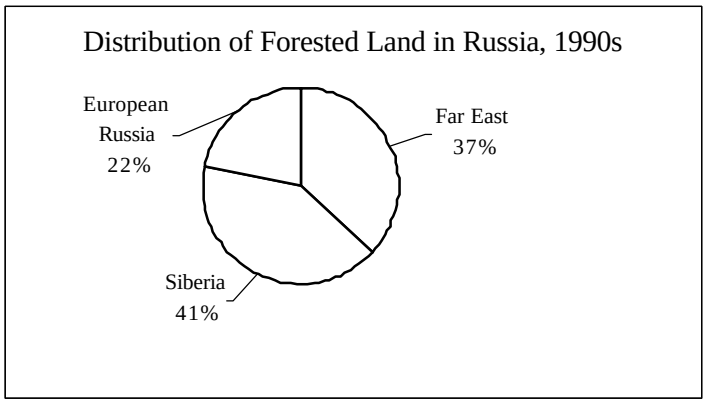
A 1997 global analysis by the World Resources Institute revealed that Russia holds 26% of the world's 'frontier forests'. Frontier forests, according to WRI, are forests that are "relatively undisturbed and big enough to maintain all of their biodiversity, including viable populations of the wide-ranging species associated with each forest type." The table below illustrates how Russia compares to the rest of the world.

Countries With Most of the World's Remaining Frontier Forest

Global Rank	Country	Total Frontier Forest (000 Km2)	Percent of the World's Total Frontier Forest
1	**Russia**	**3,448**	**26**
2	Canada	3,429	25
3	Brazil	2,284	17
4	Peru	540	4
5	Indonesia	530	4
6	Venezuela	391	3
7	Colombia	348	3
8	United States	307	2
9	Zaire	292	2
10	Bolivia	255	2
11	Papua New Guinea	172	1
12	Chile	162	1
	Total frontier forest area of the top 12 countries as a % of the global total:		**90**

Source: WRI, 1997.

Most of Russia's frontier forests are in Siberia and the Russian Far East; centuries of heavy logging and mining have taken a heavy toll on most of the forests in the European part of Russia. In terms of total forest land in Russia, Siberia has 41%, the Russian Far East holds 37%, and European Russia has 22% respectively (See the chart below). These percentages should not be confused with total percentages of frontier forest.



Source: The Federal Forest Service of Russia, 1996.

II. FORESTS OF THE RUSSIAN FAR EAST

Forests cover about 45% of the RFE and are over seven times larger than the total land mass of Japan. Scientists disagree on how much of the 'frontier forest' remains; estimates ranges from 25% to 50%. Forests of the Russian Far East total 273.7 million hectares and timber reserves are estimated at 20.4 billion cu.m. (Far Eastern Forest Inventory Enterprise, 1995).

Most forests (71.9%) in the Russian Far East are coniferous and simple in structure due to the huge larch forests that become increasingly dominant as you move from south to north; larch makes up almost 61% of all forests in the RFE. However, some of the forests in the southern Russian Far East are very diverse with a rich mixture of conifer and broadleaved tree species. The following table illustrates the tree species distribution in more detail:

Russian Far East Forests by Species

Larch: 61%
Creeping pine/Creeping Alder: 11.8%
Birch: 7.6%
Fir/Spruce: 5.5%

Korean Pine: 1.2%
Oak: 1.1%
Linden: 0.3%
Ash: 0.1%

Source: Far Eastern Forestry Inventory Enterprise, 1995.

Forty percent of the forests remain inaccessible to logging due to the mountainous landscape and lack of infrastructure. However, the timber industry has heavily overlogged many accessible areas, particularly around railroads and near population centers. This problem is compounded by uneven forest distribution. Arctic regions are virtually treeless due to the extreme cold. Permafrost, which underlies about three-quarters of the forests, combined with cold weather and low precipitation, limits tree growth and regeneration. Although foresters often state that Russian forests are increasing, this is misleading. Due to heavy logging and fire, second-growth deciduous forests are replacing mature conifer trees (spruce, pine, fir) in the total forest cover at a rate of about 0.8% a year.

The Most Commercially Valuable Forests of the RFE

The southern Far East, beginning with Primorskiy Krai, followed by Sakhalin Oblast (including the Kuril islands), Khabarovsk Krai, and then the Amur region, has the most productive and biologically diverse forests. The richest forests of all, in terms of biodiversity, are the Ussuri Taiga, along the Sikhote-Alin mountain range, which still has a number of large intact watersheds. There are many other important frontier forests in the Far East which deserve protection. These forest 'hotspots' are overviewed in Section VII and in more detail in Part II: Region by Region Studies. Some of these important forests include:

- Ussuri Taiga forests of the central and northern Sikhote-Alin mountain range
- Black-fir forests near Kedrovaya Pad Reserve (Primorye Region)
- Sakhalin Island's central and northern forests, particularly along Nabil'skiy Ridge and on Schmidt Peninsula. Fragments grow in the south.
- Kamchatka's coniferous forests of spruce and fir in the middle of the peninsula; locals call the region Conifer Island.
- Larch forests in Magadan Region, particularly those in the Magadan zapovednik (nature reserve)
- Boreal and sub-tundra forests of Sakha

♦ Amur River basin forests, particularly the old-growth pine forests west of the Selemdzha River and in the lower reaches of the Zeya River. Some species-rich conifer-broadleaved forests remain on the Zeisko-Bureinskaya plain.

Table I Timber reserves by Region

	Total (000,000 cu. m.)	Conifer (000,000 cu. m.)
Russian Far East	21,257.8	17, 861.7
Republic of Yakutia (Sakha)	9, 413	9,136.6
Khabarovsk Krai	5,378.5	4,617.2
Amur Oblast	2,033.1	1,644.7
Primorskiy Krai	1,938.1	1,335.1
Kamchatka Oblast	1,230.4	146.9
Sakhalin Oblast	689.7	597.6
Magadan Oblast	574.9	383.6

Source: Lesson (M. 1991).

An Snapshot of the Geography and Ecology of the Russian Far East

To get a clearer picture of these forests, it is important to have an understanding of how they fit into the larger RFE landscape. The following passage is excerpted from Newell and Wilson's *The Russian Far East: Forests, Biodiversity Hotspots, and Industrial Developments:*

Plateaus, mountain ranges, and peaks from about 1,000 to 2,000 meters high cover approximately 75% of the Russian Far East. The great volcanoes of Kamchatka are higher, with Klyuchevskiy Volcano rising 4,750 meters. Plains cover the remaining 25% of the region, the richest being along the Amur River and inmain tributaries the Zeya, Bureya, and Ussuri Rivers. As these plains are most suitable for growing crops, most people have settled here.

The Arctic Ocean extends along the northern coast, to the Bering Strait, which divides the RFE from Alaska. The Pacific Ocean borders the eastern coast down to the Kuril Islands. Tucked away like a pocket, the Sea of Okhotsk, perhaps the richest fishery in the world, is enclosed by the Kuril Islands, northern Japan, and the eastern RFE. The Sea of Japan brings warm ocean currents to the shores of Primorskiy Krai and southern Sakhalin.

The vegetation cover follows the same irregular horizontal flows as do the climate zones. Temperate forests reach far into the north and subarctic vegetation extends south along mountain ridges. Broadly speaking, there are four main vegetation belts:

Arctic tundra (patches of moss, sedge, and various grasses) grows as a thin belt along the Arctic Ocean coastline in the far northern regions of Yakutia and Chukotka.

Tundra grows further south, forming a thin belt in Yakutia but covering most of Chukotka and northern Kamchatka, portions of Magadan Oblast, and northern Khabarovsk Krai. In winter, this region is barren, frigid, and desert-dry. In summer, a dense carpet of gray, Arctic moss covers the tundra landscape, forming the food base for animals and migratory birds. In southern tundra zones, dwarf pines and larch grow in unusual horizontal formations, stunted by the wind, shallow soil, and cold, dry climate. Some large trees, mostly larch, grow along the major rivers and are interspersed with poplars and willows.

Taiga, the large mass of boreal forest that forms the heart of the Russian Far East, extends as a broad belt between 70 and 50 degrees latitude. Further south, this forest gradually becomes more complex, although tundra can still be found along the mountain ranges. The north is dominated by larch forests that are able to grow well on permafrost. In central and southern regions, spruce, Korean pine, fir, and Siberian pine forests begin to appear.

Korean pine-broadleaved forests grow below the taiga zone along the Sikhote-Alin mountain range, which extends along most of Primorskiy Krai and into southern Khabarovsk Krai. Russians call these forests the Ussuri Taiga, named after the Ussuri River, which flows northwestward from the Sikhote-Alin mountains and drains into the Amur River. Conifer-broadleaved forests also grow south of the Sikhote-Alin range, just east of the North Korean and Chinese borders.

Escaping the last glacial period, the conifer-broadleaved forests in these regions have evolved to become one of the richest assemblages of plant and animal species in temperate forests anywhere on the planet (Krever et al, 1994) Tree species of the boreal forest thrive here together with temperate and subtropical species such as Korean pine, varieties of maple, birch, fir, and lime. Tropical vines and medicinal plants, such as the famed ginseng and eleutherococcus, combine to form an intricate mix of flora. These forests also support the majority of the Russian Far East's rare and endangered species. Similar forests in China, Japan, and on the Korean Peninsula have been largely destroyed (Krever, 1994)

Fauna of the Russian Far East (perhaps in a box?)

The Arctic region provides habitat for the snowy owl, Arctic fox, sharp-tailed sandpiper, musk ox, snow goose (Chen caerulescens), reindeer, and many others. Wrangel and Herald Islands in Chukotka boast the highest denning population of polar bears (Ursus maritimus) in the world. Most of the world's entire population (50,000) of Ross's gulls (Rhodostethia rosea) nest in the northern RFE. Yakutia is a major nesting site for the 2,000 remaining Siberian white cranes (Grus leucogeranus) (Sparks, 1992)

Kamchatka Peninsula supports the world's largest population of brown bears, estimated at 20,000. In its rivers and along its shores are the world's richest salmon stocks (including king salmon, which can reach almost two meters in length). Huge populations of northern fur seal, Steller's sea lion, and sea otter (Enhydra lutris lutris) congregate along the Sea of Okhotsk and Kamchatka coastlines. Over two-thirds of the total seabird population of the former USSR, an estimated 4.5 million pairs, feed along the Bering Sea and Sea of Okhotsk coastlines, including most of the remaining Steller's sea eagles (Haliaeetus pelagicaus). The taiga forests teem with brown and black bears, wolves, sable, squirrels, lynx, elk, wild boar, wolverine, and hundreds of species of bird.

The Amur and Ussuri River basins provide habitat for five of the world's species of crane. The Ussuri Taiga is home to the estimated 350 remaining Amur (or Siberian) tigers (Panthera tigris altaica), the largest cat in the world. Other endangered species sharing this ecosystem include the Himalayan black bear (Ursus tibetanus ussuricus), lynx, goral (horned mountain goat, Nemorhaedus caudatus), Blackiston's fish owl (Ketupa blackistoni), yellow-throated marten, and Far Eastern forest cat (Felis euptilura). Far Eastern leopards (Panthera pardus orientalis), with a population of only about 30, inhabit the black fir forests along the North Korean border. In all, there are more than 1,500 species of flora, almost 100 mammal species, 400 species of bird, and more than 200 species of butterfly in Primorskiy Krai alone.

III. IMPORTANCE OF PROTECTING RUSSIAN FAR EAST FORESTS

Introduction

In the Russian Far East, there is still a great *opportunity* to protect large, intact frontier forests; this opportunity is increasingly rare in industrialized countries where much smaller percentages of old-growth forests remain and where much of the land 'is spoken for.' The Russian government, in

effect, is only eight years and is still in the process of being formed, so questions over land use and land ownership are still being clarified. In this sense, we speak of political and legal *opportunity*.

The importance of protecting forests is becoming well known throughout the world. "Of the world's biomes, wrote the designers of the workshops on Underlying Causes of Deforestation, "forests tropical, temperate, and boreal represent the single most important reservoirs of biodiversity." This truism reminds us that protection of world's biodiversity is not only an *opportunity*, but also our responsibility. Forests protect the life of our planet. Forests provide food and shelter and are a source of wisdom for indigenous peoples. Forests help mitigate climate change (poor logging speeds it up). Forests control erosion and flooding. Forests maintain clean water sources, control the availability of nutrients, and regulate water temperatures in fresh water and marine ecosystems. Forests let us all escape to breath in the fresh air, go hiking and skiing, and get away from it all.

Of particular relevance with regard to forests of the Russian Far East, however, are the issues of biodiversity conservation, stabilization of the climate, and long-term timber supply and so let's take a closer look at these:

Preserving Biological Diversity

Biodiversity can be defined on three different levels: 1) diversity between and within ecosystems and habitats, 2) diversity of species, and 3) genetic variation within species.

Preserving biodiversity essentially means ensuring that the earth's multitude of plant and animal species does not disappear. As forests provide habitat for most of Russia's plant and animal species, preserving these ecosystems is critical. Recognizing the critical need to preserve biodiversity worldwide, Russia joined other countries in signing the Convention of Biological Diversity at the Earth Summit in Rio in 1992 where countries promised to promote the importance of biodiversity and address impacts that threaten its preservation. Major threats to biodiversity include loss of forest due to land use (logging, agriculture, mining, oil operations), thereby fragmenting habitat and reducing species populations. Other threats are climate change, chemical pollution (such as acid rain), and the introduction of new species.

Russia is becoming well-known, internationally, for the Ussuri taiga region which forms the basis of the Sikhote-Alin Mountain range. While high in biodiversity in terms of number of species, the Ussuri Taiga has been recognized by the IUCN as a Center for Plant Diversity and contains more than 3,000 vascular plant species, the rich assemblage of species makes this area unique. This eco-

region is often expanded on in studies on the region to include the entire lower Amur River basin and Sakhalin Island, including the northern territories. The World Bank study, which is an excellent resource on Russian forests, has coined this RFE the 'Amur-Sakhalin Bioregion':

> The unique assemblages of species in the Greater Caucasus and the Russian Far East surpass the diversity and endemism found in temperate forests anywhere in the world. The Amur-Sakhalin Bioregion in the Far East has particular significance because much of the region escaped past period of glaciation. As a consequence, these areas became a climatic refuge for many species and communities and have a high level of plant and invertebrate endemism (Krever and others 1994; Charkiewicz 1993). Similar forests once covered areas of China, Korea and Japan, but they have been largely destroyed. The region's unique biogeographic history has resulted in unusual assemblages of plants and animals. Amur tigers, Amur leopards, musk deer, and Himalayan bears share the same habitat with brown bears, reindeer, and salmon.

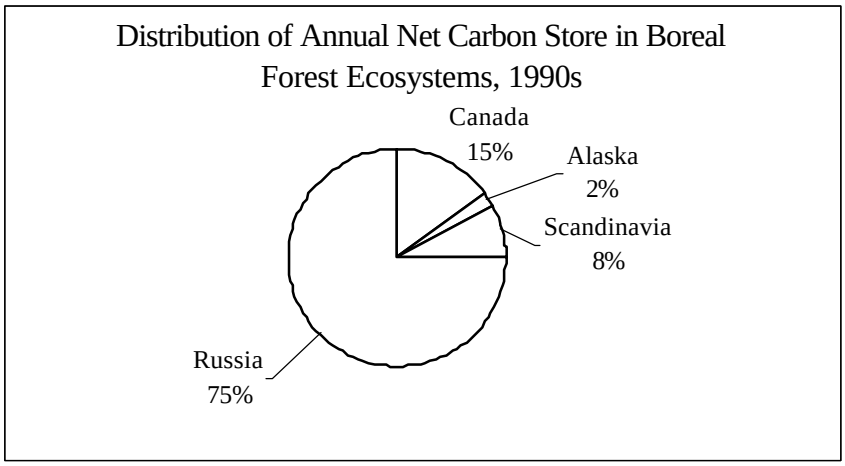
Unfortunately, most of the RFE's commercial forests are in the same region. A good majority of these forests, however, are still inaccessible and therefore there is still time to help protect some of these forests, unlike in neighboring countries such as Japan, China, and Korea.

There are a number of other important areas of forest biodiversity in the RFE. Kamchatka Peninsula's conifer forests, for example, protect the river's that have world's largest salmon runs and those salmon feed the 10,000 Kamchatka brown bears that roam the Peninsula.

Stabilizing Climate Change

Equally important is the role that RFE forests play in regulating the global climate. . The vast RFE forests act as reservoirs for CO2 gases, which scientists have identified as the major cause of global warming. Oregen State professors Kolchugina and Vinson have estimated that the total 'carbon sink' value of Russia's vast forests may be as much as one-seventh of the global carbon pool (Vinson, 1993) So properly conserved, the Russian forests act a critical green 'lung' of the earth, second only to Brazil's dense and massive Amazon forests.

Russia's boreal forests are particularly important in storing carbon; they hold 75% of the carbon stored by the world's boreal forests as the chart below illustrates:



Source: Benmann, 1995

However, deforestation is the second largest emitter of CO2 gases after fossil fuels, and large-scale deforestion of Russian forests could release large amounts of carbon into the atmosphere thereby speeding up global warming (Hammond, 1994). Much of this depends on how the forest is logged. If logged sustainably only selected trees are felled and the diverse structure of the forest remains intact then CO2 emissions are minimized.

If the forest is clear-cut all the trees on a given plot are felled deforestation not only releases massive amounts of carbon but also reduces the ability of forests to store carbon as the forest structure is destroyed (Greenpeace, 1994). More than 90% of all Russian Far East forests are clear-cut, although in the Ussuri Taiga they are generally selectively logged. Reforestation, contrary to popular opinion, does not always put carbon back into the ground as some managed forest plantations hold an estimated one-third to one-half as much carbon as does an undisturbed forest (Woodwell, 1993)

Permafrost cover's 75% of the Russian Far East

Approximately seventy-five percent of Russian Far East forests lies under permafrost, frozen ground that stores moisture the forest depends upon. In the dry summer months, the permafrost melts, supplying water and nutrients to trees and surrounding vegetation. In winter it freezes again, storing moisture. This ebb and flow is critical to the health of northern forests.

When improperly logged, Russian forests also release methane gas, which has a warming effect 10-20 times that of CO2. Large-scale logging causes the permafrost to melt unnaturally by

exposing it to direct sunlight, and previously forested ground quickly turns into swamp. Normally, dying plants do not decompose on permafrost but accumulate on the ground, but when permafrost turns into swamp, this organic matter decomposes quickly, and trapped methane is released from both plant matter and permafrost. Eventually, this swampy land dries out and may become a desert. Many heavily logged areas of permafrost-covered land never regenerate. Scientists also warn that significant warming of the earth could cause massive melting of permafrost. The resulting release of methane gas would in turn increase global warming and the vicious cycle would then feed upon itself.

A protected zone runs along the northern edge of Russia's taiga forests; scientists at the Far Eastern Forestry Research institute have proposed extending this boundary further south to protect some of these taiga-tundra transition permafrost forests that are particularly sensitive to anthropogenic activities. Rick Fox, who traveled to the northern region of Yakutia (Republic of Sakha) as a research consultant for this report summarized the effects of anthropogenic activity on these forests:

> The subarctic forests play a vital role in preventing a southerly expansion of the tundra, a process similar to desertification. In general, whenever deforestation takes place in the permafrost zone (especially clear cuts), the forest land is replaced by thermokarst depressions that will regenerate into forests only after several centuries, if ever. The frozen soils, once exposed to the heat of the north's intense summer sunlight, are transformed into swamps, then lakes. The lakes eventually dry up, leaving a characteristically circular depression unable to hold enough moisture or nutrients to sustain anything more than a localized island of tundra flora. This process also causes significant quantities of methane and other greenhouse gases to be released from the frozen soils into the atmosphere, contributing to global warming. When subarctic forests are transformed into thermokarst formations, they act as conduits through which the tundra to the north can spread southward. Although a 100 km-wide strip of subarctic forest has been excluded from economic use since 1959, most specialists agree that the strip needs to be widened considerably in order to effectively hinder the tundra's southward expansion. The portions of the subarctic forests most in need of protection are those located near human settlements or mining areas, particularly in the Deputatskiy region.

In general, protecting large tracks of Russian forests would help minimize climate change by keeping the CO2 in the ground and protect some fragile permafrost regions from being heavily

logged. Protecting large tracts of land would also provide habitat corridors for animals as they migrate in response to climate changes.

Long-term Timber Supply

Given the region's extensive timber resources, geographic proximity to large timber importers, and declining stock and growing restrictions on wood harvest in other northern hemisphere countries, the RFE will continue to grow as an important source of timber. China faces strict domestic restrictions on timber harvest and will increasingly look to other countries such as Russia for supply. Russia is now Japan's largest supplier of raw logs. Sustainable use of RFE forests is critical to ensure long-term timber supply for these major importers. However, poor and wasteful harvesting methods, lack of a processing industry, and illegal logging will greatly impact this resource. Preservation and sustainable-use of these forests is thus essential not only for biodiversity conservation and to mitigate climate change, but also to ensure available wood supply for the coming century and beyond.

Russian Forest Classification: Group I, II, and III (*Suggest offseting from the text)*

The Russian Government divides forests into three categories: Group I, Group II, and Group III. Broadly defined, Group I forests are restricted forests that are important for ecosystem protection, i.e. to protect water systems, to control erosion, and to protect forests around cities. Most protected areas are also Group I forests. Group II forests are protected forests of limited commercial value; these areas are usually sparsely forested or are in densely populated areas. Group III, the largest category, represents those forests theoretically available for commercial logging. Group I forests represent 11.7% of the total RFE forest stock; Group II forests equal 3%, and the remainder (85.3%) are Group III forests.

There is a widespread perception that Group I forests are strictly protected; this is not necessarily so. According to Russian law, Group I forests include:

a) Border forests up to 100 meters in width
b) 100-300 meter wide protective belts along rivers, lakes, and other water reservoirs
c) 100-3000 m border areas around river headwaters and springs
d) One kilometer bands around areas near health resorts and clinics, as well as mineral springs
e) forest areas containing relict or endemic species
f) 200 meter forest belts along the upper border of forests with bald peaks and near brushwood

g) 3-5 km. wide forest belts that border tundra
h) forest on slopes over 30 degrees
Source: Sheingauz et. al, Forest Sector of the Russian Far East: A status report, 1996

As forestry economist Alexander Sheingauz and others, rightly point however, with the exception of the last two, these categories restrict less than one percent of forest land and do not impact commercial harvest. Category g restricts 3% of Russian Far East forests, but primarily in the northern regions which have a very limited timber industry. The last, forests on slopes over 30%, restricts significant forests, up to 10% of all forests in Sakhalin. However, imported logging equipment, has allowed timber companies to log these areas; often illegally.

IV. MAIN CAUSES OF DEFORESTATION IN THE RFE

Introduction

The latest United Nations Food and Agricultural Organization (FAO) State of Forest analysis reports enthusiastically that there is an increase of boreal and temperate forests worldwide, including Russia. This is misleading. The definition is so broad that most 'green urban areas' can be considered major forest ecosystems (World Rainforest Movement, 1998). And more importantly, the FAO assessment takes into account simply the quantity of forest, but fails to assess the *quality* of the forest. In fact, a substantial portion of these temperate and boreal forests are biologically poor production forests due to both clearcutting and high-grading, fire, and other industrial activities; they lack undergrowth, original soil diversity, and much of the original bird, mammal, and reptilian species.

The *quality* of Russian Far East forests are declining. For example, in the Ussuri forest ecosystem, intensive high-grading of the most commercially valuable species over the past four decades, is slowly degrading the forest ecosystem, reducing the quality of these forests and its ability to maintain those functions characteristic of a primary, or frontier forest. Korean pine (*Pinus Koreaiensis*) was heavily logged for export mainly to Japan, where the wood is still highly valued in construction and in making furniture. Overlogging of Korean pine, whose pine nuts provide the food base for many animal species including wild boar, reached such a degree that the Supreme Soviet had to ban commercial logging of the species in the late 1980s. Mongolian Oak has replaced much of the area where Korean pine once dominated (Gordon, 1998). Small Russian logging companies are now high-grading these Ussuri taiga forests for ash trees, which fetch a high price in nearby China and Japan; many regional government officials and academics are

calling for a ban on export of ash logs. Far from plentiful, only an estimated 4% of the Ussuri taiga is ash and it does not grow in commercial amounts elsewhere in the RFE. Ash grows primarily along rivers and plays a crucial role in controlling erosion and flooding.

The FAO points to unsustainable agricultural practices as the source of 90% of deforestation worldwide. While agriculture certainly plays a central role in deforestation in the tropics, in the Russian Far East it plays a much smaller one. In the Republic of Sakha, larch and tundra forests are routinely cleared for cattle grazing, but most scientists in the region point to fire, mining, and logging as primary causes of deforestation. In the Khasan region of Primorye and along the Ussuri river edges, fields are burned for agricultural purposes but rarely is forest land burned to plant crops or to graze animals. Burning of the fields, though, can in some cases lead to forest fires.

Causes of deforestation in the Russian Far East vary by region. In Kamchatka, specialists point to logging, mining, and forest fires (Wilson, 1999). On Sakhalin, fires and illegal logging on steep slopes are major causes of deforestion (Lisitsyin, 1999). In Khabarovsk, fire, logging, and mining are all major causes. However, if to generalize, most Russian specialists point to two interdependent causes of deforestation: fire and logging.

Fire

When assessing deforestation throughout the Far East, most Russian scientists point to fire as the major cause. With the exception of the dry thunderstorm and lightning fires in Sakha, most of fires are not natural; between 75% and 90% of these fires are caused by humans logging, mining, hunting, mushroom picking, and other such activities in the forests. Regeneration is complicated by slow tree growth; in the boreal regions of Sakha, northern Amur region, and central Khabarovsk region forests take between 120-140 years to regenerate and become commercially valuable again (Isaev, 1996). In northern parts of RFE, where the climate is even more harsh, regeneration takes between 160-180 years. Many areas that have been burned repeatedly never fully regenerate, as grassy vegetation or Labrador tea grow back hindering natural regeneration. (Dobrynin, 1996).

Logging and mining roads, however, make access into these forests possible. There is also growing evidence among Russian scientists that a significant percentage of fires are started by sparks from logging operations and that logged areas are more susceptible to catastrophic fire (Gordon, 1998). So, in many ways, fire is not always the underlying cause of deforestation the Russian Far East, but rather the result of increased access into remote forest regions. Combined with the lack of public awareness of the destructiveness of unnatural fires and the lack of financing

to detect and control them, fires have had a devastating impact on the forests of the Russian Far East.

Logging

Background of the RFE timber industry

A number of studies point to logging as the primary cause of deforestation in the RFE (WRI, 1996). In Soviet times, timber extraction was focused around meeting quotas and little attention was given to improving efficiency and logging techniques. Today, tremendous waste still plagues the timber industry; between 40 to 60% of all timber cut is lost in the production process, a figure four times higher than in other industrialized countries. At the felling stage, loggers choose the best logs and leave the remaining ones at the logging site, which acts a source of fuel for fire. During the transportation stage, the amount of timber cut often exceeds transportation capabilities. Logs are left lying for long periods of time, and often rot or are infected by insects. In the processing stage, by-products, such as chips and trimmings, are rarely used to make fiberboard and other useful products.

The Russian Far East timber industry now lives on raw log exports, primarily to Japan, China and South Korea, see the table "RFE Timber Industry – Export Driven" illustrates. Due to a lack of high-quality timber processing equipment and the lack of markets for such products abroad, the timber industry fails to manufacture value-added products. Production of sawnwood and other finished wood products are essential to provide more income per tree, to reduce waste, and to benefit local communities by providing jobs. Many timber communities now work in horrendous social and economic conditions. By focusing on raw log exports, timber companies are speeding up logging and, faced with growing scarcity of accessible stands, are looking to develop roadless wilderness to find new sources. Relying on raw log production speeds up the rate of logging as more timber must be exported to obtain necessary revenue. This form of industrial structure is not only ecologically destructive, but also economically unstable. The on-going economic crises has slowed log exports from the RFE. "This crises, David Gordon point out, "has highlighted the problems of a 'boom-bust' economy based on raw logs exports and has led some local Russian government officials to renew their calls for investment in timber processing." Recent research by Dudley (1995) and others argue that the timber trade has become the *primary* threat to many of the world's surviving natural and semi-natural forests, particularly those in the northern temperate and boreal forest regions like the Russian Far East.

Clear-cutting remains the preferred practice over much of the boreal and northern temperate regions of the RFE. Clear-cuts cause soil erosion clogging river systems and reducing the valuable

topsoil necessary for forest regrowth. They also dry out the soil, hindering seedling growth, and create breaks in the forst canopy, making it more susceptible to wind and fire damage. Many forests that are clear-cut never fully recover. Selective high-grading, as in the case of Korean pine and ash logging, remains the preferred methods in the Sikhote-Alin region as the forest's diversity of species makes it uneconomical to clearcut (Gordon, 1998). This practice of taking out only the best trees, slowly degrades the forest's genetic diversity, and impacts river systems. Other destructive methods include the use of heavy machinery, outdated logging and transport machinery, bad road construction, and logging on steep slopes.

The wasteful methods of the timber industry, the poor logging practices, and the reliance on raw log exports all contribute to forest degradation in the Russian Far East. However, numerous researchers point out that since annual timber production is down, the threat of deforestation in the region has also decreased. But looking at the issue more deeply reveals that this is not necessary the case.

Logging in the RFE now is largely out of governmental control. Privatization of the timber industry has led to an explosion of small timber firms and exporters. The forest service lacks the funding, equipment, and human resources to control these firms and to secure revenue to pay its staff local branches (*leskhozi*) of the forest services are logging and giving licenses under the guise of 'sanitary logging'. Illegal logging is widespread as logging rules and regulations are routinely ignored; logging has been documented in nature reserves, game preserves, and in protected Group I forests. Industry experts agree that in an effort to avoid taxes and duties illegal export has reached unprecedented levels, particularly to neighboring China, whose domestic restrictions on timber harvest is leading to a booming demand for Russian timber.

To give the reader a more concrete example of the current practices of the RFE logging industry and the forest service, below is a case study entitled "Logging in the Ussuri Taiga". The second case study, "Forest Fires of 1998" provides an overview of the disastrous fires in Khabarovsk and Sakhalin and expected impacts of those fires on the forests, local communities, endangered species, and human health.

RFE Timber Industry – Export Driven (Offset from the text via a box or other tool)

The Russian Far East timber industry relies primarily on export markets such as Japan, China, and Korea and demand in those countries for a particular species directly impacts Russian forests. Ash has become a prized species by Japanese companies in housing construction; this demand has led to illegal logging for that along protected river basins and overlogging in some regions. The shift

by plywood manufacturers from tropical luan to Russian larch will have long-term impacts on the fragile permafrost northern termperate and southern boreal forests of the Russian Far East. As domestic demand is now so low, the Russian Far East timber industry has become almost entirely export market driven and the fluctuations of Asian markets.

Even though Russian timber statistics should be used with caution, comparing the graphs below does illustrate export-orientation of the RFE timber industry

1997 RFE Reported Timber Production

Region	**thousand cubic meters**
Khabarovsk	3832
Primorsky	1189
Amur	844
Sakhalin	797
Repubic of Sakha	489
Kamchatka	110
Total Production:	**7,062,000 cubic meters.**

Source: Far East Forestry Research Institute, 1998

This table, when compared with the table of total RFE exports below give a general idea of the extent of total production which is for export.. For 1997, total Russian timber export to Asian-Pacific countries (Japan, ROK, China) was 8,383,000 cu.m. of which approximately 95% was in the form of raw logs.

1997 RFE Reported Timber Exports

Japan	**6,824,000 cu.m.**
Raw logs	6,134,000 cum.
Sawnwood	504,000 cu.m.
Other	186,00 cu.m.
China	**944,000 cu.m.**
Raw Logs	944,000 cu.m.
Republic of Korea	**615,000 cu.m.**

Raw logs	585,00 cu.m.
Sawnwood	30,000 cu.m.
Total	**8,383,000 cu.m.**
Raw logs	7,663,000 cu.m.
Sawnwood	534,000 cu.m.

Source: Dalles Marketing Research, 1998

When comparing the two figures above obviously exports are higher than RFE production, this is partially due to unreported production and also due to export of eastern Siberian (Irkutsk region) timber through RFE ports and by land bridges and rail to China. Total production in 1997 from Irkutsk region was 8,597,000 million cu.m. Due to high-rail costs, other than export from Irkutsk region, however, it is simply not economical to transfer Siberian timber to Asian markets. Now further study is needed to determine how much timber comes from Irkutsk and neighboring regions to Russian Far Eastern ports, but we can draw an important conclusion from these timber production and export figures: The Russian Far East timber industry is primarily export market driven.

This phenomenon of declining production and increasing export holds true for all of Russia. Domestic demand is low and decreasing; in the last 6 years it has decreased three-fold. As a result, exporting timber abroad has become for many enterprises their sole source of stable revenue. From 1993 – 1997, Exports of raw logs from Russia have increased by 53% and during this same period the export share in the total volume of timber produced has grown from 6.8% to 19.3%.
END OF BOX

Case Study #1: Logging in the Ussuri Taiga

The Ussuri taiga, which grows along the Sikhote-Alin forests, are the densest, most biologically diverse, and most commercially valuable forests in the Russian Far East. The Khabarovsk and Primorye based timber industries which log in this eco-region are largest producers in the RFE. Total reported 1997 production figures for Khabarovsk and Primorskiy regions was 3,832,000 cu.m. and 1,189,000 cu.m. respectively. Selective high-grading of commercial timber species is

the preferred logging practice in this region rather than clear-cutting, which is the dominant method in other parts of the RFE.

The timber industries in the region can be characterized in much the same way as rest of the RFE timber industry: export-driven, raw log dependent, a growing number of small logging companies and exporters, lack of adherence to forest regulations, absence of environmental impact assessment procedure, a poorly financed forest service unable to control most operations, and extensive illegal logging and export primarily to avoid taxes.

Below we focus on two features of the timber harvest in this region that play crucial roles in fostering and maintaining this destructive industry: illegal logging and export and commercial ventures of the forest service.

Illegal Logging and Export of Timber

Logging rules in the Russian Far East are strong. There is no logging on slopes steeper than 30%, many important forests along river systems and in watersheds are restricted. As Gordon points out, "Riparian buffer zones are typically stricter than those found in the U.S. Russian rules call for buffer zones of up to one kilometer on each side of major rivers and of 50- to 100 meters on each side for most streams and creeks." But these laws are widely ignored by loggers and rarely enforced by the forest service.

Forged logging licenses, timber certificates, and export papers are available in Primorye and Khabarovsk regions. In Rosshino village, in the Primorye region, the author was offered a certificate to log and transfer timber complete with the embossed seal of the forest service on the black market for $300 (Newell, 1998). The document includes data about the logging site, species, and amount to be logged, truck license numbers, names of drivers, official stamp, and number of logging license. Armed with this certificate one can proceed through militia and customs checkpoints legally. This practice we refer to as the 'process of legalization, ' where forged documents are created for the logging and transfer and presented as legal documents when exporting the timber.

There are a number of other loopholes. One can log without a license at all, pay off the militia at the checkpoint, and then sell the timber to a wholesaler who then prepares forged documents to present to customs. According to Alexander Kichigon, director of the firm 'Belogorka' in Rosshino, "Any consignment can get through the milita point for 200-300 dollars." This timber is

then often taken to a wholesale timber yard for sale and then export. We found such a wholesale timber yard, controlled by Chinese exporters, in the city of Dalnereshensk.

Pavel Soldotov, Chief of the Committee of Ecology in Krasnoameiskiy region (Primorye) admits faked documents and bribing of militia points is comonplace. "$200-500 will get you through the militia point; the price depends on how good the faked documents are, the amount ash, the amount of people of involved. One typical procedure for dealing with the militia is to send a scout ahead of the log trucks to bribe the militia officer, then the truck can proceed."

Other strategies include: mislabeling species to avoid taxes (higher priced species such as ash are taxed more heavily), creating fake export contracts that undervalue the timber and then settling the deal in cash. In sum, there are a wide variety of methods in practice to log and export timber illegally. And this reality is well known in Russia now. As the Vladivostok News reported last year, Viktor Doroshenko, general director of Primorsky Region's largest logging firm Primorklesprom, admits that, "..as much as 40-50% of Russian timber is "sold to Pacific Rim countries under dumping prices and faked contracts."

China, in particular, has become a major source of illegally traded timber, cash transactions and 2,000 kilometer Russian-Chinese kilometer make effective monitoring of export difficult. From Primorskiy region alone, there are more than 97 points to export timber. Most Japanese transactions are by bank transfer and timber exports is exported by ship; these factors make it easier for the Customs Department to track flows.

Illegal logging makes it difficult to assess how much logging is taking place, where, and of what species. Dr. Vsevod Rozenberg, considered the most experienced and knowledge forest specialist of the Ussuri taiga estimates that, "timber harvest in Primorye and Khabarovsk regions is underreported by 100% to avoid taxes. So if the annual harvest rate was 1 million cu.m. then the real amount logged is more like 2 million cu.m. And this does not take into account the timber that is felled but left at the logging site; this figure can reach about 50% of the total cut."

Certainly, export of ash is booming. According to official Federal custom statistics, exports of ashed have more than double since 1995 from 210,000 cu.m. annually to more than 449,000 cu.m. per year.

'The Conflicting Interests of the 'Leskhozi'

The Russian Federal forest service is the primary government agency responsible for forest management and control. Under administration of the Moscow Federal Forest Service department are the 81 regional (krai.oblat, okrug) Forest Service departments; each of whom, in turn, has a number of Forest Management Units or Leskhozi under their control.. These leskhozi are responsibility for forest use, management, and protection within a particular rayon of that krai or oblast. Today, 1740 Leskhozi operate in the Russian Federation. Khabarovsk region alone has more than 40.

Decline in federal funding has left many of these regional Forest Committees and leskozi without necessary funds to manage timber harvest. Federal funding manages to cover only an estimated 45% of the funds required to operate effectively (World Bank, 1995). Leskhozi, in particular, have become increasingly dependent on local sources of revenues, such as forest fees (stumpage, leases), fines, and sale of wood from thinning and sanitary logging. However, as the World Bank study points out "Sanitary cutting appears to be used more to maximize current revenue than to maximize the future value of the forest, contrary to its intended objective."

Leskhozi abuse the system of sanitary logging to generate revenue by selling 'sanitary logging' licenses to local logging companies or simply logging themselves. Essentially, 'Sanitary logging' by Russian definition is to remove old and ill trees and those trees which pose fire threats. However sanitary logging is not taxed by the Russian government; this loophole has enabled both the leskhozi and the local companies who receive the licenses to high-grade the forest for a few key commercially valuable species, primarily ash, and not pay taxes. How can the forest service (leskhozi) actually protect the forests when they are illegally logging it?

Viktor Surkov, Vice-Director of the Regional Committee of Ecology (federal structure) in the town of Peryavslavka researched theactivities of the leskhozi operating in his jurisdiction – the southern part of Khabarovsk region. He found that 82% of the timber harvested under 'sanitary logging' licenses was of commercial grade and that it was used to generate revenue for the forest service and the leskhozi. Surkhov findings were confirmed not only by officials in the Khabarovsk regional administration but also 'off-the-record' discussions Regional forest service in Khabarovsk, which sheepishly has admitted that some of the leskhozi are out of control.

Towards Solutions

Widespread disregard for logging regulations and illegal logging and trade are degrading the unique forest ecosystems of the Ussuri taiga. The problem is compounded when the main regulatory body responsible for forest protection, the Leskhozi, are also abusing the system of

'sanitary logging' in order to survive. Clearly, not all timber companies and leskhozi, are to blame; there are a number of honest timber firms and forest service departments. However, the problems have become widespread enough to create a 'frontier mentality' in the Russian Far East making it more difficult to enforce timber harvest regulations, to collect stumpage and licensing fees, and for honest timber companies to compete.

Anatoly Lebedev, director of the Bureau for Regional Public Campaigning and author of the paper on Underlying Causes of Deforestation on Primorskiy region, proposes a number of necessary steps to combat these problems. He recommends financial and legal support of known and trustworthy government agencies in Russia whether they be leskhozi, regional Committees of Ecology, or NGOs. A number of government bodies, many of which are committed to enforcing regulations and environmental protection, are trustworthy. The difficulty, he points out, is determining which can be trusted and how to ensure public oversight to verify this trust.

Some immediate steps according to Lebedev include:

- Strengthening militia checkpoints on strategic roads by having public (NGO) oversight at these points.
- Creating an inter-institutional task force including the forest service, hunting administration, Committee of Ecology, militia, and NGOs that would regularly inspect logging sites.
- Raising awareness in local and international media.

Mid- to Long-term needs include:

- Development of alternative industries to logging such as development of the non-timber forest product and ecotourism industries.
- Development of the local processing which will reduce the rate of logging, provide more jobs, and more income per tree.
- Eliminating loopholes and vague terminology in Russian timber regulations, such as those concerning sanitary cutting.
- Reform of the Russian taxation system
- Raising awareness in export markets of the negative impacts their timber consumption has on Russian forests.

Case Study #2: Forest Fires of 1998

Huge fires devastated large tracts of forests in the Khabarovsk and Sakhalin regions of the Russian Far East in the fall of 1998. While total damage is still being calculated, in the Khabarovsk region according to a recent study by the Far Eastern Forestry Research Institute, 1262 fires burned over 1.5 million hectares of forest land. The Khabarovsk Federal Forest Service estimates 154.3 million cubic meters of wood stock was lost; economic losses total almost 4.6 billion roubles. The areas hardest hit in Khabarovsk were the Komsomolsk, Solnechny, Ulchsky, Nikolayevsk and Nanay regions. On Sakhalin, 100,000 hectares were badly damaged by the fires, particularly hard-hit was the Tymovskoye district where have half of the forests in the region were destroyed (UNDAC, 1998).

Federal Forest Authorities on Sakhalin estimate the fires have caused approximately 670 million roubles worth of damage to the forest industry; this figure included expenses for fire fighting and reforestation (UNDAC, 1998). Total area burned by fires up to now in both Khabarovsk Krai and Sakhalin Island is about 2 million hectares (ha). These fires are comparable to areas affected during recent fires in Indonesia and Brazil.

Fires in the Russian Far East and throughout other regions are frequent; according to the Russian Federal Forest Service (FFS) between 12,000 and 30,000 fires per year in the country. And in Khabarovsk region, there are an average 700 - 800 fires per year. However, for Khabarovsk, the 1998 fires were catastrophic. From 1977 to 1997 in the Khabarovsk region fires burned an estimated 2.3 million hectares, while in 1998 alone fires damaged more than 1.5 million hectares (Sheingauz, 1998).

Thankfully, other regions of the Russian Far East were not as hard hit as Khabarovsk and Sakhalin; ecologically-rich Primorskiy Krai largely escaped the fires of 1998. The Primorskiy region registered 556 fires in 1998, totalling 58,000 hectares in burned land (Sheingauz, 1998). However, one of these fires occurred in the Sikhote-Alin Nature reserve, important habitat for the Siberian tiger and other endangered species. Lack of financing was partly to blame as reserve rangers had trouble procuring fuel and equipment in time to contain the fire.

Causes behind the 1998 Fires

In 1998, the summer was unaturally dry as the monsoon season failed to bring normal amounts of precipitation. From June to August rainfall was only 15-20% that of normal levels (Sheingauz, 1998); this was compounded by lack of rainfall in September and October. By the middle of July in Khabarovsk, there were more than 40-50 fires burning each day.

While natural fires are an important process for succession in virgin boreal forests, most of the forest fires in Khabarovsk and throughout the Russian Far East are not natural. The Federal Forest Service estimates that 70-85% of forests are caused by human activity and that only 15-30% occur naturally due to things like lightening strikes.

The UNDAC mission report concluded that there nothing to show that these fires were started deliberately, but that rather that the "..current economic situation in Russia has driven many more people to use the forest margins for hunting, fishing, mushroom, berry and fruit picking, and that the non-experienced hunters could have started some fires through careless disposal of cigarettes, broken glass acting as a lens to concentrate the suns rays, cooking fires getting out of control, etc." Recent interviews by Friends of the Earth-Japan in Russia with officials from the regional forest services and environmental agencies confirmed the UNDAC conclusion.

Forestry specialist Alexander Sheingauz used data from the Khabarovsk forestry service to calculate more precisely the causes of forest destruction in Khabarovsk from 1988 -1997. The table below shows his calcualations.

Causes of Forest Fires, average for 1987-1997

Careless behavior of populace:	57.9%
Including: logging operations	5.1%
survey expeditions	6.5%
Agricultural burning of grasslands	12.2%
Lightning (natural)	16.1 %
Other	13.8%

Source: Sheingauz, 1998

Sheingauz also concluded that dry weather not only increases the probability of fires, but also other factors such as timber cuttings (branches, logs, and stumps) left at logging sites. The forest service lacks funds to regularly enforce regulations requiring logging operation to clean up after logging.

The most interesting, and perhaps significant aspect of Sheingauz's analysis is his linkage of forest fires to industrial logging. He concluded that an increase in forest fires began in the 1930s with the mechanization of the timber industry. Logging operations brought in "machines with their flames and sparks.." and "people with campfires, cigarettes, etc." Logging roads as well have

brought unprecedented hunters, poachers, and mushroom gatherers into the forest; all of whom are potential instigators of forest fires.

While there is definitely a link between logging and forest fires, the extent remains unclear and future research is needed to determine this linkage in more exact terms. Climate change as well undoubtedly has an impact on weather patterns which may make fire more likely. However, this is an even more complex question and also needs further study.

Impacts on the Environment

Aside from the massive of forest area destroyed by fire, initial reports identify large-scale impacts on wildlife. The initial assessment by the Sakhalin Committee of Ecology is grim. "Up to 50% of ground-nesting birds including game birds have been killed by the fires, 10-20% of mammal species in the area have been killed and three Red Data Book species including two eagle species have been severely affected,(UNDAC 1998)". The Khabarovsk Committee of Ecology has still to calculated the damage on a species by species basis. However, wildlife biologists fear the region's biodiversity may be severely impacted, particularly for large carnivores such as the Siberian tiger, wild boar, and bear all of whom rely on large areas of habitat to survive. Other expected and potential impacts form a long list including:

- Widespread destruction of flora and fauna
- Forced early and changed bird migration patterns
- Overall reduction in biological diversity will lead to opportunistic species re-colonization at the expense of other species
- River pollution from fires
- Loss of tree cover will affect temperatures of small river and lakes which could change invertebrate populations with subsequent effects further up the food chain.
- Damage to soil resources, which make not recover in the harsh taiga environment
- Loss of vegetation cover on mountainous terrain will lead to increased soil erosion and reduction in soil quantity and quality and downslope contamination and blocking of water courses.
- In the high mountain areas some small creeks and lakes may disappear. Others will be blocked by falling tree trunks and fire debris.
- Ash carried downstream may impact salmon breeding streams in the region and could prevent salmon from returning to usual spawning grounds.

Source: UNDAC, 1998

Impacts on the Economics of the Region

Estimated economic loss due to the Khabarovsk forest fires in 1998 was approzimately 5.5 billion roubles (Sheingauz, 1998). It is not clear from this calculation by the forest service whether they took into account damage to fisheries and game species such as sable, deer, and others.

Aside from effects on the fishing and hunting industries, the long-term impacts on Khabarovsk's timber industry will continue to be significant as the fires reduced accessible timber stock; scientists estimate that it will take at least 100 years for the forests to fully recover in the harsh northern climate, a much slower rate of regeneration than in tropical and sub-tropical regions. Some areas may never recover, particularly those areas which have burned before. Khabarovsk Federal forest service reported that 300,000 ha. which burned in 1976 are not regenerating properly.

Unfortunately, the fires included some of the most valuable stands of timber and this will force the timber industry to develop new areas (UNDAC, 1998). Early estimates are that at least 15 million cubic meters of export-grade timber was destroyed, a figure equivalent to three years of total timber production in Khabarovsk krai at 1998 levels. Production has slowed as logging companies shifted staff to battle the fires, limiting timber production.

Impacts on the health of the population

The indigenous peoples of Khabarovsk were particularly hard-hit, as many of them rely on hunting and fishing for their livelihood. The Nanaiskiy region, where 17% of the population is indigenous, was one of the five areas that suffered most heavily from the fires. Long-term effects to human health may also be significant as one million people were subjected to choking haze and smoke filled with carbon monoxide. The Regional Sanitation and Epidemiological authorities report that levels of carbon monoxide reached between 3-13 times the Maximum Permissible Concentration (MPC) over a period of weeks, with occasional levels reaching as high as 24 times the MPC (UNDAC, 1998).

Impacts on the Climate

According to the Georgy Korovin, Deputy Director of the Ecology Center of the Russian Academy of Sciences, "The emission into the air of several tens of millions of tons of carbon dioxide will cause a greenhouse effect which will contribute to global warming." Regional authorities estimate that, in total, some 100 million ha. of forestland suffered from some impact on biological processes. This in turn leads to a reduction in the carbon-fixing potential. FFS sources report that

900,000 ha completely lost this capacity and as a direct result of the fires, around 30 million tones of carbon was released into the atmosphere over a short period of time (UNDAC, 1998).

Conclusion and Recommendations

Although the fires have been stopped, according to Committee of Ecology officials some of the peat bogs still smolder and remain a fire threat. The half-dead standing timber is also a potent fire threat as it could provide fuel for future fires. Unfortunately, the Russian forest service lacks the human and financial resources to remove this standing timber and are currently negotiating with Chinese forestry officials, who want to bring in unemployed Chinese workers, many of whom lost their jobs due to restrictions on domestic timber harvest, to help remove the timber. China would receive an estimated 70% of the timber in the deal, whilst the Khabarovsk forest service would receive the remaining 30%. Environmentalists are concerned that not only half-burned timber will be removed, but commercially valuable timber as well all under the auspices of fire prevention. Removing the trees would be considered ‘sanitary logging’ and thus exempt from federal taxes. Skeptics point out that the Forest service is looking for one more way to generate revenue.

Russian officials pinpoint lack of financing as a major reason for the size of the 1998 fires. Officials interviewed by Friends of the Earth-Japan felt that with enough resources the fires could have been contained to a much smaller area. The UNDAC report came to the same conclusion:

> All official sources have consistently identified resourcing issues as being at the heart of the problem. This is the defining difference with other similar fires in the past. Although conditions for fires have been reported as being the worst for 25 years, in the past the authorities were able to respond effectively to deal with the fires. For example, FFS officials reported that in 1988 they had four times as many resources at their disposal and lost about 300,000 ha in very similar conditions. In 1998, some 2 million ha have been lost.

Lack of funding has led to inadequate early-warning systems and surveillance partrols. Fires which could have been detected in the early stages if these systems were functioning well burned out of control. In 1998, Khabarovsk's Far Eastern Forest Protection Air Base had 60 AN-24 aircraft in the field, but now they have only 8 serviceable aricraft. In 1988, three patrols a day were the norm but last year only one per week was all the Far Eastern protection base could afford (UNDAC, 1998). Only 20% of the huge Khabarovsk territory is accessible by road, making air patrols extremely important.

Available land-based equipment has also shrunk. In 1988, 500 heavy bulldozers were available for use, but in 1998 only 150. In 1988, 850 firefighters were ready to respond but in 1998 only 180 were available.

Other needs include telecommunications equipment, food and clothing, tents. In sum, the Russian government lacks the necessary means in virtually every area in which to effectively detect and control forest fires. And they desperately need more international financial support in the future until the crippling economic crises in Russia subsides.

International Aid

The Sakhalin and Khabarovsk regions, despite the comprehensive report by the UNDAC mission, received a disappointing amount of financial aid. The International Federation of Red Cross provided blankets, bed sheets, and clothing in the amount of US $15,000. The Japanese Government reportedly provided 5 million yen in emergency goods to Sakhalin to help those villages affected. The US AID office in Moscow donated $50,000 and The UN Office for Coordination of Humanitarian Affairs (OCHA) released $50,000 to purchase fire fighting equipment and related items. However, that was the extent of international support from the information we were able to gather from UNDAC and through interviews with Russian government officials.

Given the global ecological impacts of the 1998 fires and the current Russian economic crises, one would have expected much greater support particularly from Japan. Support from Japan should not only be for ecological reasons, but economic reasons as well. Russia is now Japan's largest source of raw logs and most of this timber comes from the Khabarovsk, Sakhalin, and Primorskiy regions. Doesn't it make economic sense to help protect these timber resources? This would seem particularly true for Japanese timber processing companies and plywood manufacturers, who are becoming increasingly dependent on Russian raw logs.

UNDAC has drawn up a detailed list of requirements for urgent international assistance (totalling US$ 2.5 million) and the Khabarovsk and Sakhalin regional governments have a number of proposals for financial assistance in order to fight fires more efficiently in coming years.

Concluding Remarks on Deforestation in the RFE

Clearly both logging and forest fires are major causes of deforestation in the RFE. In the Recommendations section, we propose a number of concrete actions the Japanese counterparts can take to reduce the impacts of logging and fire. The next section focuses on Russia's protected area system, which until the dissolution of the Soviet Union was one of the world's premier systems. A recent study on forest fires and protected areas in the Khabarovsk by the Wildlife Foundation (NGO) revealed that most of the protected areas were spared from the 1998 fires. Andrei Zhakarenkov, one of the study's authors, points to limited road infrastructure and human activity such as logging, hunting, etc. as major reasons for this and he also emphasizes the fire-fighting capabilities of the many of the reserves and their staffs. While they lack funds to completely control fires within the PA boundaries, many of the staff in these protected areas are regularly on the look-out for poachers, loggers, and other forms of human activity that may create fires.

THE PROTECTED AREA SYSTEM OF THE RUSSIAN FEDERATION

Introduction

This section provides a brief history of the Protected Areas system in Russia and described in detail the many different forms of protected areas currently in use. The next section discusses weaknesses of the current system, including how well Russia's biodiversity is protected.

History

The roots of Russia's protected-area system can be traced back to pre-revolutionary nobility who set aside land as hunting reserves where temporary restrictions on land use or hunting during breeding season protected important game populations. After the revolution, beginning in 1919, strict nature reserves (*zapovedniks*) were established and Lenin wrote a formal statute for *zapovedniks* on September 16, 1921. The *zapovedniks* grew rapidly, particularly in European Russia, and by 1951 there were over 128 strict reserves protecting over 12 million hectares of land.

Stalin, however, warped the initial aim of the reserves, changing their purpose from protection and the scientific study of natural processes to that of providing an "area in which scientists would learn to master and transform nature to serve the needs of the economy." And in 1952, citing economic need, Stalin's government dissolved over 70% of the reserves, shrinking the total land area to just 1.5 million hectares. Over time, many of these reserves were reestablished but not before many of them were logged, mined, or otherwise degraded. Only the mid-1980s did the figure again reach 12 million hectares, the same level as in 1951.

Forms of Protected Areas

There are a number of different forms of protected areas each with different purposes. *Zakazniks* (wildlife refuges) protect a far larger area in the former Soviet Union than do zapovedniks, but suffer the reputation of being "paper parks" because of inadequate protection. Federal national parks, which began to be established in 1985, are becoming an important tool in protecting Russia's wilderness. Other forms of protected area include natural monuments, regional nature parks, and Territories of Traditional Nature Use (TTPs).

Zapovedniks (Strict Nature Reserves/IUCN Category Ia)

Zapovedniks are primarily created to protect "samples" of a particular ecosystem or landscape (steppe, central taiga). Some zapovedniks are created to protect a particular species' breeding or wintering grounds, but the effort to preserve ecosystem samples is more common. The most important type of protected area in the former Soviet Union, zapovedniks fall under International Union of Conservation of Nature (IUCN) Category 1A, which is the strictest level of protection.

Some zapovedniks have permanent scientific research stations; but many, particularly in Siberia and the Russian Far East, do not. Since the 1970s, a few zapovedniks have been designated as World Biosphere Reserves, an initiative set up by the United Nation's "Man and the Biosphere" program, which aims to establish a worldwide network of protected areas. Usually, in Russia, such a title means greater protection. There are two in the Russian Far East -- Kronotskiy Zapovednik in Kamchatka and Sikhote-Alin' Zapovednik in Primorskiy krai. Ust-Lenskiy Zapovednik in the Republic of Sakha has been actively trying to secure biosphere status as well.

Within zapovedniks, economic activity is strictly forbidden. However, due to declining budgets, some have been opening up to small-scale tourism. Reports of logging, grazing, and other industrial activity on *zapovednik* lands have increased since the disintegration of the Soviet Union. Most *zapovedniks* have a two-kilometer buffer zone that is controlled by the regional administration. Hunting and fishing is usually permitted in these areas, but clear-cut logging and other forms of large-scale natural resource extraction are not.

Most Zapovedniks are managed by the Nature Reserve Management Division, which is part of the federal Committee of Environmental Protection and Natural Resources. Three zapovedniks in the Russian Far East are managed by the Russian Academy of Sciences: Kedrovaya Pad' Reserve, Ussuriysk Reserve, and the Far Eastern Marine Reserve -- all of which are in Primorskiy Krai.

The Committee of Environmental Protection and Natural Resources allocates funding to reserves; however the Department of Finance decides how much the Zapovednik system should receive.

The Nature Reserve Management Division has great responsibilities, but it is understaffed and ill equipped to provide a comprehensive management program for the zapovedniks. Directors of individual zapovedniks have, therefore, taken more responsibility for overall management and many are actively making international contacts, organizing ecotours, and pursuing other possibilities to secure enough funding to pay their staff and continue their research. Zapovedniks are usually run by a director and two deputy directors who oversee the scientific research and law enforcement divisions. There are usually between 40 to 80 staff members for each zapovednik.

As of 1997, there were 92 zapovedniks administered by the federal Committee of Ecology that protect 32,492,703 hectares, including 6,410,173 ha. of marine protection. Six zapovedniks are administered by the Russian Academy of Sciences and total 411,243 ha, including 63,000 ha. of marine protection. In sum, total *land* area protected under the Zapovednik system is 26,442,071 ha. or 1.55% of the Russian Federation (Biodiversity Conservation Center, 1997). These zapovednik are a potent legacy as they make up more than 40% of the world's strict scientific nature reserves (IUCN Category Ia) *See Part II of this report for a complete list of zapovedniks in the Russian Far East.*

Zakazniks (Wildlife Refuges/IUCN Category IV)

Zakazniks are created to limit, temporarily or permanently, some forms of economic activity in order to protect ecosystems or particular animal or plant species. Restrictions on economic activities are often only in effect during certain seasons. Categories of Zakazniks include zoological, botanical, landscape, and geological. Most zakazniks have been established to regulate commercial hunting in order to preserve wildlife.

Zakazniks can be organized by federal or regional governments. Regional zakazniks are far more numerous than federal ones, and they form the core of the regional protected-area network. In Russia, there are over 1,000 regional zakazniks that, on paper, protect about 44 million hectares. The 69 federal zakazniks total 11.5 million hectares. About 70% of the zakazniks protect fauna; 12% are botanical reserves.

The two main bodies responsible for leasing zakaznik land to land users are the forest service (which has rights to lease timber allocations) and the hunting service (which has rights to issue hunting licenses). Federal zakazniks usually have a staff of rangers to ensure that land-users obey

the restrictions. Unlike zapovedniks, zakazniks must be renewed every five years; this creates a problem for long-term conservation within these regions.

Natural Monuments (*pamyatniki Prirody*)

Natural Monuments protect interesting or unique natural or man-made objects. These include lakes, unique trees or groups of them, waterfalls, caves, bird rookeries, or scenic landscapes. These natural monuments protect small areas, usually between 100 to 500 hectares, and therefore cannot protect entire ecosystems. However, they are an important tool in preservation as some are combined to create a larger protected area such as a zakaznik or zapovednik. They are much easier to establish than other protected areas because they are small in size. As with zakazniks, land users are legally responsible for protecting natural monuments. Local Committees of the Ministry of Environmental Protection and Natural Resources manage natural monuments. Unfortunately, lack of funding often leaves natural monuments without local staff to protect them or even signs to indicate their location. They fall under IUCN category III.

National Parks

National parks are created to protect natural ecosystems and cultural heritage while allowing controlled educational, recreational, scientific, and cultural activities, As zapovedniks are not designed for tourism, national parks are expected to fill this role. Usually parks are divided into zones where tourism and some forms of commercial activity are allowed, and a core zone where such activities are forbidden; this zoning is similar to the national park structure of the United States. However, unlike parks in the United States, most national parks in Russia do not systematically protect unique geological features or "beautiful" landscapes, but rather focus on protecting representative ecosystems within a bioregion, much as zapovedniks do. Most national parks are large and therefore important in preserving sizable tracts of land from large-scale industrial activity. Introduced only in 1983, National Parks are a relatively new form of protection in Russia. Park staffs average about 120 persons. National parks fall under IUCN Category II.

As of 1997, there were 33 national parks in the Russian Federation, totaling an area of 4.4. million hectares or .39% of the territory of Russia. No national parks exist in the Russian Far East yet, but there are plans to create a number of them; the farthest along of these planned parks are in the Primorye region. The Federal Forest Service runs most National Parks.

Territories of Traditional Nature Use (TTPs)

TTPs are designed to protect the traditional lands of indigenous peoples. There are still no comprehensive rules for such areas in Russia. However, such territories are being created by regional governments throughout the RFE and their importance will increase in the future. TTPs fall under IUCN Category VII.

Nature Parks (Prirodniye Parky)

In March 1995, the Russian government passed a federal law that decreed that Nature Parks are a new form of protected territory. The law defines these parks as "natural recreational institutions set aside for the purpose of nature protection, education, and recreation and under management of the Russian Federation. The main focus of these parks is to provide recreational areas for Russian citizens. The parks are created by agreement of the local government and the federal Ministry of Nature Protection and Natural Resource Use. The parks differ from National parks in that they are under regional control. Over the past foour years, Nature parks have become a popular conservation tool in the RFE, with new parks in Kamchatka and Primorye regions.

Private Nature Reserves

Russia's first private reserve, Muravyovskiy Nature Park, was created in 1993 in Amur Oblast. A joint effort between the International Crane Foundation, the Wild Bird Society of Japan, and the Amur branch of the Socio-Ecological Union (SEU), this 5,000-hectare reserve was leased from the local government after agreement was reached with various land users. It is currently managed by the SEU, a Moscow-based non-governmental organization. The park is a Russian model of sustainable development; rather than prohibit development on the land, the park encourages the local community to protect nature in their own way while encouraging ecologically benign industry in the region (recreation, ecological tourism, ecologically friendly agriculture. Success, at Muravyioka, however, has been limited.

Restricted Forests

Some specialists also consider Russia’s restricted forests part of the protected area system. This Group I, Group II, and Group III forest classification was described early and so is omitted here.

VI. AN ANALYSIS OF THE PROTECTED AREA SYSTEM OF THE RFE

Introduction

As the World Bank study of Russia's forest policy rightly concluded in 1996, Russia's protected area system is "the largest, one of the most important, and, until recently one of the best organized systems in the world." Unfortunately, of relevance for our discussion now is the last part of that statement. The decline of federal government structures and the increase of power among the regional governments and the persistent economic crises have left many portions of the protected area neglected and in dire need of support. Russia's protected area system is in many ways analogous to the decentralization and loss of control of the Russian government. Funds for protected areas have fallen drastically in the past 10 years; in most zapovedniks, national parks, and zakazniks there are only funds to pay salaries. There is no money to pursue the scientific research that was the hallmark of many zapovedniks under the Soviet system. There is no money to purchase new equipment to adequately fight fires. And most importantly, there is not enough money in some cases to fend off the many illegal resource users – the loggers, the poachers, and the miners who are ignoring laws and regulations regulating or forbidding resource use in protected areas. At least half the nature reserves and one-third of the national parks are in or are approaching a critical state, and the system itself is in jeopardy (World Bank, 1996).

And while nature is being poorly protected in existing reserves, a rapidly growing consensus of scientists and conservationists realize that Russia's current protected area system fails to adequately Russia's biodiversity and forest ecosystems. A global study by the World Conservation Monitoring Centre (WCMC) on the degree of protection of the world's forests revealed this troubling reality. "The region with the lowest protection figure was Russia at 2%, while insular South East Asia had the highest at 17%. It does appear that their calculations only include zapovedniks and federal zakazniks, not regional zakazniks and regional nature parks. If they had done so, these figures would be considerably higher. Nonetheless, the percentage would still be much lower than the current global percentage of 8% and definitely too low to protect Russia's biological diversity.

To analyze the weaknesses of Russia's protected area system and to further the discussion about what can be done to resolve these problems, let's examine each weaknesses in more detail starting with the most serious one – lack of financing. An assessment of how well this system protects biodiversity follows this section on financial problems and structural weaknesses.

Weaknesses in the System

Lack of financing

Discussions with zapovednik directors, zakaznik rangers, NGO, Committee of Ecology officials, and scientists continue to reaffirm the poor state of financing for protected. While national parks and protected areas in the U.S, Japan, and other industrialized countries also have periodic financial shorfalls; they do not compare to the perpetual funding problems of those in Russia. Many zakazniks (wildlife refuges) lack full-time staff and infrastructure. Most zapovedniks have full-time staff, but some have no equipment and/or fuel to patrol the reserve boundaries in search of poachers, crumbling staff facilities and no funds to do scientific research. In real (constant price) terms, financial support for Russia's nature reserve system has declined to less than 20% of the 1985 level (World Bank, 1996).

Mikhail Bibikov, Head of Primorye's Committee of Environmental Protection, summed up the problem neatly in dollar figures, "Each Zapovednik in Russia only receives about $10,000 annually; this comes from the federal budget and the Committee's environmental fund. However, the needed budget for each zapovednik is estimated at $130,000. These financial problems have become more acute since most recent economic crisis in Russia. Many Zapovednik directors are raising money on their own, via international fund agencies, scientific exchanges, and from NGO support. The most urgent needs, in my mind, are radios, computers, fire prevention equipment, gas, electricity, and salaries for rangers."

An analysis, for this report, by a scientific team at the Institute of Water Ecological Problems revealed the meager level of support for Khabarovsk region's protected areas. In Botchi Zapovednik, for example, a critical old-growth forest ecosystem for the endangered Siberian tiger, there are no "scientific workers, an incomplete ranger staff and insufficient finances." Further north, in Dzhugdzhurskiy Zapovednik, a huge reserve protecting boreal forest, "there are no staff, no scientists, and no funds to construct an office or living quarters. Thus, the only existing preserve in Okhotiya (central and northern Khabarovsk region) cannot ensure preservation of the gene pool of its rare species of plant and animals."

In nearby Jewish Autonomous Oblast (JAO), the zakaznik system is even worse off than many of the zapovedniks. Vasilli Gorobeiko, a staff member of the JAO Committee of Ecology confirms that due to the economic crises and mounting pressure from poaching activities, the "zakazniki are in an extremely difficult situation and incapable of fulfilling their function of protecting nature."

And finally, in Chukotka, the northeastern part of the Russian Far East,

"The financing of the zoological zakaznik "Lebedinyi", which has federal status, is also very inadequate. It does not even appear as a separate item in the budget of the administration of the Game department. The director of the reserve and the only ranger receive their salaries with great delays. Of the six regional reserves, only three (the "Chaunskaya Guba," "Omolonskiy" and "Ust'-Tanyurerskiy") have a protective staff (of one ranger each) who get their miserly pay at irregular intervals. All the protected areas suffer from chronic lack of water and land transport, spare parts, track-lubricating materials, communication equipment, field gear, etc. In effect, the most valuable spots of the Chukotka preserves have been left defenseless." (Gennadiy Smirnov, Kaira Club, 1999)

Part of the problem has to do with poor allocation of funds. While the Division of Nature Reserve Management remains the most important federal body to oversee zapovedniks, it has almost no say in financial matters. This power rests within the Division of Finance. And there are constant squabbles between Moscow and the government structures in the region, the latter complain that all the money earmarked for the region never arrives but is mysteriously siphoned off, while Moscow complains that when it is delivered to the regions it is spent improperly. However, these problems pale in comparison to the absolute lack of funds available for protected areas

This lack of financing has also exacerbated a number of other problems, in particular general disregard for laws and regulation of protected areas, poor public support, and federal vs. regional control of protected areas.

Disregard for laws and regulations

Illegal logging, mining, and poaching as become a huge problem in many of protected areas of the Russian Far East. Without funds to pay rangers properly, to purchase or fix transport equipment, and often without funds to buy gasoline, the zakazniki, zapovedniks, and natural parks are ill equipped to protect reserve area boundaries.

While largely due to funding issues, it also has to do with a growing disregard in Russia for laws and regulations. Perhaps this is a response to strict Soviet era enforcement, when disobeying the law meant, in some cases, extended period in work camps. This phenomenon pervades much of Russian life today and certainly is not limited to illegal harvest of resources, but extends to the taxation system, and so on.

Lack of a Unified Management Structure

Zapovedniks, zakazniks, and national parks are each under the control of different government departments and there is no effective coordination between them. The Federal level Committee of Environmental Protection and the Russian Academy of Science administers the zapovednik system, whose aims are towards conservation of ecosystems and research. National Parks, on the other hand, are controlled by the Federal forest service whose primary concern now is promoting the timber industry, as the Forest service's revenue in part is dependent on stumpage fees. Logging is allowed in most national parks. The hunting administration and forest service control most of the federal zakazniks and they have the legal right to issue hunting permits and logging licenses, respectively. Regional nature parks are often controlled by the Krai or raion-level administrations, which are regional not federal bodies. Therefore, the priorities of each type of protected is different and coupled with the confusing melange of government bodies responsible, one can imagine how difficult it is do develop a unified management structure and forest biodiversity conservation program.

Nonetheless, a number of regional administrations in the RFE are making efforts to overcome this lack of cohesion. In Jewish Autonomous Region, for example, the administration adopted a new law "On Specially Protected Nature Territories" and set up an Interdepartmental Commission to increase coordination among the different PA systems.

Federal vs. Regional Control of Protected Areas

Frequent conflicts arise over whether a proposed protected area should be a 'regional' or 'federal' designation, particularly when the protected area will generate revenues. For example, the primary stumbling block to creation of Middle-Ussuri (Sredne-Ussuriskiy) National Park in the Primorye region is resistance of the local governor; he wants the region to receive the taxes generated from the expected ecotourists. While Moscow wants to have federal control over the territory. A similar debate is underway in Kamchatka where the federal forest service would like the newly created, and huge, nature parks to come under federal jurisdiction. Alexei Avramenko, head of the Kamchatka Forest Service, argues that by turning them into national parks, Kamchatka would receive federal funding. Of course, the funds would come to the Kamchatka forest service which would be the legal entity responsible for administering the parks.

This jockeying between Moscow and the regions further clouds clear control over protected area administration and makes successful administration of the protected area system more difficult.

Poor Public Support

In Soviet times, zapovedniks were for scientific research, not tourism. Many Russian citizens feel the reserves were created for the scientific elite and resent that land has been taken out of commercial use. Zakazniks were created to protect a particular game species. Natural monuments were to protect a specific area of natural beauty, ecological importance, or historical or cultural significance. There was no system in place for recreation and ecotourism and as, a result, the protected area system historically and still today suffers from a lack of public support. The Soviet government finally realized the need to provide the Russian people with recreational areas when they created the National Park system in 1983. Nonetheless, the Russian people have been slow embrace the concept of designated areas in which to relax, pick mushrooms, go fishing, and so on. Most Russians see the 'taiga' as a common resource.

New forms of protected areas such as national parks, nature parks, and territories of traditional nature use (TTPs), hopefully, will hopefully combine the twin issues of economic needs and ecological preservation. And increasing public awareness of Russia's nature at the local level, is a useful way to broaden public support for the country's protected area system. The region's growing international reputation as land with vast forests, tigers, and cranes (something some of us in other countries could only hope for) is leading to increased awareness among Russian people of the global ecological significance of the area in which they live. Ecotourism, still a fledgling industry, has already helped to promote the value of the country's wilderness and marketing of non-timber forest products in local markets and abroad will also increase awareness of the wisdom of preserving forest ecosystems.

Protecting Forests and Biodiversity of Russia's Far East?

The World Conservation Monitoring Centre's study on the state of forest protection worldwide was influential in the case of Russia as it documented the low level of protection, in terms of percentage, when compared with other countries. According to the study's authors, "Analysis also showed that some forest types and variants were rare and unprotected in Russian, and should be examined for conservation needs without delay. The vast areas of boreal forest are of conservation concern particularly because of the very large area forest that is required to support viable populations of the large carnivores found there." Again, much of this 'vast boreal forest' lies inaccessible to industrial development due to lack of infrastructure. However, it is exactly this lack of infrastructure which has kept much of this old-growth forest intact, and thus presents the

international community with a great opportunity to help Russia protect large portions of these boreal forests.

The World Bank forest review came to the same conclusion as the WCMC study; Russia needs to expand the protected area network to protect her forests. "If Russia's protected area network is to provide adequate protection for biodiversity, the system will require significant additions. Effective action must be taken in the next few years to conserve large, unprotected wilderness areas that are not yet sufficiently represent in the protected area network."

A Regional Analysis of the Protected Area System in the RFE

Global studies provide good overviews, but in the process of summarizing tend to simplify the issue and lack the detail of a regional studies. Percentage figures alone do not reveal whether Pas protect forests and biodiversity. Scientists at the Institute of Water and Ecological Problems conducted an interesting study on the percentage of rare and endangered species of plants and animals present in existing protected areas in the Khabarovsk region of the Russian Far East. Currently, where Pas comprise almost 6% of the territory. The study revealed the following:

> 55% of the 212 rare species of vascular plants (IUCN categories I – III) are not included in the protective system of the protected area system. A similar situation also applies to the animal world. Out of 50 species of vertebrate land animals that had been entered in the Red Data books of the IUCN, USSR, and RSFSR only 32 have protection in the preserves of the Krai, although some of the remaining 18 species (or 36%) can be found on an irregular basis. Apparently the lack of special protection for these species and their habitats in the protected areas prohibits them to achieve a stable existence on Krai territory. Most of these populations are at the peripheries of their ranges, and are seldom in their optimal habitat. One can, therefore, conclude that the existing protected areas of the region do not ensure the preservation of its entire gene pool of rare species. And although the proportion of the rare animal species protected in the preserves is greater than that of the plants, it does not ensure their stable existence.

A similar study of Jewish Autonomous Oblast's PA system concluded that even though 9% of the region is protected in some form, the region's biodiversity remains insufficiently protected. Particular regions of concern the Amur lowlands and Daurian steppe.

Total percentage figures should be used in tandem with more detailed regional analyses. Another example is in Kamchatka, where almost 20% of the territory is protected. However, much of that

area protects the upper elevations of the Peninsula's Volcanoes which are primarily 'rocks and ice'. And yet, Kamchatka's most important conifer forests, so essential in controlling flooding and ensuring healthy salmon runs, remain unprotected and threatened.

Conclusion

The Soviet government created one of the world's premier protected area systems and certainly the largest. However, times have changed. While the system has always been fraught with some structural problems such as lack of a unified management structure, government decentralization has led to conflict between federal and regional bodies over control of existing protected areas and creating of new reserves. Low public support, which partially stems from the Soviet period, has made it more difficult to keep illegal resource users out of the reserves and to create new protected areas. However, the biggest threat by far to Russia's protected area system is lack of financing. Unable to patrol reserve boundaries, illegal logging, mining, and poaching continues to increase in protected areas. Scientific research and monitoring programs have been cut. The foundations of the Russia's protected area system are solid, but lack of resources are causing it to crumble.

Despite these problems, the Russian government realizes the global ecological importance of Russian forests and continues to create new protected areas, particularly on the regional level. Urgent assistance is needed to help Russia protect and expand the PA system; the government simply does not have the necessary financial resources to do it alone.

VII. THE RUSSIAN FAR EAST BIODIVERSITY HOTSPOT STUDY

Introduction

The overarching goal of the FoE-J/IUCN Russian Far East Biodiversity Hotspots is to bring Russian scientists, government officials, and NGOs together to identify those forest, wetland, tundra, and arctic ecosystems (Hotspots) that are of great ecological importance but are threatened and require urgent assistance. Some of these areas are existing protected areas, while others are not. And a number of these hotspots call for the need to develop sustainable development projects. Below is an account of how the project has evolved.

The Hotspot Study – Past and Present

In January 1995, Friends of the Earth-Japan, with the Botanical Gardens of the Russian Academy of Sciences, organized the first Biodiversity Hotspot conference in Vladivostok to identify nature

protection priorities (Hotspots). We felt that what was needed was not another scientific study, but a political process based on scientific criteria to identify Hotspots. So, we invited academics, member of government, and NGOs from all ten regions of the Russian Far East to discuss and identify these priorities, or Hotspots. The international environmental community knew so little about the region at that time and with the dissolution of Soviet Union, the easing of borders and increased trade and investment, we saw a potential threat to the forest wilderness of the Russian Far East. Also, it was (and still is to a degree) a time of opportunity. The new Russian government was formulating laws re. resource use and environmental protection. We saw it as a chance to advance the cause of biodiversity conservation.

The criteria we used to determine the Hotspots was the following:

1. Existing and projected threats from industrial development
2. Presence of rare and endangered plant and animal species or endemic species
3. Level of Ecosystem fragility
4. Importance of traditional land-use by indigenous peoples
5. Poorly studied areas that could be considered as meeting criteria 1,2,3 and/or 4 above.

In total 52 Hotspots were identified at the 1995 Vladivostok Conference and for the past four years FoE-Japan has provided funding for some of the key forest Hotspots; we helped to create new protected territories such as Vostochniy Zakaznik (wildlife refuge) in Sakhalin, the Shufan Plateau Zakaznik (wildlife refuge) in Primorye region, and we made progress towards conservation of other critical territories such as Anuiskiy National Park and the Samarga river region. We also provided funding and equipment for existing protected areas with were also identified as Hotspots such as Kedrovaya Zapovednik, home of the Far Eastern Leopard and important habitat for the Amur or Siberian tiger.

Aside from our small efforts, the Hotspot list served as a useful guide for other international non-governmental organizations working on biodiversity conservation in the region as the list demonstrates consensus by region of the most important conservation priorities. WWF, for example, has over the past 4 years funded a number of projects to protect these Hotspots; these projects have led to creation of a number of new reserves, including zapovedniks in Amur and Koryakia regions.

In 1997, in an effort to make our Hotspot work more visible and powerful, we joined forces with IUCN (European and Moscow offices) to complete another Biodiversity Hotspot Study. This was a much larger endeavor and we refined our earlier methodology to do the second study. Using the

same criteria, we decided to have regional roundtables in each of the 10 administrative regions of the Russian Far East and did so over a twelve month period during 1997 and 1998. At these roundtables, representatives from regional administrations, nature protection agencies, scientific institutes, industry, and non-governmental organizations met to identify and agree on 5-7 priority territories (Hotspots) for biodiversity conservation in their respective region.

The exact procedure for reaching consensus at these roundtables began with presentations by all invited specialists who described and supported the inclusion of one or more territories to the list. Then, on the basis of the criteria outlined above, specialists nominated and explained the reasons for the five areas they felt best suited the criteria. Finally, the selections were tallied and the 5-7 (in case of ties) 'Hotspots' receiving the most votes were put forth for final approval by the roundtable participants; these expert teams are listed in the Part II: Region by Region Studies.

In many cases, these Hotspot Roundtables were integrated into regional government commission resolutions on protected area development and general developmental plans of regional government. In Amur region, for example, roundtable coordinators Dr. Yuri Darman and A.T. Koval, Chairman of the Amur Regional Committee on Environmental Protection, used the results of the Hotspot Roundtable to prepared a resolution on protected area development that was enacted by the Governor of Amur Oblast. This was Resolution #139 of the Amur Oblast Administration signed on 1 April 1998 (For more information, see the section on the Amur Region in this report). In Khabarovsk region, the Hotspot Roundtable was chaired by the Regional Administration's regular meeting of the Commission on Protected Areas. In this way, the Hotspot identification and decision-making process has become an effective tool for reaching consensus within the government as it brings together and unifies key stakeholders from government, academic, and NGO circles.

To announce the findings of the Hotspot roundtables, to develop protection strategies, and to make recommendations for sustainable development of the region, Friends of the Earth-Japan, IUCN, and the Republic of Sakha Government held an international conference in Yakutsk, Russia in June 1998. Attendees at this conference unanimously agreed to endorse these Hotspots. Since June, more than 45 international NGOs have also endorsed the Hotspot List.

The Hotspots Process as a means of generating Consensus and Political Will

While the Hotspots process does use scientific criteria in order to identify these priority territories, these roundtables are primarily a *political process* in that they aim to develop broad-based support and consensus for acting to protect urgent nature conservation priorities. We have the viewpoint

that in many cases enough scientific research has been done determine whether an important forest or wetland ecosystem should be protected. In many regions of the RFE, Russian scientists have studied these areas in detail. What has been lacking is the political will and or financial resources to act to protect these Hotspots.

Let's take a specific region of the Russian Far East as a case in point -- the Sikhote-Alin mountain range which is critical habitat for the endangered Siberian tiger. Since 1991, with international scientists, there have been extensive studies of migratory corridors of the tiger and what watersheds are essential to ensure that this animal has enough habitat. Most likely, much of this was done by Soviet scientists in the 80s but that is another matter. In 1995, the Hornocker Wildlife Institute (U.S.) with funds in part from the US AID funded EPT project, a $16.5 million dollar effort to conserve biodiversity and sustainably developm the Sikhote-Alin region, prepared a comprehensive tiger habitat conservation plan. These areas are well known to those that work in the region and include the Samarga river basin, the Upper Bikin River watershed, the Chuken river watershed, the Matai River, the Middle-Ussuri River. However, to date, there has been limited success in protecting these areas as there has been insufficient political will mobilized and funds which have not been channeled strategically. The Hotspot Study identifies all of these areas as key protection priorities. So while scientific studies provide the knowledge base that these areas are important, the Hotspot roundtable process, the conference, and future promotion will help provide the political will and even mobilize some of the financial resources to make protecting these key forest Hotspots a reality.

There are other examples. In Sakhalin, for example, scientists concur that the Schmidt peninsula, Vengeri and Pursh-Pursh river regions, Krilon Peninsula, and South-eastern forests are the primary frontier forests remaining on Sakhalin. All of these are Hotspots in the new IUCN/FoE-J study.

In the new Hotspot List 59 territories are identified. An interesting development in this new list is the increased number of protected areas selected; almost half of the Hotspots identified in the new study are existing protected areas. This reveals that the existing reserve system lacks support and is threatened. For a number of Hotspots there is a call for sustainable development projects, rather than simply recommending for a new protected area. This is based on the realization that to protect biodiversity in some areas, we must develop sustainable economic activities. For example, in the Samarga river region, a huge 800,000 ha. territory in the Primorye region that is home to the Udege peoples, specialists recommend developing a sustainable non-timber forest product industry and ecotourism. Properly implemented, these activities will help provide income for the local community and simultaneously protect the ecosystem. The concept of ‘Hotspots’ is evolving as a conservation tool to include not just areas where new protected areas should be established, but it

has also become a tool to support existing protected areas and to develop sustainable economic models.

Compatibility with other Conservation Projects

As illustrated above in the case of tiger conservation in the Sikhote-Alin region and frontier forest protection in Sakhalin, Hotspots supports existing scientific studies that show the need for protection of a particular area or groups of areas. Also, we described above how the Hotspots process have been integrated into government programs for protected area support and development in the Amur and Khabarovsk regions. Let's look at some of the other major forest and biodiversity conservation projects underway in the Russian Far East and how they fit into the Hotspot concept:

World Resource Institute's Forest Frontiers Initiative (FFI)

WRI's influential study on the world's frontier forests pinpointed the Russian Far East as one of the areas with the world's largest remaining tracts. While some of their map data on the Russian Far East is not accurate, their global forest map does serve well as a general overview of where frontier forests remain. Their feature forest ecosystem under high threat is the Northern Primorskiy region, i.e. the Bikin and Samarga river basins. Both of these rivers systems are on the Biodiversity Hotspot list; in fact, we helped to provide data on this region to WRI. Currently, WRI does not have programs in the RFE, but they are planning to expand activities to include Russia in the near future.

World Wildlife Fund (WWF) Projects

WWF is the largest and one of the most active NGOs in the Russian Far East currently supporting protected areas, anti-poaching patrols, and other conservation activities. WWF funds a number of projects working for the conservation of the territories identified in RFE Hotspot Study, including the Sakha, Kamchatka, Primorye, Khabarovsk, and Amur regions. In 1994, WWF-US coordinated a study entitled "Conserving Russia's Biological Diversity" which made the case for support primarily of existing nature reserves in Russia. This document helped to generate some financing for protected areas. Aside from the 1994 study, WWF has not coordinated a comprehensive study on biodiversity conservation. They are currently developing a US $1.5 million project that will analyze the Amur eco-region (an area that includes much of the southern Russian Far East region minus Sakhalin); this project will provide recommendations for general ecosystem conservation in the region. When funding projects in the RFE, FoE-Japan coordinates with WWF to ensure that

projects do not overlap and if possible synergize to achieve maximum benefit. There is currently discussion with WWF and other environmental NGOs working in the RFE to hold yearly donor roundtables to coordinate funding properly.

Concluding Remarks

In sum, the Hotspot study does not compete with, but complements existing conservation initiatives. The Hotspots process builds political consensus among government, NGO, and academic in determining urgent forest conservation priorities. This generation of political will can serve to assist all working for conserve priority forest territories in the Russian Far East.

Key Forest Hotspots in the Russian Far East – A Snapshot (Suggest offset from the text in a box perhaps)

Below are some of the forest Hotspots identified by the 1998 study, For more information on these hotspots and others please refer to Part II of this report which outlines the importance and threats, and makes recommendations for conservation of these critical forest ecosystems.

Sikhote-Alin Mountain Range (Primorye and Khaborovsk regions)
The rich Ussuri taiga forest grows along much of this range, which is home to the famed Siberian tiger and a host of other endangered species. The traditional homeland of the Udege peoples, these forests are threatened by logging and fire. Russian scientists and NGOs are now preparing documents to make a large portion of the Ussuri taiga a World Heritage Site. Priority forest hotspots of this region include:

- Samarga River Basin
- Middle and Upper Bikin River Basin
- Middle-Ussuriiskiy National Park
- Upper-Ussuriiskiy National Park
- Anyuiskiy National Park
- Matai Zakaznik
- Pikhtsa-Tigroviy Dom Zakaznik
- Gur-Khoso Zakaznik

Conifer Forests of Kamchatka Peninsula
The central Kamchatka river valley holds the only significant conifer forests (fir and larch) on the Peninsual. The most eastern example of Siberian taiga forest on the Eurasian continent, locals call

these forests "Conifer Island." In past thirty years, logging and fires have destroyed over half of these forests. While the logging has declined, the economic crisis has paralyzed fire-fighting services and fires have become the main cause of forest destruction. If logging and fores fires continue at the present rate, Kamchatka's old-growth forest could be gone in 20 years. 'Conifer Island' is one of three identified forest hotspots on Kamchatka.

Forests of Sakhalin Island

Historically heavily logged, old-growth forests remain in sizable patches on this mountainous, biologically diverse island. Brown bears, sable, river otters, musk deer, and foxes all depend on these forests, which also play a crucial role in preserving Sakhalin's rich salmon rivers. Forest Hotspots of the island include:

- Vengeri and Pursh-Pursh River basins
- Anna, Sima, and Bukhara River basins
- Schmidt Peninsula
- Krilyon Peninsula
- Vaida Mountain

Boreal and Sub-tundra Forests of Republic of Sakha (Yakutia)

Sakha's massive boreal forests are a huge carbon sink, their preservation is critical in the effort to mitigate climate change. All the forests grow on permafrost, which can melt due to logging, mining, or fire, and in the process cause a release of methane gas. The subarctic forests also play a vital role in preventing a southerly expansion of the tundra, a phenomenon similar to desertification. Forest Hotspots of Sakha include:

- Sub-tundra forests of Northern Sakha
- Between the Lena and Amga Rivers
- Tuimaada Valley

Amur River Basin Forests

Heavily logged in the past, the Amur and Jewish Autonomous regions still have valuable korean pine, larch, and birch forest ecosystems that need protection. Forest hotspots of these regions include:

- Arkhainskaya Lowland and Little Khingan Range
- Mukhinka Drainage Basin

- Between the Nora and Selemdzha Rivers
- Mountains surrounding Zeiskoye Reservoir
- Nyukzhinskiy Ridge and Amur Pinelands
- "Kuldur" Nature Park

Larch Forest of Magadan

Magadan larch forests regulate the hydrology of the ecosystem and protect soils. This function is particularly important in the north where forests meet tundra. Mining and fires are the primary threats causes of deforestation in these forests. Magadanskiy Zapovednik, which protects a portion of these forests, is a hotspot.

Source: FoE-J/IUCN 1998 Biodiversity Hotspot Study.

VIII. RECOMMENDATION ACTIONS

These recommendations, in part, stem from the IUCN/FoE-Japan/Ministry of Nature Protection of Republic of Sakha (June 1998) Conference held in Yatusk, Russia. The Conference Resolution and appendixes outline in some detail what fire prevention, forest 'Hotspot' conservation, forest harvest, and illegal logging measures need be taken to protect Russian Far East forests. Information generated by the Friends of the Earth-Japan research team over the past five years and most recently in March 1999 have also guided a number of these recommendations. Finally, while there are a number of urgent measures the Russian Government, NGOs, and scientific institutes need to implement themselves, the following recommendations are tailored to how Japanese counterparts (government agencies, NGOs, and academics) can help contribute to RFE forest conservation.

1. Support Russia's Protected Area System

Russia's protected area system, historically one of the world's best, is in jeopardy primarily due to lack of financing and equipment such as vehicles, communication equipment, field gear, spare parts, etc. Urgent support is needed from the international community to help the Russian Federation maintain this system until the current economic crisis subsides.

A. Financial Assistance

A financial assistance program should be developed that provides aid to a number of key protected areas (Zapovedniks, Zakazniks, and regional parks) that are critical for forest and biodiversity conservation. Some of the strategic regions of the RFE include the Primorye, Khabarovsk, Sakhalin, and Amur regions; a number of these reserves are identified in the Hotspot Study. Financing would help fill gaps in the current budgets of these reserves and funds would go to pay salaries, purchase gasoline and equipment, conduct scientific research, and develop public education programs.

B. Technical Assistance

Japanese equipment, such as vehicles, radios, clothing, etc. would greatly increase the ability of Russia's reserves to control illegal resource use and poaching in reserve borders, control forest fires, and conduct scientific research.

C. Promotion of Ecotourism

Promoting ecotourism in Russian reserves is crucial to the development of a stable source of financing for the protected area system and jobs both for the Russian people and internationally. Representatives from the Japanese park system, government, and tourism companies should work with Russian and international counterparts to develop infrastructure, routes, and advertising for ecotourism in the Russian Far East.

2. Support Creation of New Protected Areas

In addition to support for existing protected areas, Russia needs international support for new protected areas. The current system fails for protected the region's globally important forests and biodiversity. The RFE Hotspot Study identifies many of the critical forest ecosystems that are currently unprotected. In many cases, such as some areas in Khabarovsk, Primorye, and Sakhalin regions, the only obstacle is lack of financing.

A. Financial Assistance

Financial Aid should be provided to Russian and International NGOs working with the Russian Government to create new protected areas.

B. Technical Support

Japanese expertise in protected area infrastructure would be useful to the Russian government as they create new protected areas. Survey equipment, vehicles, radio transmitters and other such equipment would also help Russian protected area planning teams in creating these new reserves.

C. Joint-Research

Some areas need further scientific research in order to document animal migration patterns, develop nature reserve boundaries and buffer zones, and ecological-economic justifications (obosnovaniye) for proposed reserves and expansion of existing protected areas. Japanese scientists would be valuable partners in these efforts; there have already been a number of joint Russian-Japanese expeditions for these purposes particularly on Sakhalin Island and they have proved fruitful. Japanese scientists and institutions would also be valuable partners in research existing reserves, as well.

3. Assistance with combating Forest Fires

The 1998 forest fires had a devastating impact on forests in Khabarovsk and Sakhalin, destroying almost two million hectares of forestland. Preliminary studies reveal that the fires emitted 30 million tons of carbon dioxide into the atmosphere and that 900,000 ha. of forest land has completely lost its carbon fixing potential. These fires have global implications for the world's climate and as such the international community needs to support fire prevention programs in Russia. Financial support from the international community was feeble.

Russia is also Japan's largest source of raw logs and the 1998 forest fires have reduced available timber stock in the Khabarovsk region by an estimated 154 million cu.m. It is in the best interest of the Japanese government, timber importers, and wood processing companies to help protect this critical source of wood supply. The fire threat in Khabarovsk remains, Russian scientists fear that this spring fire will breakout again as the standing half-dead timber remains a serious fire threat and the government does not have enough financing to remove it all.

A. Financial Assistance

The Russian Forest service needs funding to prepare for future fires; they lack sufficient equipment and staff. NGOs and scientific institutes need funding study the long-term impacts of the 1998 fires, to develop fire prevention programs such as education, and to monitor logging operations.

B. Technical Support

Japanese fire fighting equipment is needed, including vehicles, fans, radio equipment, and clothing.

C. Joint-Research

A number of Russian scientific institutes, NGOs, and government agencies expressed interest in collaborating with Japanese counterparts in researching the long-term effects of the fires including impacts on biodiversity, CO2 release, fisheries, marine resources of the Sea of Okhotsk, and human health, particularly among indigenous communities. Other areas worthy of joint-research include how logging operations can cause fires and the impacts of fire on permafrost.

4. Raising Awareness of Russian Forests in Japan

While the global importance of tropical forests is well-known in Japan, awareness of the importance of Russian forests is low. Some within the Japanese timber industry are promoting Russian wood as the 'green source for the twentieth-century' and they appear unaware of the role that temperate and boreal forest play in regulating the global climate or of the biodiversity values of the region. Increased awareness among Japanese media, government, academia, and industry is critical. A number of concrete measures can be taken including:

A. Support Japanese NGOs to raise awareness in Japan.
B. Support measures to reduce consumption of timber in housing construction. Measures can include policy changes that lengthen the life span of houses, allow for use of alternative building materials, and reform of building codes.
C. Use planned and existing Russian-Japanese agreements, such as the recent Obuchi-Yeltsin declaration to include measures for Russian forest conservation and 're-activate' agreements such as the Russian-Japan migratory bird treaty.
D. Publish research materials in Japanese
E. Hold symposia, roundtables, and meetings on Russian forests in Japan

5. Help Russia address Illegal Logging and Trade

Illegal logging and trade continues to increase in the Russian Far East. Measures to be taken should include:

A. Use the international fora such as the IFF, CBD, and G-8 meetings to raise the issue of illegal logging and trade. The last G-8 communique outlines a "Forest Action Programme" that includes suggested measures on illegal logging and trade. This Action Programme needs to be implemented by signatory governments.
B. Support development of forest certification, such as that developed by the Forest Stewardship council (FSC), in Russia and Japan. In Japan, particularly, a consumers market for such wood products needs to be nurtured via government incentives.

6. Jointly Develop and Support Community-based, Sustainable Resource Use Projects

Communities, government agencies, and industries throughout the Russian Far East are interested in developing projects that use forest resources sustainably, but many lack the start-up financing to get these projects 'off-the-ground'.

A. Strategic funding and technical and marketing expertise is needed to help develop locally-based processing of timber and non-timber forest products, and to replace burning of diesel, gas, and wood with renewable sources of energy

Note About Financing Projects in Russia: When financing government implemented projects in Russia, NGO oversight is highly recommended to ensure that the funding is spent properly and in a most efficient manner. It is also essential to spend time gathering background data on government agencies, academic institutes, etc. that are being considered for financing; some of these institutions may not spend the money properly. In general, it is good practice in Russia to also specify exactly how the funds should be used; this will also help to ensure that funds are being spent properly. Finally, as a rule, if providing assistance to the Russian Far East, all effort should be made to fund that particularly region directly rather than through Moscow. Federal agencies in Moscow should be informed, but with the proviso that funding needs to go directly to the regional government, NGO, or academic institute working in the RFE.

Note About Providing Technical Assistance to Russia: Russian import tariffs and taxes can cause considerable delays in the transfer of equipment from abroad, even equipment to be used for humanitarian or environmental purposes. Research and negotiations with the Russian government should be done prior to providing any form of technical assistance. Past technical assistance efforts have in case been stymied by the byzantine nature of import tariffs and regulations and they cases are all too well known throughout the Russian Far East.