

By Newell and Zhou / Sources: Ministry of Natural Resources, 2002; ESRI, 2002.



Map 3.1
Khabarovsk Krai
788,600 sq. km

Khabarovsk Krai

Location

Khabarovsk Krai, the second largest administrative region of the Russian Far East (RFE), stretches 1,800 km from north to south along the Tatar Strait and the Sea of Okhotsk. Its northern zone extends to within 430 km of the Arctic Circle, and its southernmost tip is approximately on the same latitude as Seattle in the northwestern United States (47° N).

Size

788,600 sq. km; approximately 4.6 percent of the entire Russian Federation, one and a half times larger than France, and equal to the combined area of the states of Oregon, Washington, the western third of the province of British Columbia, and the Alaskan panhandle.

Climate

Winters are cold and dry. January temperatures average -23°C in the south and between -36°C to -40°C in the north. Summers are warm and humid, with July temperatures in the south approximately 21°C and in the north about 15°C . The southern portion of the region has approximately 130–150 frost-free days per year; in the north-central region and at higher elevations, the number of frost-free days drops to 90–130.

Geography and ecology

Because Khabarovsk Krai extends a great distance north to south, it has a wide diversity of plant and animal species. Mountains in the northern part of the *krai* are covered with tundra and fields of lichen-covered rock called *goltsi*. Further south one finds sparse Dahurian larch (*Larix gmelini*) forests interspersed with Japanese stone pine (*Pinus pumila*) on mountain slopes, and then denser Dahurian larch forests (which cover 15 percent of the north) with grass, small marshes, and meadows. Most of the region lacks roads and is therefore largely inaccessible. The towns are along the coast. Population density is low. The central part of the *krai* includes the lower part of the Amur River valley, one of the world's largest river basins. The headwaters of the Amur are in Chita Oblast and China. Here, in the broad Amur Valley, the region and its forests are influenced by the monsoon climate. East Siberian fir (*Abies nephrolepis*) and Ayan spruce (*Picea ajanensis*) forests gradually mix in with the Dahurian larch. Usually spruce and fir are dominant on the wetter eastern slopes, while larch grows on western slopes. Birch (*Betula*) and aspen (*Populus tremulae*) grow back first after logging or fire. The Baikal-Amur Mainline (BAM) and adjacent rail spurs have greatly increased access. Population density is higher here than in the northern regions of the *krai*.

The southern part of the *krai*, which includes part of the Ussuri River basin and the southeastern sea coast from around the town of Vanino, is strongly influenced by the monsoon and has warm, humid summers. It escaped glaciation during the last Ice Age and has high levels of biodiversity. The Ussuri Taiga, named after the Ussuri River, is one of the most unusual and species-rich temperate forests in the world.

Flora and fauna

There are about 2,000 species of vascular plant (terrestrial and nonterrestrial) and 650 vertebrates (including freshwater fishes) in the *krai*, including many rare and endangered species. There are approximately two hundred different types of woody plant species and a large diversity of forest cover, including: deciduous (broadleaved) and mixed forests, forests of Mongolian oak (*Quercus mongolicus*), forests of Korean pine (*Pinus koraensis*), secondary aspen and birch forests, thickets of Japanese stone pine, regions of stone birch (*Betula ermani*), poplars (*Populus*), chosenia (*Chosenia arbutifolia*), elms (*Ulmus*), and ash (*Fraxinus*) forests, spruce and fir forests, peat bogs with sparse larch trees, complex forests with Ayan spruce dominant and birch, alder (*Alnus*), and mountain ash (*Sorbus*). Key species include the Siberian tiger (*Panthera tigris altaica*), Oriental white stork (*Ciconia boyciana*), and Steller's sea eagle (*Haliaeetus pelagicus*). Other mammals include the Himalayan bear (*Ursus thibetanus*), brown bear (*Ursus arctos*), and wild boar (*Sus scrofa*), as well as many smaller mammals such as river otter (*Lutra lutra*), American mink (*Mustela vison*), yellow-throated marten (*Martes flavigula*), sable (*M. zibellina*), wolverine (*Gulo gulo*), red fox (*Vulpes vulpes*), raccoon dog (*Nyctereutes procyonoides*), Eurasian lynx (*Felis lynx*), Eurasian squirrel (*Sciurus vulgaris*), and variable hare (*Lepus timidus*). Numerous whale species feed in the rich waters around the Shantar Islands. In the *krai*'s estimated 120,000 rivers and 50,000 lakes, there are over 200 species of fish.¹

Largest cities

Approximately 85 percent of the *krai*'s population is urban, distributed among the seven major industrial centers.² The administrative center is Khabarovsk, the largest territorially (400 sq. km) and in terms of population (pop. 617,800). Khabarovsk is also a center for petroleum refining, meat, dairy, and fish processing,

Key issues and projects

Pollution of the Amur River

The Amur River is one of the world's ten largest rivers. It is also among the former Soviet Union's most polluted (see pp. 154–55).

Logging by multinational corporations

Of all the regions in the RFE, Khabarovsk has attracted the most multinational logging companies. The giant Malaysian company Rimbunan Hijau recently secured over 1 million ha of prime forestland and has begun logging (see pp. 175–77).

Increased road building

Rapid road construction in the southern Khabarovsk, much of it federally funded, continues to fragment the critically important forests there, opening up new areas to logging.

Forest fires

Forest fires, most caused by humans, plague Khabarovsk. Fires in 1998 were particularly destructive with millions of hectares burned throughout the *krai*.

Foreign investment in the timber industry

As Khabarovsk is the largest timber-producing region in the RFE, the World Bank, USAID, the Canadian International Development Agency (CIDA), and others are funding projects (see pp. 171–72).

Indigenous land rights

Even though the Khabarovsk government began determining borders of Territories of Traditional Nature Use (TTPs) in 1992, indigenous peoples still do not hold title to or own their own territory and do not have the right to allocate resources from their traditional territories (see pp. 173–74).



Khabarovsk Forest Service

The 1998 fires devastated huge areas of Khabarovsk.

and light industry. Particular industries are associated with each urban area, for example: Komso-molsk-on-Amur (pop. 309,400) is a center for petroleum refining, ferrous metallurgy, meat, dairy, and flour production, fish processing, and chemical production; nonferrous metallurgy is associated with the town of Solnechny; gold, silver, and platinum refining are centralized in Mnogovershinny; Okhotsk, with a 245,000-ton handling capacity, is a center for fishing and seafood processing. Amursk (pop. 57,900) is a center of the *krai's* defense industry. Nikolaevsk-on-Amur (pop. 35,600), Vanino (pop. 22,000) and Sovetskaya Gavan (pop. 34,400) are the *krai's* three major port cities.

Population

As of 2001 the population was 1,506,700, almost 25 percent of the RFE total.³ Eighty percent of the population is Russian, approximately 8 percent Ukrainian, 2 percent Jewish, and, very approximately, 2 percent a combination of Nanai, Nivkhi, Ulchi, Evens, and Negidal ethnic groups. Density

varies from the sparsely populated northern regions (approximately 1 person per 10 sq. km) to the warmer and more industrialized south (approximately 10 to 30 people per sq. km). Most people (1,223,700; about 80.6 percent of the *krai's* total) live in cities; the rest in villages. The population is, however, decreasing; the local death rate exceeds the birth rate by 1.9 times. Approximately 50.6 percent of the *krai's* population is considered of employable age. Of this population, 86.9 percent was employed (663,000 people), with the remainder, according to the International Labor Organization, unemployed. Officially, 25,100 people, 3.3 percent of the total potential labor force, were registered as unemployed.

Political status

Through the influence of the governor, Viktor Ishaev, Khabarovsk enjoys a much better working relationship with Moscow than does Primorsky Krai. Critics point to Ishaev's control over all facets of economic and social development in the *krai* as a major reason for this close relationship.

Natural resources

One of the richest RFE regions in terms of quantity and diversity, Khabarovsk is perhaps best known for its timber and mineral resources. There are approximately two thousand known deposits of one hundred different commercial minerals, including gold, silver, platinum, molybdenum, tungsten, copper, lead, zinc, bismuth, arsenic, antimony, mercury, and rare metals.⁴ The world's largest zirconium deposit is in the Ayano-Maisky region—a region well known for large gold, silver, and platinum deposits.⁵ Khabarovsk has one of the largest reserves of tin in Russia. Figures for total timber reserves vary widely, as inventories are often based on outdated Soviet data. The Federal Forest Service estimates that the *krai* has about 1.75 billion cu. m of commercial timber (70 percent coniferous, with the following reserves by species (million cu. m): spruce (515), pine (505), and oak (185). Much of the commercially valuable timber is in the southern half of the *krai*, and accessible areas have been heavily exploited and exposed to fire. Commercial reserves of black and brown coal total about 1 billion tons, with coking coal reserves at 4 billion tons. Agricultural lands total 695,500 ha, about 0.9 percent of the total land area. Preliminary estimates of oil and gas reserves, mainly offshore around the Shantar Islands, put the figure at about 500 million tons.⁶

Main industries

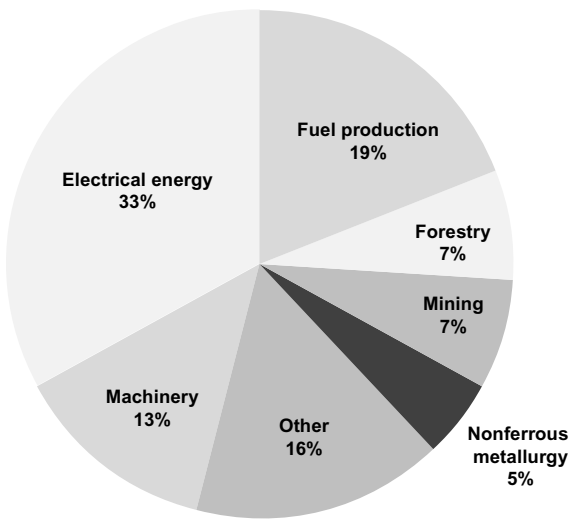
Power and fuel production account for about 50 percent of the total industrial production, as reported in state statistics, but these sectors are heavily subsidized and do not generate significant revenue, aside from federal government support (see fig. 3.1). The backbone of the economy consists of exports of aircraft equipment, refined oil and oil extraction equipment, timber (mostly raw logs), precious metals (gold, silver, and platinum), and fish. In 1999, gold and platinum yielded 97 percent of the mining industry's output.⁷ The Solnechny Mining complex, one of the largest in Russia, used to produce over 35 percent of the country's tin and copper concentrates. Most output, however, is sent to other regions in Russia for processing. Today, the shaft mine at Urgal, one of the largest in the Far East, produces more than 1 million tons annually. Despite this production and large coal reserves elsewhere, Khabarovsk annually imports about 6 million tons of coal each year from other regions of Russia, much of



Josh Newell

While Khabarovsk would like to increase exports of sawnwood, outdated machinery poses a huge obstacle.

Figure 3.1
Industrial production in Khabarovsk Krai, 1999



Source: Khabarovsk Administration, 2000.

that coming from the Republic of Sakha's huge Neryungri coal deposit.⁸

The Khabarovsk timber industry is the RFE's largest, with about 5 to 10 million cu. m of timber produced yearly. In recent years and particularly the past few, almost all production has been exported as raw logs. With the size of the forests, their geographically strategic location for export markets, and a relatively well-developed rail, road, and port infrastructure, the timber industry is attracting foreign investment and international aid projects. The *krai* also has the largest machinery and metalworking plants in the RFE, again in Khabarovsk and Komsomolsk-on-Amur, and a large ship-building facility in Amursk, the Amur Shipbuilding Yard. This yard, along with the Amursteel Company, has received a number of contracts to build portions of the oil platforms for the Sakhalin projects. These contracts have helped to retool the industry. Khabarovsk also has the two biggest, and really only significant, petroleum refineries in the RFE, with enterprises in Komsomolsk-on-Amur and Khabarovsk. The Komsomolsk Refinery, in dire need of modernization, is

looking to Japanese investment to achieve this, and hopes to receive a steady supply of oil and ultimately gas from Sakhalin offshore oil and gas projects via an existing oil pipeline connecting oil extraction facilities in Sakhalin with the refinery.

Infrastructure

Two railroads, the Trans-Siberian and the Baikal-Amur Mainline (BAM) cross the *krai* and are linked by two connecting trunk lines. Construction of the federally funded Chita-Nakhodka road has opened up large areas of forestland in the southern part of the *krai*; this road included construction of a bridge across the Amur to the nearby Jewish Autonomous Oblast (JAO). The eastern terminus of the BAM is in Vanino, the port that handles most of the region's timber exports to the Pacific and runs a ferry between Khabarovsk and Sakhalin Island. Vanino handles approximately 10 million tons of shipments a year, 20 percent of which is export. Five thousand freighters, 50 percent oceangoing, visit the port annually. Until quite recently, 65 percent of the freight destined for Sakhalin from the Russian mainland passed through Vanino. Sovetskaya Gavan, a port city just to the south and a part of Primorsky Krai until 1948, and the port city of Nikolaevsk-on-Amur to the north are both rapidly growing in importance as timber and fish export points. Cargo volumes and turnover have been increasing, and as of March 2000, were up 116 percent and 106 percent, respectively, over 1999 levels. Railroad transport accounted for 70 percent of total regional cargo volumes. According to various specialists, with the prospective construction of a second rail line, Sovetskaya Gavan would be capable of handling more than 1.5 million tons of freight annually.⁹ Khabarovsk's international airport and Vladivostok's newly expanded international airport compete for designation as the Russian Far East's largest. The northern part of the *krai* has few roads, no railroads, and is accessible largely by helicopter.

Foreign trade

Japan and China are the *krai*'s largest trading partners (see fig. 3.2).¹⁰ Reported exports totaled U.S.\$1.3 billion in 2000, and imports totaled U.S.\$141 million; this is about double the 1999 trade turnover (exports—U.S.\$596 million; imports—\$157 million).¹¹ This increase was largely from the sale of military aircraft and equipment to China, which accounted for about \$524 million in exports from the *krai*. The largest exporters were the Komsomolsk Aircraft Manufacturing plant (\$444 million), the Komsomolsk (\$260.5 million) and Khabarovsk (\$113.7 million) oil refineries, the heavy industry manufacturers, Amurmetal (\$44.8 million) and Vostok Metall (\$12.8 million), and the timber exporters, Flora (\$31.1 million), Dallesprom (\$12.9 million), and Forest Starma (\$11.5 million). Khabarovsk supplies approximately 4 percent of Russia's total wood exports and is the RFE's leading exporter. In 1999, Khabarovsk exported about 4 million cu. m, including 3,937,000 cu. m in raw logs. There were over 220 timber exporters active in the trade, but 45 firms control about 90 percent of total exports.¹² Export of fish and sea products amounted to 21,300 tons during the first quarter of 2000, an increase of 3.2–3.4 times over January–March 1999. Most were sold directly to foreign countries, including the United States (40 percent), Cyprus (29 percent), Japan (25 percent), Poland, South Korea, and Peru. Imports are primarily of machinery and equipment, food products, and electronics from Japan, China, the United States, and South Korea.

Although the *krai* receives U.S.\$300 million in investment each year, more than 90 percent comes from within Russia. Between 1994 and 2000, about \$105 million, or 40 percent of all foreign investment during the period, went into the timber sector, with mining receiving about \$38 million.¹³ Corporations from Japan, Malaysia, and the United States are the largest investors.

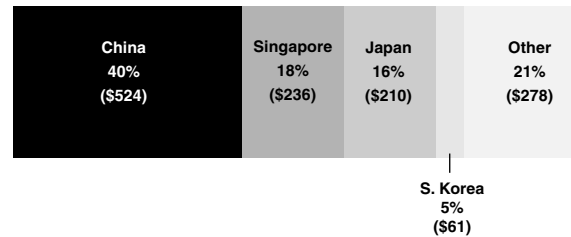
Economic importance in the RFE

- RFE's third largest industrial producer after the Republic of Sakha and Primorsky Krai and contributes about 1.2 percent to Russia's gross domestic product.
- Provides more than one-third of the RFE's annual timber production.¹⁴
- Second highest number of operating companies and enterprises: as of 1999, Primorsky officially had 38,867 registered enterprises, Khabarovsk had 26,314.
- The regional leader in oil and gas refining (not diesel) and the wholesale petroleum trade; the fourth-largest coal reserves in the RFE.
- Fourteen percent of gold reserves in the RFE and, in 2000, Russia's third-largest gold producer.
- Vanino and Sovetskaya Gavan ports are key export and import centers not only for the *krai*, but also for the entire RFE.

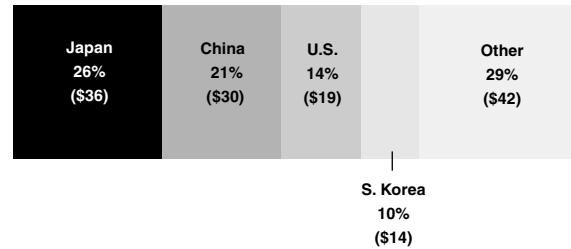
Figure 3.2

Foreign trade with Khabarovsk Krai, 2000

Export – U.S.\$1.3 billion



Import – U.S.\$141 million



Source: Khabarovsk Administration, 2001.

- Currently the only producer of metal-cutting machinery in the RFE and, with Primorsky, one of only two regions in the RFE that produces wood-processing machinery.

General outlook

In the past ten years, the *krai*, especially the southern part, has suffered severe deforestation, forest fires, and water pollution, all caused by destructive logging, mining, agricultural, and industrial practices. Open-cast and placer mining have impaired riverine fisheries and polluted important groundwater reservoirs, such as those near the villages of Solnechny and Gorny. The huge forest fires in 1998, largely brought on by poor logging methods and inadequate forest conservation efforts, burned about 3 million ha of forestland and, in the process, created a public health crisis. Unfortunately, policy makers in the *krai* have not yet heeded this warning and have failed to act decisively to protect forests in the region. Inappropriate logging has historically led to losses in forest cover, to inadequate forest restoration and soil erosion, and to the destruction of salmon spawning grounds. The Khabarovsk government has had little success in controlling illegal logging or the illegal export of raw logs. Rather, Khabarovsk is known internationally as a center of the so-called Russian timber mafia—elites within the timber industry who manipulate forest-management decisions to their benefit. The region was the first to receive large-scale foreign investment in the timber industry, but environmental groups are concerned about the tactics used to attract this investment and the real possibility that foreign companies will have a major influence on the management of Khabarovsk's forests. The Khabarovsk government is also interested in attracting Chinese companies and workers to develop logging concessions. If this trend continues, it is unlikely that forest management in the *krai* will benefit local communities and residents. Control by foreign companies may make it more difficult to ensure enforcement of environmental regulations, although at this stage this is not clear; Russian firms are currently the main violators.

Khabarovsk policy makers have made some effort toward the sustainable management of forests. In 1999, for example, the regional Duma passed a regional forest law. However, even proponents of the law admit that Khabarovsk Forest Service employees have failed to implement it. Khabarovsk's governor recently issued a decree calling for the gradual abolishment of raw log exports. The decree is laudable, but only time will tell whether it will be implemented, given the Japanese and Chinese desire for raw logs rather than processed timber and the hopelessly outdated wood-processing equipment. The region, of all of those in the RFE, has proceeded most quickly to certify some of its forest operations according to Forest Stewardship Council (FSC) standards, but these remain small in size and largely unsuccessful as they are competing with operations that largely ignore forestry practices codes.

Protecting the remaining old-growth forests in the southern part of the *krai* is critical, as these forests support the highest biodiversity and are the most productive in the region. If protected, they will form a core wilderness complex with neighboring areas in Primorsky Krai to protect the heart of the Sikhote-Alin Mountain Range.

Khabarovsk has gained political clout in major decisions affecting the RFE in recent years and its governor, Viktor Ishaev, is in high favor with President Putin. He sits on the influential Federation Council in Moscow and has persuaded Konstantin Pulikovskiy, Putin's presidential representative, or super governor, to the RFE, to set up his offices in the

city of Khabarovsk. However, Governor Ishaev has come under criticism for his authoritarian, heavy-handed style. Khabarovsk is known as one of the least friendly regions in the RFE to civil society and nongovernmental organizations.

Several other serious environmental and land-use issues are likely to become more prominent in the coming years. Chronic pollution of the Amur River continues to degrade fisheries stocks and damage the health of local residents. So far, scientists in Khabarovsk have been unable to explain significant occurrence of pollution, such as the presence of high phenol levels in fish. As conditions in the Amur worsen, Khabarovsk will need to focus significant attention on restoring this vital watershed.

The Khabarovsk government is also lobbying for the construction of a new pipeline from Sakhalin Island to Komsomolsk-on-Amur to transport oil and gas from the Sakhalin I and II offshore oil and gas projects. Khabarovsk hopes to process the oil in Komsomolsk and reexport the oil and gas to China, and would also like to provide natural gas as an energy source to its own residents. The latter, however, is unlikely because of the significant investment required to modernize Khabarovsk energy systems and the inability of Russian consumers to pay world prices for the oil and gas. The Sakhalin government is opposed to the pipeline proposal and is threatening to stop the oil project outright. The existing pipeline from Sakhalin to Komsomolsk-on-Amur—which transports oil from onshore projects in Sakhalin—is in disrepair and requires extensive upgrading. There are also plans to open up the Shantar Islands and the eastern portion of the *krai* near northern Sakhalin to oil and gas development.

Issues of indigenous land rights are likely to become significant over the next several years. On paper, the Khabarovsk government has approved forty-one Territories of Traditional Nature Use where indigenous peoples are guaranteed participation in land-management decisions. Local officials have, however, never truly provided equal participation. Indigenous peoples in the *krai*, and especially along the lower reaches of the Amur River, have started to organize in order to assert the due process granted under the law.

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Ecology

Boris Voronov, Vladimir Sapaev, Jeremy Tasch

The *krai*, extending almost 1,800 km north to south, is exceptionally diverse in both topography and biogeography. Tundra grows along the northern borders of the region, and broadleaved forests, with unusual subtropical flora and fauna, grow in the south. Mountains cover nearly three-quarters of the *krai*. The largest, and most geographically complex mountain ranges include Sikhote-Alin, Suntar, Dzhugdzhur, Bureya, and Stanovoi. Separating the ranges are large freshwater lakes and alluvial plains, including those of the Tuguro-Evoron, Udil-Kizin, and the Middle Amur. The territory contains approximately one hundred and twenty thousand streams and rivers and close to fifty-five thousand lakes.¹⁵ The largest rivers are the Ussuri, Amgun, Bureya, Uda, Maya, Uchur, Anyui, Khor, and Okhota. Most of the rivers are located within the basin of the Amur, one of the ten largest rivers of the world. Its annual discharge is 227 sq. km, 90 percent of that in the summer.

Much of the *krai* north and west of the Amur River is taiga dominated by Dahurian larch. Dahurian larch, east Siberian fir, and Ayan spruce forests cover the Lower Amur basin. South of the Amur and along the Khabarovsk portion of the Sikhote-Alin Range are rich Korean pine and mixed broadleaved forests. These forests, home to more than 260 species of terrestrial vertebrates and more than 1,400 vascular plants, hold the greatest biodiversity in the *krai*. The Sikhote-Alin Range, in particular, stands out for its biodiversity and endemism. There are close to 1,600 vascular plant and about 290 vertebrate species here. Biotopic diversity is also great, with almost all of the *krai*'s vegetation types represented here. Rivers contain more than thirty-five species of fish. Many plant and animal species are not seen in such quantities anywhere else in Russia.

In total, there are about 2,000 species of vascular plant (terrestrial and aquatorial) and 650 species of vertebrate (including freshwater fish) in the *krai*. Unfortunately, due to years of intensive logging, the forest structure has been damaged and many ecosystems are now degraded.

Ecological imbalance. In the 1950s it became apparent that human depredations were outpacing the land's ability to replenish itself. Despite this, development has continued. In the northern regions, the pace of gold mining and tin ore extraction is increasing. Forests are being logged at an unsustainable rate. Korean pine forests have decreased drastically, and dozens of animals and plant species are threatened with extinction. Poor logging practices have altered the hydrology and temperature of rivers and streams. This, and overfishing in the 1960s and 1970s, has greatly reduced fish populations throughout the Amur basin. Massive timber harvests

have reduced populations of brown bear, Siberian tiger, wild boar, Eurasian lynx (*Felix lynx*), Siberian grouse (*Falcipennis falcipennis*), and many others. In the ten years following construction of the BAM, lynx populations have shrunk by twenty times in most areas, and in some locations the animal has disappeared completely.

Unfortunately, government planners have not created a suitable strategic plan for land use. The biological importance of many regions in the *krai* remains poorly studied. Environmental policy still does not properly regulate how the environment will be used. There are no long-term plans for development in regions that will soon lose their importance as a source of raw materials. One hundred and ten settlements and thousands of roads have been abandoned as intensive logging has exhausted the forests. As present-day land-use policies suggest, these territories have no future until the forests around them regenerate themselves. Considering the ten- to fifteen-year cycle of ecological catastrophes in such areas and the weakened regenerative potential of the forests, it could be many generations before forests reach a stage of regrowth sufficient to justify logging again. Meanwhile, the fabric of the region's ecology is destroyed. In recent years, many serious ecological changes have hit the *krai*.

Ecological disaster areas are constantly developing and broadening, especially around the cities of Komsomolsk-on-Amur and Amursk, in the Lake Evoron region, along the BAM, and around the towns of Urgal, Chegdomyn, and others. Destructive logging, mining, and agricultural practices have damaged the areas adjacent to the Chegdomyn-Uralsky and Badzhalsky industrial complexes, and those around



The rare spotted lady's slipper (*Cypripedium maculatum*) grows in Khabarovsk.

Nikolaevsk, Polina Osipenko, and Lazo. Specific environmental problems include forest fires, watershed pollution by sedimentation and heavy metals, untreated industrial effluents and agricultural wastewater, the destruction of riverine spawning grounds, and an overall degradation of ecosystems to the extent that they are losing their resource-forming qualities. Of special concern is the worsening water quality in the Amur and its main tributaries—the Sungari (in China), Ussuri, Zeya, and others. The construction of new water-treatment facilities in Khabarovsk and Komsomolsk has stopped and existing plants are outdated and insufficient.

The fragility of the *krai's* northern ecosystems makes them extremely sensitive to even minor disturbances. Present environmental problems in these areas are tied to mining, frequent forest fires, and destruction of fish habitat. But, being relatively inaccessible, parts of these far northern regions and some higher-elevation areas have avoided environmental degradation.

Russia's ongoing economic crisis has had mixed effects on the *krai's* environment. Pollution emissions have declined with the reduction and even complete collapse of some industries. In many cases those emissions have been replaced by other forms of pollutant. For example, the region has seen a rapid increase in the number of automobile emissions. Large and long-lasting forest fires in 1998 dramatically affected air quality in most *raions*. The increase in carbon dioxide in Komsomolsky, Amursky, Solnechny and other *raions* continually exceeded 20 million parts per centimeter during this period. The government lacks funding to combat forest fires and oil spills and to introduce new environmentally sensitive industrial equipment and machinery.

Water and air pollution—the Amur River. Ecologically, historically, and geographically the Amur has been a vital life-sustaining and transport artery in the *krai* as well as the wider RFE. Few rivers in the northern hemisphere are as important for biodiversity. According to Russian scientist Vladimir Belyaev, 104 species and 7 subspecies of fish, 18 of which are endemic, inhabit the river, and a diverse array of plants and animals (including several rare species) are found within its floodplains in Russia, China, and Mongolia.¹⁶ Historically, the lives of several indigenous peoples, including the Ulchi, Negidals, and Orochi, have been closely tied to the currents of *Batyuska Amur* (Father Amur). Geographically, the Amur extends 4,400 km and connects the RFE territorially, economically, and strategically with China and Mongolia.

Parts of the river rival other waterways of the former Soviet Union for the unfortunate distinction of being the most polluted.¹⁷ The highest pollution levels are found downstream of the city of Khabarovsk, a result of a combination of household and industrial discharges, agricultural runoff, and landscape disruption in several parts of the vast watershed. Contaminants include organic and bacterial substances and heavy metals. Primary discharge in combination with other

substances forms secondary pollution. Although anyone who consumes fish, especially from the river's lower reaches, is at risk, that risk is particularly acute for the local indigenous peoples who traditionally rely heavily on fish from the Amur.

Surprisingly, the *krai's* industries are not responsible for the bulk of the river's industrial contaminants. Although Russia's economic troubles have impaired many aspects of life across the federation, some regional environments have benefited. Despite reductions, and in many cases the cessation, of industrial production throughout the RFE and the effects of stricter environmental legislation, the condition of Amur has not improved. Russia currently lacks an adequate monitoring system, but from proxy data it appears that the main sources of pollution are located in China.

After pollution levels dropped by 4.2 percent in 1998, they rose, possibly because of increased industrial activity in the Chinese portion of the Amur and Surgyan River basins. Four million Russians live along the Amur; 70 million Chinese live on the other side. Better monitoring and documentation are necessary but not currently possible financially. More collaboration with Chinese researchers and governmental authorities is needed.

As the river delineates 2,900 km of a shared border, a small portion of which is still in dispute, politics, security, economics, and sovereignty are all intertwined in a complex international network of historical biases, contemporary priorities, and ethnic identities, as well as environmental policy. Cooperative ecological programs could permit the other areas of joint concern to be addressed and perhaps encourage economic and cultural ties that would forestall political or security conflicts.



Vladimir Sapaev

The Kaluga sturgeon (Huso dauricus) is the largest, and one of the most endangered, fish species in the Amur River.